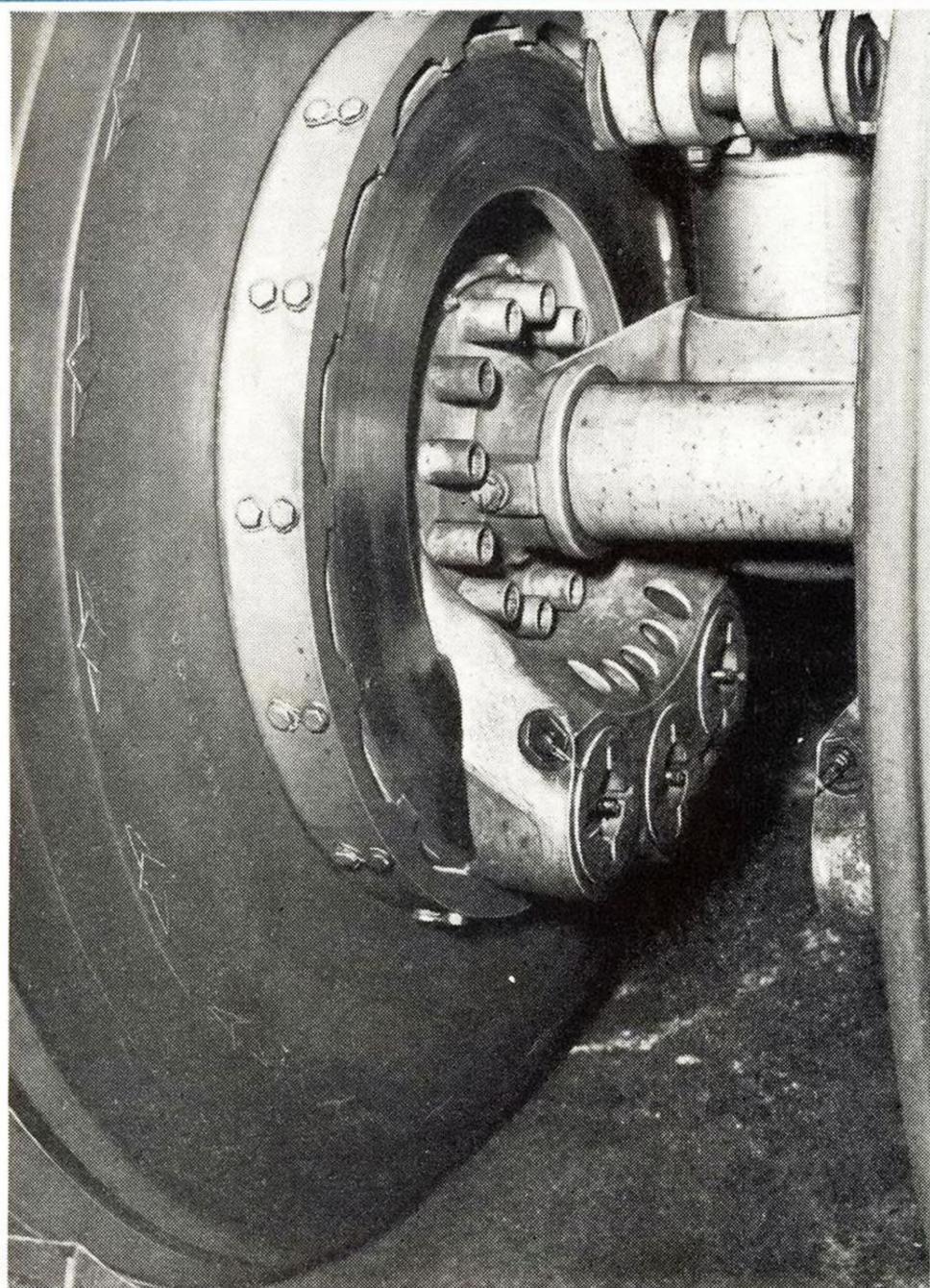


AVIATION WEEK

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APRIL 2, 1951

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Aviation Week



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Another AiResearch first—this system reflects our technical skills and ability to solve problems of unusual difficulty in the field of aeronautics.



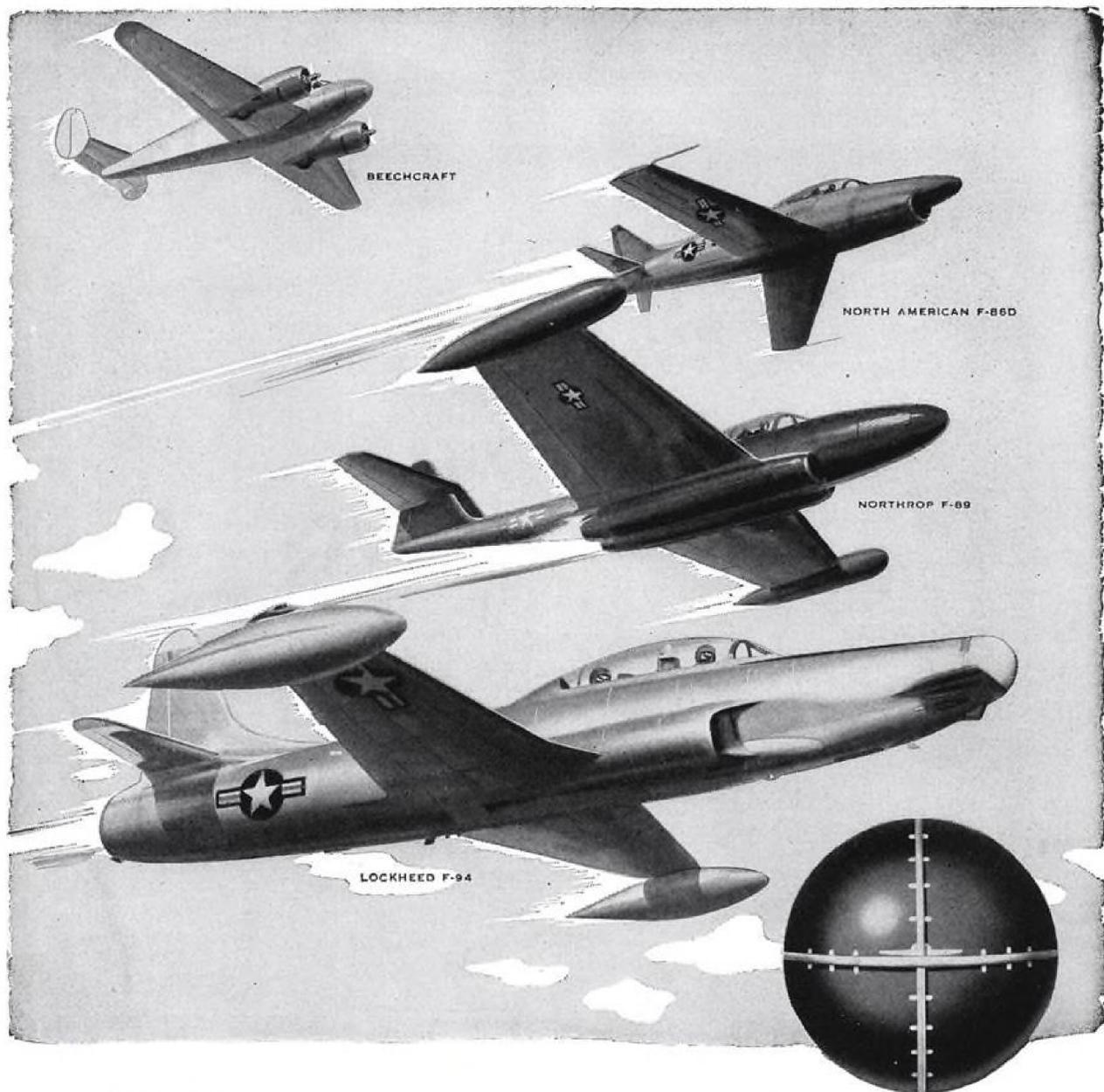
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NEWS DIGEST

DOMESTIC

Shipments of complete civil aircraft came to 348,300 lb. of airframe weight in January, compared with 529,700 lb. for the similar period last year. In the first month of this year, 255 civil planes were shipped, valued at \$4.9 million compared with Dec. 1950's shipments of 305 planes worth \$8 million. Total horsepower of civil airplane engines shipped during Jan. 1951 came to 181,100, while the previous month's was 191,300 lb. Civil engine horsepower shipped in Jan. 1950 was 140,200.

Los Angeles Airways certificate would be extended for seven years and be amended to permit carriage of passengers under recommendation of CAB examiner Ferdinand D. Moran.

Fairchild Engine and Airplane Corp. has received a new Air Force order for C-119 Packets, to be built at the Hagerstown, Md., plant.

USAF Douglas C-124A vanished some 800 mi. off the Irish coast while on a routine flight from the U.S. to Britain carrying 48 passengers and crew of five. Aboard were four SAC Hq. officers; also Brig. Gen Paul T. Cullen, deputy commander of the Second AF, Barksdale AFB. At presstime, no survivors had been located, nor had the cause of the disappearance been determined.

Atomic Energy Commission has officially acknowledged that it is negotiating with GE to develop a nuclear reactor for aircraft. AEC said that the nuclear reactor development would "parallel the development of associated propulsion devices for which the Air Force has previously announced contract negotiations with General Electric." No other details were disclosed.

Kenneth L. Vore, former director for transportation for Los Angeles Chamber of Commerce, has been named director of military traffic service, Department of Defense. He will be responsible for coordination and channeling all air and rail transportation needs of the three military departments. During World War II he was traffic manager for Convair.

Shipment of 231 personal and executive planes during February by ten manufacturers brought \$1,410,000, according to AIA. Export of 32 planes,

valued at \$153,408, during February was made by nine companies.

North American Aviation, Inc. will build AJ-1 Navy attack planes at its new Columbus, Ohio, plant, beginning next year. It now is tooling Columbus for production of Navy FJ-2 fighters.

Dan R. Hudson, Birmingham insurance executive and head of that city's aviation planning board, has been assigned as special consultant to the procurement division in the Office of Small Business, NPA, Department of Commerce. His responsibility will be to organize a field force to work with federal procurement agencies, prime contractors and subcontractors in channeling defense work to small firms.

FINANCIAL

Solar Aircraft Co. reported net sales of \$16,479,810 for the first nine month period ending Jan. 31, 1951. Net income for the same period is listed as \$563,186.

Delta Air Lines has declared a 25-cents dividend payable Apr. 17 to stockholders of record Apr. 3. Company reported net profit of \$376,129 after taxes for January and February, as compared with \$98,248 in same period last year. Operating revenues were \$4,063,379 for the two months, up 37 percent over the same 1950 period. Passenger business was up 49 percent so far this year with indications of even greater gains for March.

Texas Engr. & Mfg. Co. Dallas, declared the regular quarterly dividend of five cents a share on the common stock payable Mar. 31 to stockholders of record Mar. 23.

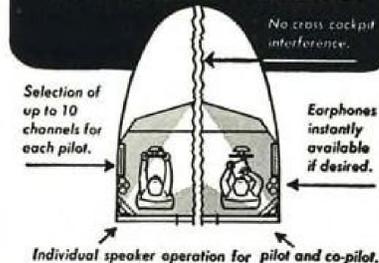
Republic Aviation Corp. reports profit after taxes of \$2,355,006 on an income of \$57,843,076 for the year ending Dec. 31, 1950. Year-end backlog was \$245 million and orders since then have pushed it above \$500 million.

INTERNATIONAL

Lansa (Colombia) DC-3 crashed near Cartagena, killing all 24 passengers and crew of three. Cause was not determined.

Argentine State Airline DC-3 crashed in Tierra del Fuego, Argentine, killing 11 aboard.

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SIDELIGHTS

Speaking of Safety

President Truman told newsmen that, next to the auto, the two most dangerous places in the country were the bathtub and the kitchen.

Air Force

Watch for reshuffling in general ranks about May 1 as USAF moves to scramble some cliques . . . Some amazing designs are turning up at the Pentagon for consideration in the new interceptor competition. The tentative Apr. 2 decision is being set back to May 1. Military sources predict a configuration entirely unconventional by present standards . . . Moody AFB, Valdosta, Ga., World War II basic flight center, was reopened Apr. 1, to base a jet fighter wing.

95-Group USAF: When?

Joint Chiefs of Staff program calls for a 95-group Air Force in being by July '52. Even if the Air Force were given all the money it needs for the build-up tomorrow, it couldn't reach the goal before October '52. Funds to start it off were supposed to go to Congress in January.

But USAF won't get all the money it needs. And what it does get probably won't reach it before June. Top level Defense Dept. & Budget Bureau economizers are holding it up, but having difficulty finding enough "fat" to cut the AF budget back to the size they want. Now, it appears USAF will probably be allowed enough funds to reach a 95-group strength by sometime in 1954.

Navy

Navy is developing Cecil Field, Jacksonville, Fla., as a "master" jet installation. Base will feature dual runways capable of handling fastest as well as heaviest carrier and land-based equipment . . . For the 4th year, Navy will sponsor the 20th annual national model airplane championship meet during week of July 23 at Dallas.

Washington Notes

RFC still keeps all applications for loans secret, despite pressure from the Senate's Fulbright subcommittee, which will push legislation requiring the agency to operate in the open . . . Defense Dept. soon will rescind its ban on publication by the Census Bureau of monthly reports of military airframe shipments by weight, and quarterly shipments and backlog. Decision came after protests by both industry and government aviation groups . . . Plan to give the Commerce Undersecretary for Transportation powers to revamp the entire domestic land, air and water route structure is still a live issue. Hoover Commission recommended it. Legislation introduced by a bi-partisan group of 15 senators last week directs Secretary of Commerce to work out a systematic domestic route plan, initiate actions before CAB and other regulatory agencies to implement it.

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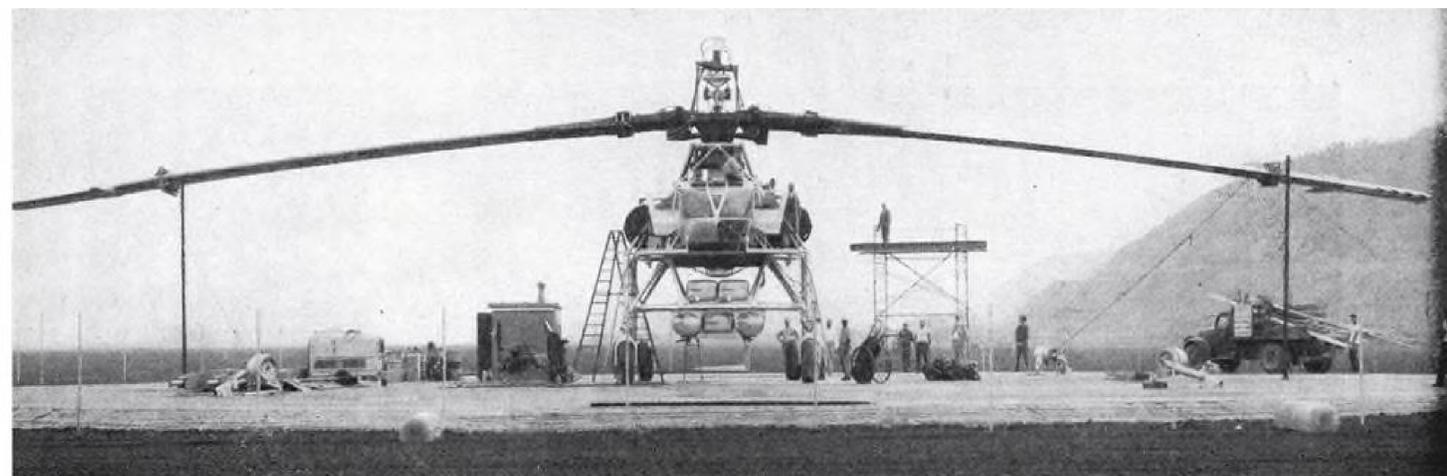
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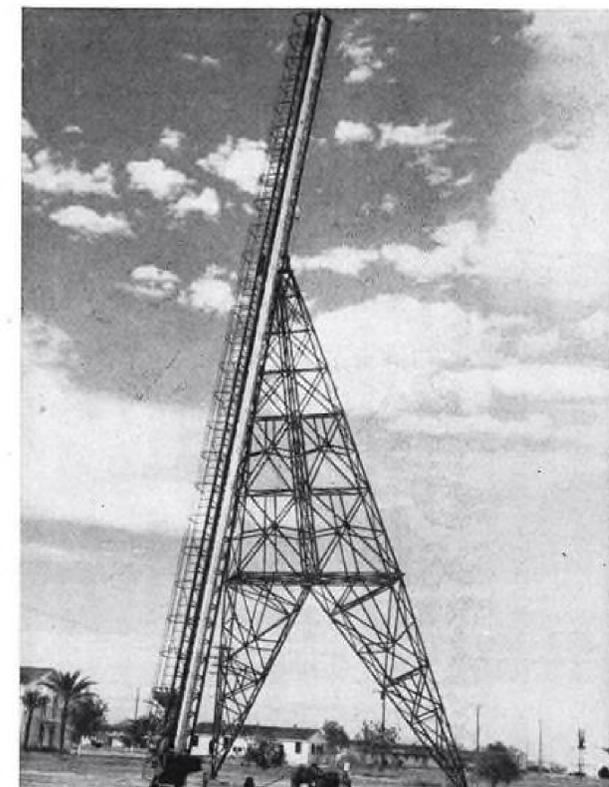
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GENERAL MOTORS CORPORATION
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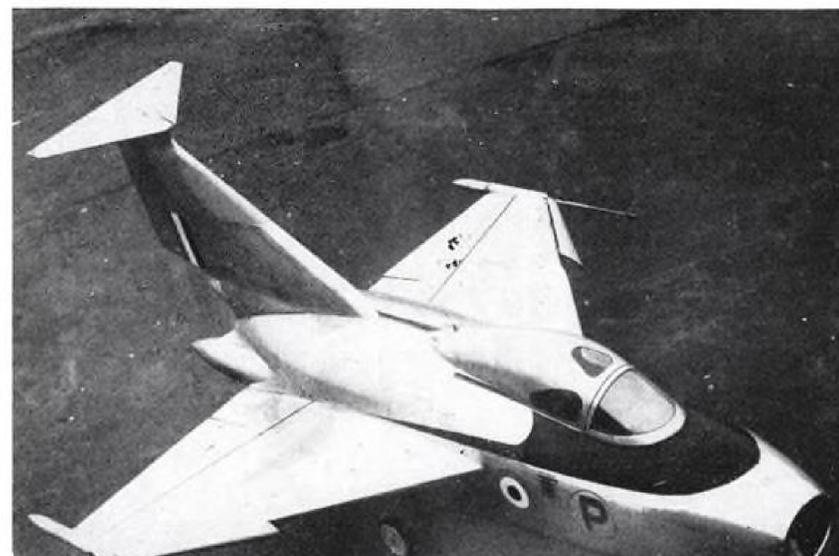
COPTER COLOSSUS—Howard Hughes' giant XH-17 "flying crane," powered by two GE J-35 turbojets, is seen tied down at Culver City. Two-blade rotor spans 136 ft. Still to be added are flight control system, tail boom, horizontal stabilizer, etc., prior to flight test.



IT'S COLD OUTSIDE—One-piece GE electrically heated flying suit tested by AMC is designed to keep airmen warm in temperatures as low as -65 deg. F., be handier than present suits.

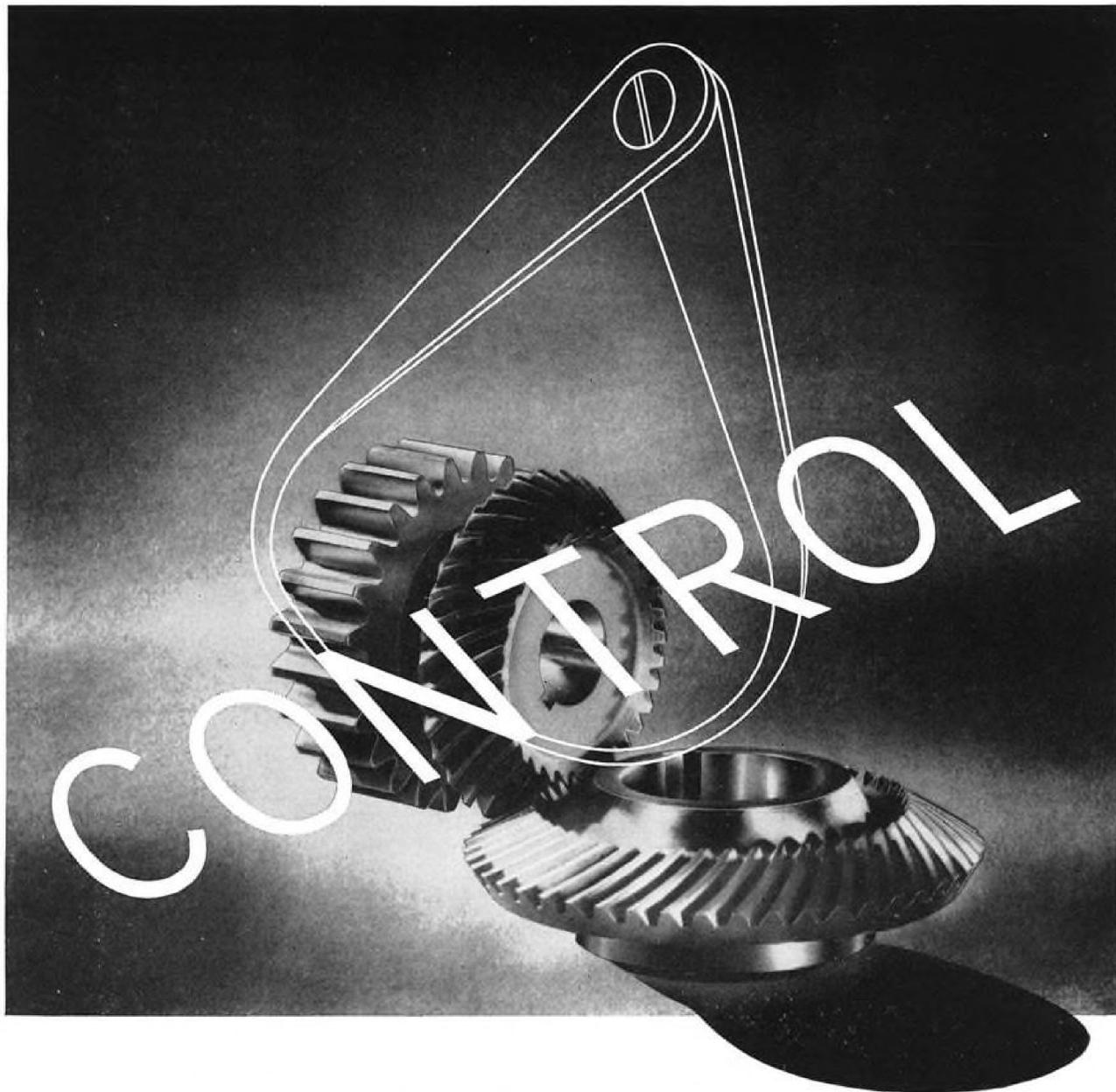


EJECTION TRAINER—This 100-ft. Allis-Chalmers tower to teach AF cadets ejection seat procedure is being used as part of standard training program at Williams AFB, Ariz.



Service Aviation Picture News

THIRD OF A TRIO—Tiny Fairey F.D.1 delta-wing research plane is the third of its type being tested in Britain—the others being the Avro 707B and the Boulton Paul P. 111. The F.D.1 has sweepback of about 48 deg. at the leading edge. The leading edge slats and horizontal tail are temporarily fitted for initial tests. A Rolls-Royce Derwent is the main power source, but the bulges on either side of the fuselage rear may house auxiliary Fairey rocket motors.



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WHO'S WHERE

In the Front Office

R. W. Ryan has been appointed vice president of Canadian Pacific Air Lines. Ryan, who started his flying career with the Royal Flying Corps in World War I, has been executive assistant to the president of CPA since the carrier set up its trans-Pacific services to Australia and the Orient.

James G. Flynn, Jr. has left American Airlines, where he was eastern region operations director, to join Collins Radio Co., Cedar Rapids, Iowa, in an executive capacity. He will familiarize himself with Collins' overall operations prior to a firm assignment. Flynn had been vice president-operations of AOA up to its merger with PAA. While with AOA he assisted in changing the carrier's flying boat uses to landplanes.

Changes

Henry J. Sieradzki, formerly a project engineer with Fairchild Aircraft division has been named chief engineer for Lundy Manufacturing Co., L. I., N. Y. . . . W. H. Dickinson has been appointed director of engineering department of Westinghouse Electric's Headquarters Manufacturing division, and G. P. Longabaugh is new director of the headquarters equipment department.

Robert Monroe has been named director of materials for Marman Products, Inglewood, to succeed E. W. Roche, who retired in February. . . . Harry M. Crandell has been made new Wichita, Kan., area representative for Adel division of General Metals Corp.

Clarence B. Rex, has joined Piasecki Helicopter as controller. . . . Robert G. Bounds has been made divisional superintendent at Glenn L. Martin, and Glenn A. Evans now heads the company's tool manufacturing department.

Honors and Elections



RAMSPECK TAKES THE OATH—Robert Ramspeck, Air Transport Assn. executive vice president, is seen during the swearing-in ceremony attending his new position as chairman of the Civil Service Commission. U. S. Chief Justice Fred M. Vinson officiates at the ceremony. Ramspeck is on a 15-month leave from ATA to handle his new duties; in his former post is ATA General Counsel Stuart Tipton.

INDUSTRY OBSERVER

► First Sikorsky H-19 ten-place helicopter to be sent to Korea will be watched closely by all three services during its combat evaluation, since the big craft has been ordered in quantity by Air Force and Navy and will be bought by Army as soon as the weight limitation on aircraft the Army can buy is washed out. At least one H-19 is due for arrival in Korea very soon and may already be there.

► Official report on the crackup of the Bell Army H-13D helicopter in Korea after which Maj. Gen. Bryant E. Moore died, states that the craft struck a cable while flown at very low altitude, and turned over. Both main and tail rotors were badly damaged, but the cabin was not. Medical report indicated the general's death was due to heart attack possibly induced by shock, but not from injuries suffered in the crash. The report cleared the copter of mechanical malfunctioning.

► Pratt & Whitney's new J-57 turbojet is taking up the challenge of the Allison J-35-A-23 engine for the claim of most powerful American engine (see page 25) with a statement that the J-57 is "superior in power and fuel economy to any other engine known to be in a correspondingly forward state of development" (flight test stage). Both engines are reported to have dry thrust ratings around 10,000 lb.

► Range of U. S. jet bombers is gradually lengthening, as indicated by the newly disclosed flight of a North American RB-45C four-jet bomber from Fairfield-Suisun AFB, Calif., to Honolulu, in 5 hr. 22 min. The flight was made last Sept. 22, but was only recently reported.

► U. S. Dept. of Agriculture scientists have developed a new synthetic rubber, Lactoprene BN, useful for oil seals, fuel tank lining, gaskets, and similar uses where unusual ranges of high and low temperatures are experienced. It keeps its desirable properties at temperatures from 300 deg. F. to minus 30 deg. F., and has good resistance to water, oils, and aging. Principal components are butyl acrylate and acrylonitrile.

► U. S. Air Force and Navy are following up British experiments on reverse pitch propellers for shorter landings for fighters. British tests were made with Spitfires. U. S. tests probably will be made with such planes as Navy Grumman F8Fs, Vought F4Us, and Air Force North American F-51s. An alternative, also being considered for short landings, is the bouncing rubber mat technique which the British also have developed. This has been used primarily for carrier landings with Sea Vampires, but might be adopted for landing fields. In this procedure, a plane minus landing gear drops a landing hook and flops down to a sudden stop on the rubber mat (Aviation Week June 20, 1949).

► The Burnelli lifting fuselage cargo plane model CAM-1, originally built for TACA by Canadian Car and Foundry Co., Ltd. is being demonstrated to Air Force and Army officials around Washington and Ft. Monroe as an all-purpose cargo carrier. It is credited with a payload of 8000 lb. for 1000-mi. range. Demonstration pilot is the veteran transocean flyer Clyde Pangborn.

► Principal U. S. aircraft and engine manufacturers are being queried by USAF as to their space requirements for flight test units at Edwards AFB, Muroc, Calif., in the expanded flight program which is planned there. Indications are that virtually all USAF flight testing will be concentrated there as soon as the base facilities are expanded to meet the additional requirements.

► Typical of some meaningless Air Force security restrictions is one which Allison's general manager E. B. Newill disclosed has been put on his company, setting a ceiling of 5200-lb. thrust as the limit for disclosures of specific engine thrust ratings. Meanwhile competitor companies have been permitted to release much higher thrust ratings for their products. (Pratt & Whitney J-48 is rated at 6250-lb. thrust, and Curtiss-Wright Sapphire J-65 is rated at 7200-lb. thrust.)

Washington Roundup

When Will We Be Ready?

The recent U. N. advances in Korea have taken the steam out of defense mobilization in Washington.

After the big Communist offensive of last November, the general clamor here was for speed in an all-out build-up. Now, the Capitol is thick with delaying debate over 101 aspects of the mobilization program.

There's a fundamental cleavage between Charles E. Wilson's Office of Defense Mobilization and the Joint Chiefs of Staff. It's this:

- Wilson wants the military build-up spread over three years. U. S. would be ready for all-out war by mid-1954. The plan reportedly was "sold" to Wilson by top Administration politicians. At any rate, it pleases them. Spacing the military draw on aluminum, steel, and other basics in short supply over a few years would mean less hardship for consumer, farmer, businessman—and less worries for politicians.

- Joint Chiefs of Staff are insistent on squeezing the build-up into a year-and-a-half, reaching effective fighting strength by mid- or late 1952. This "target date" is based on intelligence reports, indicating when war might be expected.

- **Outlook:** The Wilson plan will win out. Secretary of Defense George Marshall reportedly is ready to give way to his position, and that would cinch it.

It would take another Communist onslaught in Korea, or elsewhere, for Washington, once again, to give top priority to the position of the JCS, observers say.

Air Power's Hotspur

Brig. Gen. Bonner Fellers (ret.) a West Pointer and career Army officer, is seen by many as the guiding hand of the GOP's drive to make political hay over the Administration's intent to "waste the taxpayers' money" on a big build-up of ground forces.

Top USAF officers don't go along with the Fellers thesis—that the U. S. ought to pull in its horns, all but abolish the Army, and rely almost solely for defense on long-range strategic bombing. Top USAF officers, as well as top Naval air officers want to hold Europe as a base for operations and maintain bases around the world—supported by Army contingents. They say this in private, as well as for the record.

A friend of Fellers, who served with him in the last war, said to AVIATION WEEK:

"He soured on Army bungling while serving under MacArthur in the Pacific during the war. He was disappointed at his slow advance in the service. A member of the West Point class of '18, he watched officers of later classes promoted over him. He voluntarily retired, went to the Republican National Committee. His plan for all-out emphasis on strategic air, with secondary emphasis on Naval power, and reducing the ground forces to a small mobile force, saving the taxpayers' billions of dollars annually, clicked there."

Target: Vandenberg

Some Republican senators in the "isolationist" camp are applying rather undignified and un-senatorial epithets to USAF's Chief of Staff, Gen. Hoyt Vandenberg.

They wanted the USAF general to come out against the Administration's plan for the defense of Western Europe—which includes a small contingent of U. S. land forces there. They wanted him to advocate complete defense reliance on strategic airpower. He didn't. No, Vandenberg told the Senate Foreign Relations Committee, strategic air as well as over-all U. S. defense would be the better if Europe were held on our side.

But he didn't miss his chance to plug air power in his public appearance. He thought it ought to be built up faster and higher. But this didn't satisfy the Republican statesmen.

Commented one Republican leader: "If 'Billy' Mitchell ever heard that prissy endorse a land contingent to Europe, I am sure he would turn over in his grave. What's the matter with the Air Force? Why don't they have any Mitchells anymore?"

Air Support to Europe

Prospect is that USAF will supply substantially more support to Western Europe than the Army with its six divisions. The present ratio is one tactical air group to each Army division.

USAF's Lt. Gen. Lauris Norstad is now surveying the situation in Europe. His preliminary reports are that substantially more than six air groups will be needed to repair the lack of air power on the Continent. European nations that can equip ground divisions will require U. S. air groups for their tactical support.

Investigations

- **International mail pay.** There's going to be a big showdown behind closed doors of Senate Appropriations Committee soon on mail pay to international carriers.

The 1951 fiscal year Post Office Department appropriation bill, passed by the House last week, is now before the group. The new chairman of its subcommittee on Post Office, Sen. Harley Kilgore, is convinced international airlines—Pan American World Airways, in particular—are "walking off with the Federal Treasury." He is going to insist on getting all the facts.

Worry of some airline people is that in doing this, he may branch out into matters far from Post Office Department mail payments. He may lead into the payments to Pan American for building "military" bases in South America during the last war. The cloak of security has been kept tightly closed over this.

- **CAB friends and their influence.** Sen. William Fulbright thinks there ought to be an investigation of how friends and political contributions influence CAB and other quasi-judicial agencies in Washington.

The objective of the investigation: legislation setting up a code of ethics for members of the agencies.

But Fulbright, whose investigatory job on Reconstruction Finance Corp. may have set him in the Democratic doghouse politically, doesn't want to do it. He has recommended that "an outside commission of private citizens" be appointed for the unpleasant task.

The Republicans are determined that there's going to be an investigation. They'll clamor for it. As the truth dawns that several top Republican Senators might figure prominently in it, however, observers think their clamoring will probably dwindle. —Katherine Johnsen

Funds Cut Threatens All-Weather Program

Military and CAA asking that ANDB's 1952 budget be slashed by \$5.3 million.

Air Force, Navy, CAA and Army this week will send the House Appropriations Committee a revised and sharply cut fiscal year 1952 budget for the Air Navigation Development Board. Because of the cut, most development work on the all-weather common system of navigation, landing and traffic control is being held up by these agencies to assure all-out research and development effort on short-term military electronics projects.

The slash has chopped the ANDB part of the Commerce Department to \$3.2 million from its original figure, \$8.5 million, a reduction of \$5.3 million.

This represents a cut of approximately two-thirds of the research and development projects, put in effect by joint action of top level Air Force, Navy, Army and CAA officials.

Observers close to the Board's activities are fearful that the curtailment may set a precedent for similar future actions thus destroying the effectiveness of the Board as an overall technical controller for a common military-civil aviation system of navigation and landing aids. ANDB has at times killed various service projects in favor of others the group itself thought superior.

- **Temporary Move Seen**—However a high CAA source states that there is no intent to make the curtailment of ANDB's program permanent, and that its services as a coordinator of research in the air navigation and traffic control field are fully recognized by the federal agencies. This is the favorable interpretation.

Under the worst interpretation, this could mean that Air Force, Navy, Army and CAA will take over independently on their own navigation and control research projects, driving off in four separate directions, with the wasteful duplication which ANDB was established to prevent.

Just what happens to the ANDB technical staff in the shakeup that is going on is a good question. All of the staff came to ANDB from industry. Most of them are looking back toward industry again.

Meanwhile the ANDB, which by consent of the four government agencies, has held a unified control of research

and development for air navigation and control for the last two years, could become just another subordinate federal agency without the independence of action which has made it effective.

It is understood that part of the slash came because the ANDB project list duplicated, at least in part, some of the classified military projects which were being given high priority, but had only specialized applications. Research on these projects, however, it is understood, would have definite eventual application to some of the ANDB projects.

- **Not Abandoned**—The high CAA source stated that the ANDB program was far from being abandoned, and that it was rather an emergency delay, caused partly because of more urgent needs for available research facilities.

On the other hand, it has been pointed out that the entire ANDB program originally planned for fiscal 1952 would amount to only \$8.5 million or less than one percent of 1951 military aviation electronics commitments of over \$1 billion. It is further observed that the whole ANDB program for all-weather flying has definite military application.

For months it had been expected that military agencies would call for more emphasis on research and development projects with immediate application to military needs at the expense of the non-military projects.

But ANDB staff members are reportedly seething over the fact that they were not consulted in making the cuts. And because they had no say, the residue of projects still authorized has little or no continuity as an overall program, some observers feel.

- **Nyrop Proposals**—CAA Administrator Donald Nyrop made the actual proposals for the item-by-item slash which is now ready to go into effect, at a recent meeting of top-echelon representatives of the military services and CAA. The Nyrop proposals were reported as "right down the line" with the desires of Air Force and Navy, as to which projects were too long-term, or were not essentially military. Yet analysis of the total list of projects (see next page) indicates instances where short-term projects were dropped and long-term proj-

ects were kept, and other instances where Air Force and Navy projects were canceled. Yet strangely enough, not one of the CAA sponsored research projects lost a dime in the curtailments.

A possibility remains for salvaging the overall ANDB program—if a top Defense Department official steps in, or if Congress comes to the defense of the ANDB concept because of its economy features which limit duplication of research and development among the services. Deputy Secretary of Defense Robert Lovett, who has been advised of the blowup, is now reportedly examining the situation.

In the leaner years, when Air Force and Navy were short of research funds, they welcomed the idea of joint participation with civil aviation agencies in the long-term technical program for all-weather flight, financed by a single congressional appropriation.

- **Through Budget Bureau**—The appropriation goes through the Bureau of the Budget, and then to Congress as a part of the Commerce Department appropriation, since Commerce Department acts as the housekeeper for ANDB.

But this time, in an unusual procedure, high level representatives of the four agencies met in February and prepared the list of cuts in projects, which was later presented to ANDB as an accomplished fact, without recourse by the working level members or the research staff of the Board. In effect ANDB was given a directive to submit the curtailed program as its budget request for 1952 fiscal year.

Sitting in on the top level deciding conference besides Administrator Nyrop were Harold C. Stuart, Assistant Secretary of Air Force, John F. Floberg, Assistant Secretary of Navy for Air, and A. S. Alexander, Undersecretary of Army.

Members of the ANDB are: Col. S. A. Mundell, USAF; Col. W. B. Larew, Army; Capt. C. G. Miller, Navy, and J. E. Sommers, CAA.

Technical staff of ANDB is headed by Dr. Douglas H. Ewing, director of development, crack RCA engineer brought in to run the program under a special defense Department Research and Development Board classification. Key members of his engineering staff include: Norman Caplan, J. Wesley Leas, Laverne R. Philpott, Maxwell K. Goldstein and Henry R. Senf, all of whom came to the board from private industry.

Proposed Changes in ANDB Program

ANDB NO.	PROJECT TITLE	CONTRACTOR	STATUS		PROJECT TITLE	CONTRACTOR	STATUS	
			FY 1951	FY 1952				
1.1	Study of airport time utilization techniques	Cornell	Completed*		6.5	Procurement of shipboard VOR antenna for evaluation	Navy	Completed
1.2	Development of airport time utilization equipment	CAA-TDEC	Kept	Terminated**	6.6	Navy participation in ANDB evaluation projects		Canceled Canceled
1.3	Study of regularization of air traffic	Cornell	Completed		7.1	Study of propagation in the 900-1600MC region	BuStandards	Canceled Canceled
2.1	Development of R-Theta transponder and associated components	Navy	Completed		7.2	Development of aircraft antennas	Navy BuAer	Canceled Canceled
2.2	Development of ultimate program interrogating radar and transponder	Navy	Canceled	Canceled	7.3	Development of 1000MC Ground master oscillator power amplifier transmitter	Army Sig. C.	Completed*
4.1	Study of applicability of simulation to investigation of air traffic control problems	Franklin	Completed		7.4	Study of circular polarization on X-band	Air Force Watson	Completed
4.2	Analysis of technical parameters affecting development of future aids to air navigation and traffic control	Cornell	Canceled	Canceled	7.6	Development of 1000MC receivers and test equipment for propagation research	BuStandards Polytechnic Res. & Dev. Co.	Completed
4.3	Study for analytical formulation of the air traffic problem	MIT Res. Lab.	Completed		7.7	Development of moving indicator		Kept
4.4	Meteorological forecasting investigation for improving the prediction of airport acceptance rates	Weather Bur. & Garbell	Terminated***		7.8	Development of 1000MC airborne transmitter	Army Sig. C.	Canceled
4.5	Development of traffic control computers		Not Scheduled	Canceled	7.11	Study of Radio Meteorological phenomena	Navy	Kept Canceled
4.6	The application of computers and simulators to investigation of air traffic control problems	Franklin	Completed		8.1	Study of Airport surveillance primary radar	Air Force	Completed
4.7	Investigation of information devices		Canceled	Canceled	8.2	Development of alstar model	Gen. Elec.	Kept
4.8	Aircraft and communication measurements	Franklin	Kept	Kept	9.1	Development and test of directional VHF localizer array	CAA-TDEC	Completed
4.9	Development of transition track-while-scan mechanisms		Kept	Kept	9.2	Development and evaluation of flare-out landing airspeed control and purchase of automatic recording equipment for automatic flight controller mark III	Air Force AWFDF Sperry	Kept Canceled
4.10	Development of improved air traffic control communications		Kept	Uncertain****	9.3	Development of improved flare-out altimeter	Air Force C&N	Kept Canceled
5.1	Development of Airport Surface detection equipment (ASDE)	Air Force Watson	Kept	Kept	9.4	Development of traffic control modifications to par-1	Air Force Watson	Completed
6.1	Omni-bearing distance evaluation program	Air Force AIL	Completed		9.6	Development of experimental measuring apparatus for ultimate par	AIL	Kept Completed
6.2	Terminal aids evaluation center	CAA-TDEC	Kept	Kept	9.7	Development of automatic nose wheel steering control system	Air Force	Kept Canceled
6.2.0	Evaluation of Navascreen	CAA-TDEC	Completed		9.9	Procurement of an automatic PAR model for evaluation	Air Force Gilfillan	Completed
6.2.2	Evaluation of standard airport surveillance radar	CAA-TDEC	Kept	Kept	9.10	Procurement of an Engineering model of a six-channel A PAR	Air Force Watson	Completed
6.2.3	Evaluation of Airport Surface detection equipment (ASDE)	CAA-TDEC	Kept	Kept	9.11	Study of ultimate program PAR system	Air Force	Canceled Canceled
6.2.4	Evaluation of R-Theta transponder and associated ground components	CAA-TDEC	Kept	Kept	9.12	Development of the magnetic guidance system	AF AWFDF	Kept Uncertain
6.2.5	Evaluation of pictorial computers	CAA-TDEC	Kept	Kept	11.1	Development of a long-range program for human engineering research concerning air navigation and traffic control	Natl. Res. Council	Canceled Reduced 1/2
6.2.6	Evaluation of air traffic control communications	CAA-TDEC	Kept	Kept	11.2	Development of visual data relay equipment for evaluation purposes	Air Force RCA	Completed
6.2.7	Evaluation of air traffic control displays	CAA-TDEC	Kept	Kept	11.3	Development of bright-tube displays		Completed
6.2.8	Consultants for terminal aids evaluation center	CAA-TDEC AIL	Kept	Kept	13.1	Integrated & individual displays	CAA-TDEC	Kept Completed
6.3.1	Evaluation of VHF ILS with modifications and additions	Air Force	Kept	Reduced 2/3	13.4	Development of storage tube for DME searching	Army Sig. C.	Canceled Canceled
6.3.2	Evaluation of ILS-altimeter flare-out	Air Force AWFDF	Kept	Reduced 2/3	13.5	Development of airborne antenna R-F switch for DME	Air Force C&N	Completed
6.3.3	Evaluation of 1000MC. and 5000MC. ILS	Air Force	Canceled	Canceled	13.6	Investigation of long-distance navigational systems		Canceled Canceled
6.3.4	Evaluation of "Split" PAR	Air Force AWFDF	Kept	Reduced 2/3	...	Airport & approach lighting		Canceled Canceled
6.3.5	Evaluation of PAR	Air Force AWFDF	Kept	Reduced 2/3	13.8	Study of ultimate program Rho-Theta navigational system		Canceled Canceled
6.3.6	Evaluation of automatic precision approach radar (apar)	Air Force AWFDF	Kept	Reduced 2/3	13.9	Development of miniaturized DME interrogator		Kept Completed
6.3.7	Evaluation of Doppler range and azimuth monitor	Air Force AWFDF	Canceled	Canceled	13.10	Development of light-weight DME interrogator		Kept Completed
6.3.8	Evaluation of new VOR antennas	Air Force AWFDF	Kept	Reduced 2/3				
6.3.9	Evaluation of new R-Theta equipments	Air Force AWFDF	Canceled					
6.3.10	Evaluation of improved flare-out components, including improved altimeter, speed control, and runway guidance	Air Force	Kept	Reduced 2/3				
6.3.11	Evaluation of airborne displays including pictorial communications, storage tube(s), and integrated displays		Kept	Reduced 2/3				
6.3.12	Consultants for navigational aids evaluation center	AIL	Kept	Reduced 2/3				
6.4	Procurement of VOR gage-type antenna for evaluation	Air Force Federal	Completed					

FOOTNOTES:

- *Project is either finished or will be using fiscal year 1951 money already transferred from ANDB to services.
 - **Will probably be shot off at end of FY 1952.
 - ***Shut off in 1951—might have continued.
 - ****For airport surface navigation (not detection) equipment—a long-term project.
- Cornell—Cornell Aeronautical Laboratory
Franklin—Franklin Institute
Garbell—The Garbell Research Foundation
AIL—Airborne Instruments Laboratory
Federal—Federal Telecommunications Laboratory
Watson—Watson Laboratories (AF)
TDEC—Technical Development & Evaluation Center (CAA)
AWFDF—All Weather Flying Division (AF)
C&N—Communications and Navigation Laboratory (AF)

Gaps in Aviation Safety Research . . .

Survey by the Aviation Safety Center at Cornell University indicates that despite more than 600 research projects on aviation safety now being carried on by various research agencies, there are gaps to be filled by additional work in the following areas:

- **SERVICE TESTING TO IMPROVE THE RELIABILITY** of aircraft accessories and equipment, particularly electrical and electronic accessories, at a center or two or more coordinated centers, serving all aircraft manufacturers.
- **INSTRUMENTED CRASH TESTS IN MILITARY, transport and personal aircraft** to determine vertical and side loads and forward decelerations. Tests should simulate actual conditions with seats, dummy crews, instruments and equipment, to determine progressive disintegration of structure, and establish load criteria for design of seats, belts, shoulder harnesses, and strengthening of cockpit or cabin structure.
- **ADDITIONAL RESEARCH ON CONVERTIBLE** aircraft combining vertical takeoff with horizontal flight and its possibilities for personal aircraft.
- **PREPARATION OF A HANDBOOK ON AIRCRAFT** hydraulics and pneumatics including a section on safety measures necessary with installation of such equipment, similar to AIA handbooks on air-

craft electrical installations and aircraft fire protection.

- **IMPROVEMENT OF METHODS NOW BEING** used for distributing weather reports to off-airline points and the nation's small airports.
- **IMPROVED SHORT RANGE FORECASTING** and more complete visibility information, to discover hazards existing in the airport area that are not now revealed by instruments in the tower.
- **ALL-WEATHER LANDING AIDS FOR PERSONAL** aircraft, with study of automatic control from ground, utilizing military automatic guidance equipment developed for missiles.
- **COORDINATING STUDIES RECENTLY COMPLETED** on military pilot training methods, using flight simulators and training aids, and navigation training equipment, to improve both military and commercial pilot training.
- **ACCELERATION OF RESEARCH TO DETERMINE** ability of pilot and crew to function in emergencies under varying degrees of mental stress or fatigue.
- **GREATER USE OF ADVANCED STATISTICAL** analysis methods and computers to determine significant factors and uncover trends and cycles in accident analysis of research and operational data.

Center Aims to Make Air Travel Safest

Guggenheim group calls together civil and military aviation officials to coordinate safety research.

By Alexander McSurely

How can aviation be made the safest form of transportation?

That is the large-sized question which the new Guggenheim Aviation Safety Center of Cornell University has taken as its objective.

Last week the center called together in Washington top U. S. civil and military aviation officials interested in safety to start a coordination of research programs—a quest for gaps in present aviation safety research—to make possible future higher marks in flying safety.

That is not saying that today's aviation safety record isn't excellent overall. But it can still be improved much further, the Aviation Safety Center points out.

► **Steady Improvement**—Take a look at the progress in sight in improving air transport safety in recent years: using the common yardstick of the number of fatalities per million passenger miles for the domestic scheduled airlines you find: in five-year periods since 1930 the figure has shrunk, progressively, from 15, to 6.1, to 2.4 to 1.8, to 1.3 in 1950.

Then if you examine over-ocean flying you find that its record is better than that of surface ocean vessels, by the same yardstick, with a perfect score for the year 1949.

To go further: to ride a domestic, scheduled airline in 1950 was twice as safe as traveling by private auto, but only one sixth as safe as train or bus travel.

Unfortunately, records for the non-scheduled and irregular air carriers are not so good, and personal flying safety records are definitely open for major improvement. The Guggenheim center's frank and factual analysis finds a record of 30 to 40 fatalities per million occupant miles for personal flying compares with the fatality record of the horse and buggy rider of 1909.

► **600 Safety Projects**—The Washington conference at National Advisory Committee for Aeronautics headquarters disclosed that more than 600 non-classified research projects aimed at making flying safer, are already underway in this country, in addition to other projects which have been classified secret.

Harry F. Guggenheim, president of

the Daniel and Florence Guggenheim Foundation, established the safety center last September, "to foster improvement of aviation safety by research and education." Key operational heads of the center are Dr. T. P. Wright, former CAA administrator, now acting president of Cornell and Chairman of the center, and Jerome Lederer, veteran aviation safety engineer and director of the center.

A greater emphasis on safety in aircraft designing will be sought by the center through influencing the aeronautical engineering courses in U. S. universities, and technical schools. The several Guggenheim-endowed schools, which are among the principal engineering schools of the country are expected to take the lead in this new engineering educational trend, with an ultimate far-reaching effect on tomorrow's aircraft designs.

The center will prepare material for student engineers, and will press for the inclusion of a new course in human engineering for all aeronautic student engineers. Additional safety data for technicians in the aviation industry will be prepared to show good safety design practices.

Director Lederer has already made about 15 talks on the program in this country and in Canada, and is sched-

uled to talk in England, before the Royal Aeronautic Society next September. An aim of the Guggenheim foundation is to make the work of the center international in scope, improving aviation safety wherever planes fly. Also a primary objective, Lederer points out, is to make the whole program a cooperative project with the aviation manufacturers and operating companies, schools and research centers.

First project in "promoting awareness of aviation safety by information exchange" was a comprehensive survey of existing aviation safety research projects, aimed at determining where the gaps were that needed further research attention.

Initial report, dated Jan. 1, was compiled after study of current projects of Air Force, Navy, Army, Coast Guard, CAA, CAB, NACA, Bureau of Standards, Weather Bureau, National Research Council, ICAO, Aircraft Industries Assn. and Air Transport Assn., and coordination with the Defense Department's Research and Development Board. Other groups used as sources for projects included aviation manufacturers and suppliers, scheduled airlines, schools, industrial laboratories, and privately financed research units.

►Some of the Gaps—Analysis of some of the gaps in existing research called for projects such as: crash research in full-sized robot-controlled airplanes with dummy crews and passengers, new test centers for improving reliability of aircraft accessories and equipment and automatic guidance for personal planes patterned on military controls for guided missiles.

Taking a look at some of the aviation research projects now underway you find such things as: Texas A & M's research project to develop information for complete lateral control at and near the stall point of an airplane; NACA's compilation of data from commercial transports on airspeed, altitude and normal acceleration in relation to experiences with gusts; CAA studies on emergency procedures in event of explosive decompression of pressurized cabin aircraft; Cornell University's automatic collision warning indicator, and the famous Cornell "thin man" project studying the motion patterns of human bodies during crash decelerations.

This gives an idea of the magnitude of the task that has been given the new organization at the outset.

All in all, the report of the first survey contains more than 1500 entries on the research projects, since the projects are catalogued under more than one general subject, if they are pertinent to more than one. Standard aeronautical indexing system, used for the Air Technical Index, Central Air Documents office, and Institute of the Aeronautical Sciences, is employed for the listings.

Our Expanding Industry . . .

Kaiser-Frazer Corp. is doubling the manufacturing space of its Oakland (Calif.) Aircraft division with a new one-story plant containing about 50,000 sq. ft. When the new facility is in operation late this summer, about 500 will be employed on subassemblies of Lockheed's P2V Navy patrol bomber. . . .

Buick division of General Motors is starting construction of a new building to be used in manufacturing the J-65 Sapphire jet engine. . . .

Hiller Helicopters has rented additional manufacturing space at Redwood, Calif., to bring its space from 38,000 to more than 60,000 sq. ft. Before the year is out, more expansion will push the area above 100,000 sq. ft. Growth is made necessary by new orders from the Air Force for the H-23 evacuation copter, and from the Navy for the HTE training machine which bring Hiller's backlog to \$18 million. . . .

Rheem Mfg. Co.'s aircraft division has signed a new subcontract with Lockheed, this one for components of the P2V-6. Lockheed also has increased its contracts with Rheem for sub-assemblies of the T-33 jet trainer and F-94 all-weather jet fighter. Rheem is opening a new plant at Downey, Calif.

Additional aviation safety surveys will be conducted by the center, acting in its principal function of clearing house for aviation safety information, and it will also encourage additional research projects to solve safety problems that are not now being attacked by researchers.

Headquarters for the Guggenheim Aviation Safety Center has been established at 2 E. 64th Street, New York, in space made available to Cornell University by the Institute of the Aeronautical Sciences.

Following are the foundation committee, and the executive committee for the center:

• **Foundation committee:** Harry F. Guggenheim, Chairman; Vice Admiral John H. Cassady, Deputy Chief of Naval Operations (Air); General J. Lawton Collins, Chief of Staff U. S. Army; Dr. Jerome C. Hunsaker, Chairman, National Advisory Committee for Aeronautics; Donald W. Nyrop, CAA Administrator; Vice Admiral Merlin O'Neill, Commandant, U. S. Coast

Guard; Delos W. Rentzel, Chairman, CAB; General Hoyt S. Vandenberg, Chief of Staff, U. S. Air Force; Dr. T. P. Wright, Acting President, Cornell University; Dr. G. Edward Pendray, Consultant; Jerome Lederer, Safety Center Director.

• **Executive committee:** Dr. Wright, Chairman; Jerome Lederer; Major General Victor E. Bertrandias, Deputy Inspector for Technical Inspection and Flight Safety Research, Norton AFB; John Chamberlain, Director of Safety Regulations, CAB; J. W. Crowley, Associate Director of Research, NACA; Dr. C. C. Furnas, Director, Cornell Aeronautical Laboratory; Major Gen. James Gavin, United States Army; Ernest Hensley, CAA Director of Aviation Safety.

S. Paul Johnston, Director, Institute of the Aeronautical Sciences; Dr. Richard Parmenter, Coordinator of Research, Cornell University; Capt. W. B. Scheibel, Executive Assistant, Search and Rescue Agency, U. S. Coast Guard; Dr. W. G. Smillie, Professor of Public Health and Preventive Medicine, Cornell Medical College; Commander William G. Von Bracht, Head of the Flight Safety Branch DCNO-Air, Navy Department.

Electronic Production Board Established

An Electronics Production Board which will be responsible for over-all coordination of work in that field under the mobilization program has been established by Production Administrator W. H. Harrison.

The new board is charged with determining the total requirements—military, civilian and foreign—for electronic products and is to recommend methods for their distribution.

The EPB, in addition, will establish policies and procedures for insuring required production, including production-facility expansion, conservation and standardization of products.

Administrator Harrison, in announcing the new board's establishment, said, however, that National Production Authority will still remain the principal point of contact for the electronics industry on questions relating to components, production, materials and supply. Similarly, he pointed out that procuring agencies, including the armed forces, and the Atomic Energy Commission will remain the prime points of contact for their contractors.

Harrison said that the use of electronic devices has grown to such huge proportions in equipment for defense, machines of industry, and for communication facilities that any failure to develop and produce electronics on schedule could hamper mobilization.



WORLD'S LARGEST PLANE, Hughes flying boat, as it was being prepared for flight a few years ago, a scene shortly to be repeated.

Hughes Boat Being Prepared for New Flight

By Ben S. Lee

The world's largest airplane, Howard Hughes' eight-engined flying boat, which hasn't flown for three and a half years, is now being groomed for new flight tests scheduled to start in May.

West Coast sources say the big plane has been hangared on Terminal Island, Long Beach Harbor, Calif., behind locked doors under a top-secret status imposed by Hughes for approximately a year.

► **Atom-Powered Prototype?**—There is some speculation that the big wooden plane might be advanced as a prototype for an all-metal atomic-powered flying boat. Top civil-military authorities predict that the first atom-powered aircraft will be about the size of the Hughes craft, and that a flying boat would make a convenient vehicle to carry an atomic engine. A flying boat, these authorities point out, could land and take off in areas where large population groups would not be endangered.

The huge seaplane which was first designated the HK-1 (and unofficially nicknamed the "Hercules") has cost the U. S. government some \$18 million in addition to approximately \$17 million of Hughes' own money.

Howard Hughes is currently spending approximately \$300,000 each month on the flying boat. Since its first flight, Nov. 2, 1947, Hughes has spent almost \$10 million on the installation of a new electrical engine control system, various modifications and special tests.

During its 42-month dry-dock modification period, its original assembly cradle has been removed and a new

articulated cradle has been substituted section by section. The new cradle, believed to be the first of its kind, uses a pivot principle. It is adjustable to any angle determined by the plane's exact center of gravity, eliminating the placing of tremendous pressures on points of the hull and permitting safer and faster launching and docking.

Also the original canvas-covered hangar structure has been replaced by a more permanent metal structure.

► **Plywood Construction**—Built entirely of Duramold processed plywood, the HK-1 probably is the outstanding example of wood aircraftmanship, and very possibly the last massive all-wood plane that will be built. Despite much public controversy, a company official declared, the flying boat was completed at a cost per pound less than that of any other large experimental plane in recent years.

Constructed of laminated wood, according to World War II contract terms which specified non-strategic materials, glue used in the original bonding process presented considerable problems. Eventually these difficulties were surmounted by use of diathermy, tapping very high frequency electrical currents through the wood, and special glues. Hughes officials have stated, however, that, if the HK-1 is ever duplicated, it would be of metal.

► **Specifications**—The plane has a wing span of 320 ft. 6 in.; hull length of 218 ft. 6½ in.; height from bottom of hull to top of vertical fin 79 ft. 3¾ in. Indication of the plane's tremendous size is the fact that root chord of the wing is 51 ft. 9¾ in., and wing root thickness is 11 ft. 6 in. Tip chord is 19 ft. 7¼ in.

The Hughes flying boat is powered by eight Pratt & Whitney Wasp major engines developing 3000 hp. each. It was recently reported that new Pratt & Whitney 4360 engines were installed in the flying boat, upping the total horsepower from 24,000 to 28,000 hp. A company spokesman said however that no engine changes have been made although Hughes would be interested in larger powerplants when more powerful engines become available.

Current power packs are contained in conventional nacelles mounted on the leading edge of the wings.

Study has been given, however, to burying more powerful engines in engine rooms in the huge wings with extension shafts to props. If the engine room plan were adopted in future development of the flying boat it would mean that only the props would be exposed. This would greatly cut down nacelle drag and at the same time would permit possible coupling of two engines for greater horsepower or thrust rating.

The plane has a gross weight of 300,000 lb. Performance specifications called for a top speed of 218 mph., cruising speed of 175 mph., and a cruising range of 3500 mi., with a 65 ton payload cargo. Used as a hospital evacuation plane the HK-1 could accommodate 350 litter patients and necessary complement of attendant medical personnel.

► **Three Ordered Originally**—The development started under auspices of the U. S. Maritime Commission as a means to eliminate the menace of submarines against surface shipping. The original Hughes contract ordered construction

of three flying boat production prototypes. Reconstruction Finance Corp., through its subsidiary, Defense Plant Corp. agreed to back the project to the extent of \$18 million.

Negotiations with Hughes Aircraft Co. and Henry Kaiser Shipping Corp. were entered into by Maritime Commission and Defense Plant Corp., neither of whom were entirely qualified as expert on aircraft development costs, in 1942. According to DPC, it was intended that the \$18 million represent the gross development costs for not only actual plane construction but for facilities built in that connection.

Air Force and Navy, not entirely happy with the whole idea to begin with, finally agreed that they would lend whatever technical assistance was necessary or requested in the project. In 1944, when the World War II balance swung in favor of the Allies and aircraft production was cut back, both services pulled out of the Hughes-Kaiser venture. Maritime Commission then ordered the original three-plane production prototype contract revised downward to one experimental aircraft and stepped out of the picture.

Henry Kaiser, seeing no immediate mass production in store for the plane likewise bailed out leaving Howard Hughes and RFC with an \$18-million-dollar headache. At that time some \$13 million had been obligated by RFC and the difference committed.

► **One Flight**—On its first flight Nov. 2, 1947, the plane was airborne at an indicated speed of 80 mph., and at weight of 276,000 lb. It carried 2000 gal. of gas in its 14,000-gal.-capacity tanks. During its first and only flight so far, the plane reached a speed of 94 mph. before touchdown in the waters of San Pedro Bay which is near Los Angeles.

Recent suit entered by Hughes Aircraft Co. against RFC to recover approximately \$2.5 million spent in connection with the flying boat development actually seeks clarification of early negotiations in the 1944 contract revision.

RFC officials say that the Culver City plant and facilities originally built for the flying boat development cost approximately \$3.5 million and that those funds were scheduled for inclusion under the total \$18 million set aside for HK-1 development. Hughes claims the entire \$18 million is for actual plane development.

The plant was declared surplus to the government through War Assets and sold to Hughes Aircraft following World War II. It is reported that company officials are seeking now to recover the original \$2.5 million plus an approximate \$500,000 under a price escalator clause.

Reconstruction Finance Corp. has

O.K.'d the suit because they seek a qualified definition of contracts and more definitive writing of lease agreements for the seaplane.

Because the plane is legal property of the RFC, following the 1944 revision of the number of planes to be built, a letter of agreement between Hughes and RFC set out lease of the boat on a monthly rate, an hourly flight rate and an hourly engine running test rate. There has been some disagreement between Hughes and RFC in interpretation of those agreements on the lease.

Boeing's Backlog Reaches \$Billion

Boeing Airplane Co. last week came up with the largest sales and backlog in 1950 yet reported by any of the aircraft manufacturers, backed up with a two-and-one-half-times increase in profit and the largest ratio of profit to sales it has had since 1941.

Its sales of \$307,250,982 and backlog of \$1 billion as of Dec. 31 were both considerably higher than those of United Aircraft Corp. (AVIATION WEEK Mar. 26, p. 17), which ranked at the top until Boeing's report was issued. In 1949, Boeing's sales were \$287,012,824.

For 1950, Boeing earned, after taxes, \$10,826,558, compared to \$4,411,348 in 1949. In his report, President William M. Allen declared that while Boeing is trying to give the government the greatest possible return on its defense dollar, the needs for expansion make it necessary that the aircraft industry be permitted to "earn and retain reasonable profits (after payment of equitable dividends) for reinvestment in the business."

Possibly because of that belief, possibly because of the increased volume of business, Boeing in 1950 showed a noteworthy increase in the ratio of profit to sales. In 1950, profit was about 3.5 percent of sales, versus about 1.7 percent in 1949. In the past ten years, only 1941 produced a better ratio, about 6.2 percent.

Last year, Boeing produced a record number of airplanes for a peace year, the report says. And its backlog should keep production high for several years, although Allen says that 1951 profits should not be as high as last year because of increased taxes and accelerated depreciation.

Boeing's orders now include C-97s, B-47s, a small order on B-50s, B-29 and B-50 modification and a production contract for the XB-52 although neither of the two prototype airplanes has yet flown. Boeing Field's runway is being extended from 7500 to 10,000 ft. to permit flights of the XB-52.

The company is expanding its activities in guided missiles, the report says, but has not started production work on any jet transports because of "the heavy investment required and the corresponding risk involved."

Stratojet Becomes Long-range Threat

Successful in-flight refueling of the Boeing B-47B Stratojet bomber from a Boeing KC-97A tanker Stratofreighter now makes the high-speed Stratojet a much more dangerous long-range threat to enemy countries.

USAF's recent announcement that satisfactory test refueling had been accomplished near Wichita with repeated refueling contacts made between a Stratojet equipped with a refueling receptacle in its nose, and a KC-97A fitted with the Boeing flying boom refueling system.

Range of the B-47B un-refueled has not been disclosed, but it is known that it exceeds 2289 mi. since the original XB-47 prototype flew this distance nonstop in a transcontinental speed dash Feb. 8, 1949 from Larson AFB, Washington to Andrews AFB, Md. in 3 hr. 46 min. at an average speed of 607.8 mph.

► **First B-47A**—First of the production B-47A Stratojets was rolled out of the Wichita factory a year ago, and since that time the plane has been going into increasingly rapid production as the largest bomber production schedules in the Air Force program have been assigned for the six-jet bombers and the later four-jet B-47Cs.

Second and current production model of the B-47, the B-47B differs from the A primarily in a number of internal changes, presumably including refueling equipment. Third production version, forthcoming later this year, will be the four-engine B-47C.

Other planes equipped with the Boeing refueling system are the Boeing B-50, and B-29, the North American B-45C and the Republic F-84E.

The B-45C is equipped with two large wingtip tanks with a capacity of 1200 gal. each supplementing internal fuel tanks of 4200 gal. Official combat radius of the B-45C is 1000 mi. With equipment of in-flight refueling system this range is considerably increased.

USAF still classifies as secret in-flight technique used on the B-47, but it is reported to be very similar to that of the B-45. The B-45 refueling couplings are housed in the upper nose section of the plane. The opening is faired for streamlining and is operated by an electrically operated hydraulic-controlled doors.

Still longer range is expected for the B-47C.

How TIMKEN® bearings help 75 people to sit down easy

WHEN the giant, 75-passenger Stratocruiser sits down, the wheel and brake assemblies have to take a tremendous shock load. B. F. Goodrich engineers designed a new assembly for the plane that provides maximum strength to weight ratio. For the wheels, they selected bearings they were sure would stand up under the shock—Timken® tapered roller bearings.

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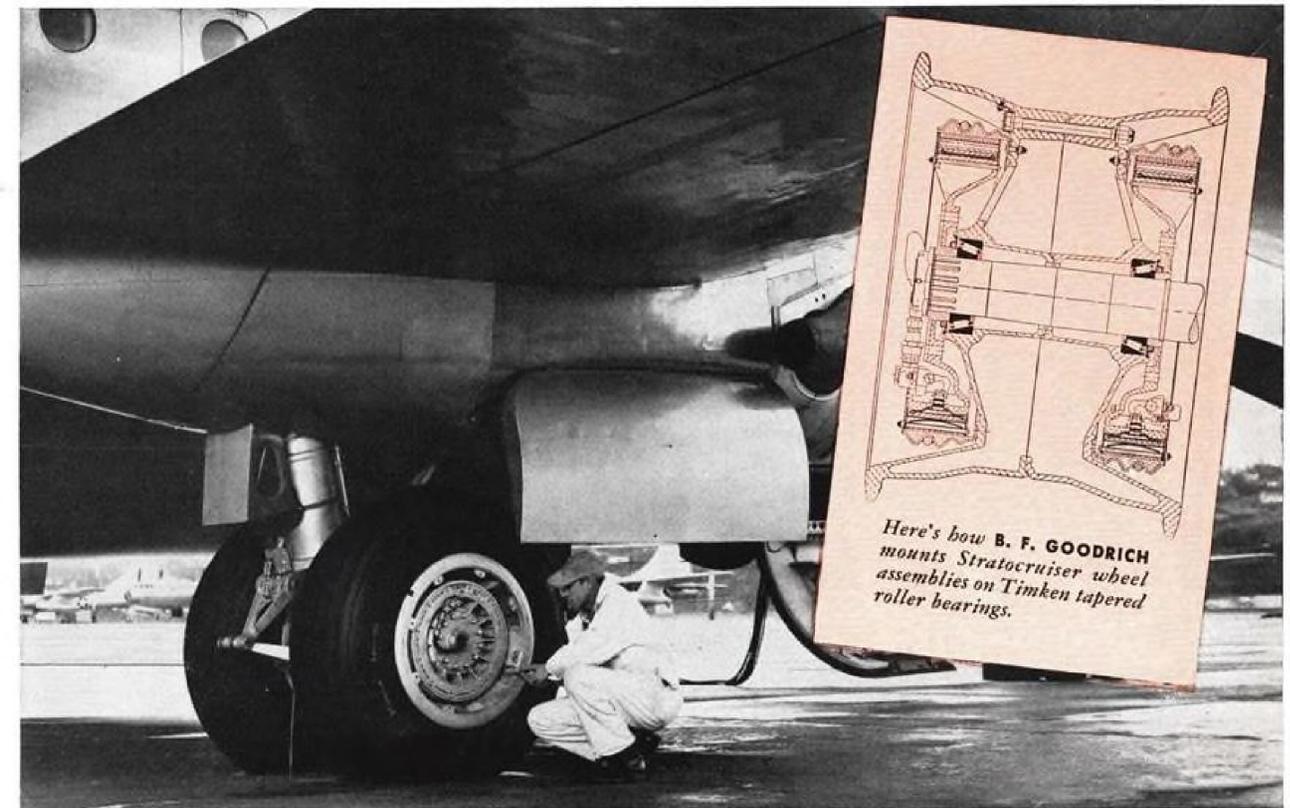
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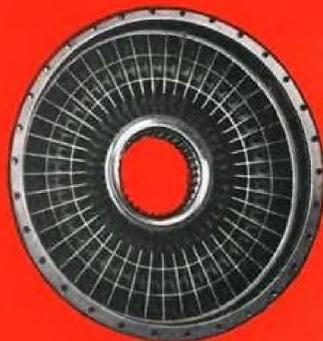
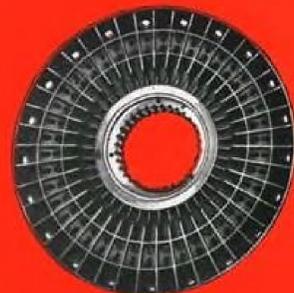
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Parts pictured here are for hydraulic coupling—the heart of the supercharger—made of special Sharon chrome-moly alloy that exactly fits job requirements.

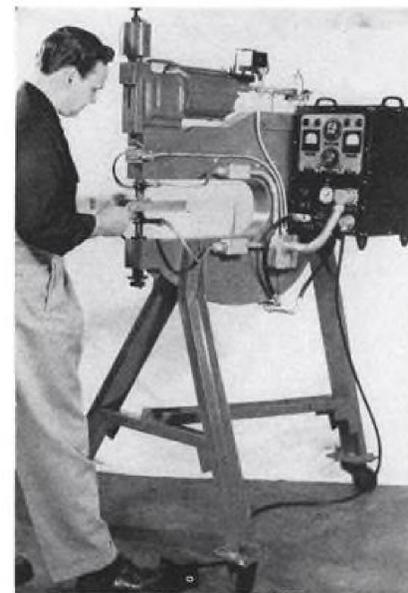
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PRODUCTION



DIMPLER UNIT (black box) attaches to standard squeezer, left, also has special tools.

Hot Dimpling Widens Metal Use

Improvements in methods of preparing flush riveting encourages new applications of high-strength alloys.

Hot dimpling of metals is gaining wide acceptance in the aircraft industry. It overcomes the problem of brittleness of some metals under cold dimpling, and it is faster and more uniform than countersinking.

Perhaps the most significant result following development of hot dimpling equipment is it has encouraged broader use of aluminum alloys with higher strength-to-weight ratios and even lighter weight magnesium sheet. It has accomplished this by eliminating production difficulties in preparing these metals for flush riveting.

Practical hot dimpling equipment has been on the market for some time—equipment that can be used with standard dimpling squeezing machines, avoiding the need for buying new or additional machinery. Hot dimpling controls lately developed also are quite adaptable to portable tools.

► **Squeeze and Dimple**—A good example of such equipment, which has proven popular with a number of aircraft manufacturers and airlines, is the "Thermotronic Control Unit," designed for attachment to standard squeezing machines (photo at left above), and developed by Aircraft Tools, Inc., Los Angeles.

This hot dimpling control operates in conjunction with special dies made

by the company. With it, a single squeezing machine can hot dimple 75ST aluminum alloy and magnesium sheet, and cold dimple 24ST and stainless. The company believes titanium alloys, when they arrive on production lines in quantity, also can be hot dimpled with existing Thermotronic control units. Further development of the unit is being carried out, however.

Present users of this equipment are the Air Force, Navy, Consolidated Vultee Aircraft Corp., Douglas Aircraft Co., Glenn L. Martin Co., Northrop Aircraft, Inc., Texas Engineering & Mfg. Co., Pan American World Airways, Capital Airlines and others, according to Harold W. Dellett, vice president at Aircraft Tools.

► **Portable Unit**—A "Thermo Buck" control (photo at right, above) with special dies for use with portable squeezers also is being produced by the firm. These tools are designed to dimple skin while it is on the aircraft.

The Thermotronic control unit has a background of broad experimentation. It employs conduction heating of the metal by heated dimpling dies. The heating element is placed in the dimpling tool and backs up the die. Tests and service experience have convinced the company this is the most reliable, straightforward method presently known

of successfully hot dimpling metals. ► **Background**—Why is hot dimpling necessary? Because, explains Dellett, such high strength alloys as 75ST do not have sufficient ductility to cold dimple satisfactorily. They crack at the dimple too easily. Still, it is highly desirable to use these high strength metals in applications where flush riveting is required, such as on aircraft skin. They could be countersunk, to accommodate flush rivets, but that is a slower, more difficult and expensive process. And it doesn't produce as uniform results as dimpling, particularly if carried out by relatively unskilled personnel.

In cold dimpling, local elongation of the metal at time of fracture was 25-35 percent for 75ST, while local elongation for 24ST could be stretched to 40-50 percent before fracture. This is the reason 24ST can be cold dimpled and 75ST cannot be. In fact, 24ST is one material, says Dellett, that definitely should not be hot dimpled because it is subject to softening and intergranular corrosion.

It was discovered that with 75ST, hot dimples were up to 15 percent stronger than cold dimples to the same configuration. By dimpling 75ST at elevated temperatures, work hardening or embrittlement is minimized so the metal retains its strength and ductility.

When advantages of hot dimpling became apparent, Aircraft Tools set out to design a compact unit that would remove "discrimination" against flush riveting 75ST and magnesium and permit them, too, to be placed on existing machines in the factory.

► **Heating Tests**—The question arose: What is the best method of heating the material?

To find the answer, the company's engineers conducted a series of tests on various methods of heating.

• **High frequency induction** heating of the sheet was tried on a laboratory scale, but was not developed because of difficulties in localizing heat at desired areas. Also, there was evidence of damage to the material, probably because of extreme thermal gradients.

• **Resistance heating** appeared a rapid method and equipment was inexpensive. However, cleaning precautions are excessive, the tool soon loses dimensional control because of arcing and the uncertainty of temperature was always present.

• **Preheating sheet metal** by an advance hot shoe was attempted, but high thermal conductivity of sheet rapidly dissipated heat before dimpling started.

• **Hot air blasts** and a number of other methods were proposed but did not receive serious attention.

• **Conduction heating** by heated dimpling tools, lined up against all other methods tested, appeared to be the most efficient.

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► **Conduction Problems**—After deciding conduction heating through heated dies was best, Aircraft Tools attempted to modify existing tools by using concentric or clamp-on heating elements. With this arrangement, control of heater temperature was satisfactory with the lighter gage metals, where the rate of dissipation of heat was not too great. But, in dimpling heavier gages, heat was pulled out of the tool and dissipated too rapidly.

The heat could not be poured into the dimpling tool rapidly enough to maintain temperature. This caused the metal to crack unless the rate of dimple operation was retarded.

The solution was found in placing the heating element within the tool so it backs up the dimple die. With this arrangement, a cold tool will heat up to operating temperature within one to two min., instead of 20 to 30 min. required by the clamp-on type of heater, says Dellett.

In order to determine sheet temperature as accurately as possible, the thermocouple, rather than being placed in the heater, is located between the dimpling tool and holder, rather than in the heater. This way the temperature reading is actually that of the tool.

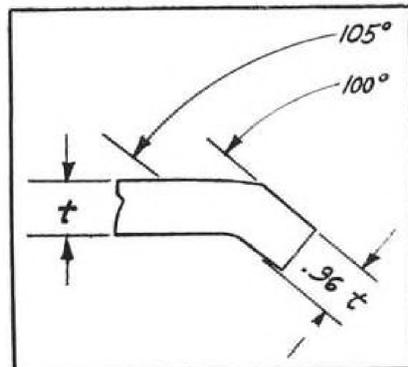
► **Die Design**—Simultaneous with development of the electronic part of the equipment, Aircraft Tools carried out development of suitable dies for the equipment.

In designing these dies, Aircraft Tools tried several forming methods to determine the optimum dimple configuration and how severely dimples should be formed. Three methods gave best results.

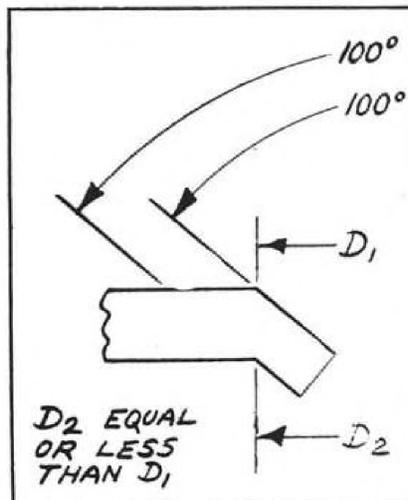
- **Natural forming** was based on a minimum movement of material, with normal thinning from the circumferential and radial strain. According to Dellett, advantages of this method were: minimum pressure required; good structure with no internal signs of high shear. Disadvantages: Poor definition when used over a wide range of sizes; poor nesting in multiple stacked sheets; if 105-deg. countersinks are used, stocking of both 100- and 105-deg. countersinks is required; generous female die radius to avoid circumferential cracking in screw dimples is necessary.

- **Over forming** has these advantages: sharp definition; permits multiple stacking; permits 100-deg. countersink; reduces tendency to circumferential cracks. But its disadvantages are: requires greater tonnage; produces critical shear deformation in heavier gages.

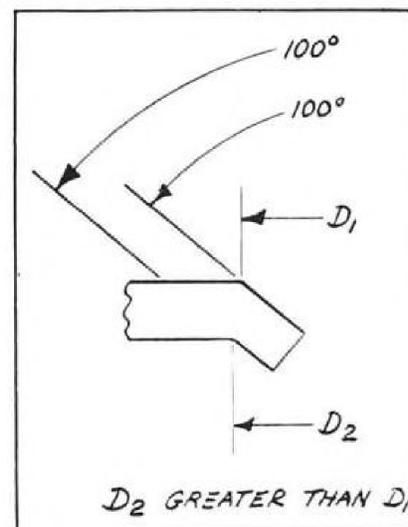
- **Optimum forming** finally was achieved by increasing the female die diameter to a critical relationship. Its advantages: shear deformation is negligible; good definition is retained through out the full range of gages; multiple stacking and 100-deg. countersink pro-



THREE METHODS: Natural forming...



... over forming, and ...



... optimum forming gives best results.

duce the best possible nesting with no loose dimples; provides the best balance of high strength, definition (superior to present methods), suitability for all materials. It allows dimpling of 75ST, magnesium and titanium, cold dimpling of 24ST and stainless steel.

Aircraft Tools gives much of the credit for developing the dies to Douglas Aircraft Co., whose engineering staff co-operated with it in this work.

UP THERE WITH THE BIG NAMES... CHAPTER NUMBER 3



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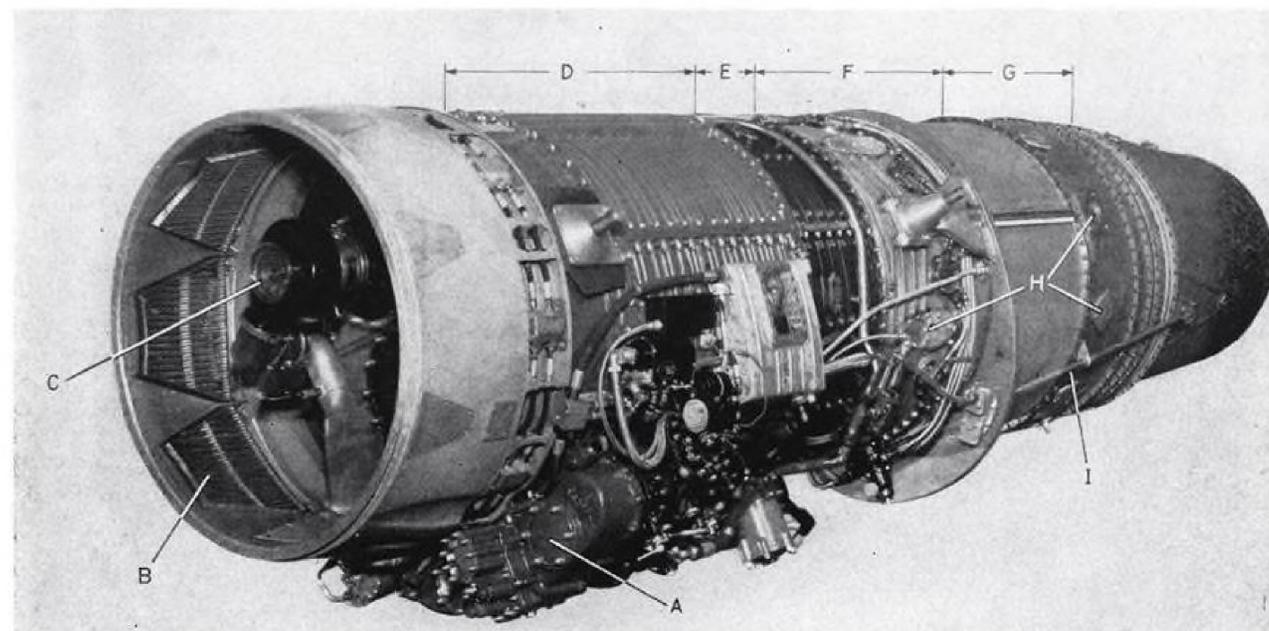
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MOST POWERFUL turbojet for which a production contract ever has been let is this new J-35-A-23, according to Allison. Details: (A) controls, (B) inlet screens, (C) starter, (D) 16-stage compressor section, (E) diffuser, (F) combustion section, (G) 3-stage-turbine housing, (H) bearing-cooling discharge air, (I) variable-nozzle control. Engine diameter is 37 in.—same as earlier J-35s.

J-35 Points Up New Thrust Achievements

Allison's new model going into production sets stage for stiff competition in 10,000-lb. thrust class.

By Irving Stone

Indianapolis—Announcements indicate that three significant achievements in the field of jet propulsion have brought new distinction to Allison division of General Motors Corp.

Its new turbojet, the J-35-A-23, is advanced as the:

- Most powerful jet engine under contract for production.
- Most economical jet, fuelwise, in this status.

And Allison has just delivered its 10,000th jet engine to the military.

Neither Allison nor the military will give any specific thrust figure for the new J-35 except the usual "over 5200 lb." value. But some idea of the engine's power potential can be deduced.

Allison does say it has been accepted for use in the prototype of Boeing's YB-47C and will fly in this plane later this year. Because of the engine's "substantially increased power" compared with those now in the six-jet B-47B, only four of the new engines will be required. The company says the four engines will deliver "a great deal more power than the B-47B's six."

► **Thrust Estimate**—Rated power of each

of the B-47B's General Electric J-47 jets are given as 5200-lb.-plus. The "plus" is the indeterminate quantity, but reports have attributed about 5600 lb. thrust to the B-47B engine. On this basis, the six would give total thrust of 33,600 lb. Dividing this thrust figure between YB-47C's four new Allison jets each J-35-A-23 would have a power value of 8400 lb.

But this computation must be further extended in the light of Allison's claim that the four new engines in the YB-47C will deliver "a great deal more" power than the six in the present Stratojet configuration.

This phraseology should not be lightly interpreted, for engineers don't easily squeeze an extra few hundred pounds of thrust out of a jet engine. This, coupled with the fact that security regulations tend to minimize power claims, should indicate that the "great deal more" means just that—perhaps an additional 1000 lb. of thrust, bringing the figure to about 9500. Other estimates put this value at 10,000 lb. thrust (AVIATION WEEK Mar. 19).

► **Other Contenders**—In view of all the "dark horses" in the turbojet field, it must be stressed that Allison's an-

nouncement that the J-35-A-23 is the "most powerful turbojet engine for which a production contract ever has been let" should be considered strictly a company claim. Other engine builders probably would dispute this distinction—as well as the claim that the new engine is the most economical yet released for production.

• **Westinghouse** is reported to have a production contract for its J-40 and it, too, is in the high-power bracket.

• **Modified Sapphire (J-65)** to be built under production contract by Curtiss-Wright and Buick, its licensee, also will have a thrust rating that will push for top honors.

• **Pratt & Whitney**, which is said to have a production contract for its J-57, is reported to have carried this engine to a stage of development that gives it a thrust potential comparable to any of the new engines. It's likely that this turbojet has already passed its 50-hr. test to clear it for flight and is on its way to establish an official rating after the 150-hr. trial.

Though Allison says that the new J-35 has not yet flown, the company claims the engine has produced its rating on the test stand.

► **GE is Dark Horse**—In the final analysis, these ratings are only transitory, for the development pace pushes power values behind almost as fast as they are

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established. How true this can be will probably be emphasized when General Electric's J-53 makes its debut.

While the existence of this project has never been confirmed, there is ample reason to believe that this engine will have a higher push than any of the known current-project engines (AVIATION WEEK Dec. 4, 1950).

► **Fuel Consumption**—Allison also says that the new J-35's fuel consumption is 20 percent less than that of early J-35s. If a reported sfc. figure of 1.12 lb./hr./lb. thrust for earlier J-35s is accurate, then a 20-percent cut would reduce fuel consumption of the new J-35 to about .89.

This value would seem at variance with the company's claim that the new engine is the most economical yet released for production, because current reports indicate that an sfc. better than 0.8 lb./hr./lb. thrust has been achieved in at least one other production engine.

But even though it is not clear at the moment what engine is the leader in the jet race, Allison's new powerplant is an impressive achievement design-wise. Measuring 172 in. overall, its new power punch is packed into the same diameter of the earlier J-35's 37 in.

This is a significant factor, because the new engine will mount in almost any nacelle taking the earlier J-35s, as well as making it readily adaptable to a great variety of planes. The basic wing of the B-47 will not require redesign to accommodate it.

► **Compression High**—It packs 16 stages of compression into a relatively small span. Some idea of the efficiency of the air-handling unit may be gained from the observation that the inlet guide vanes are only about 8 in. long. Allison claims that the compression ratio is higher than that of any engine they know of. This means that it should be better than 7:1—the figure reported for the Sapphire.

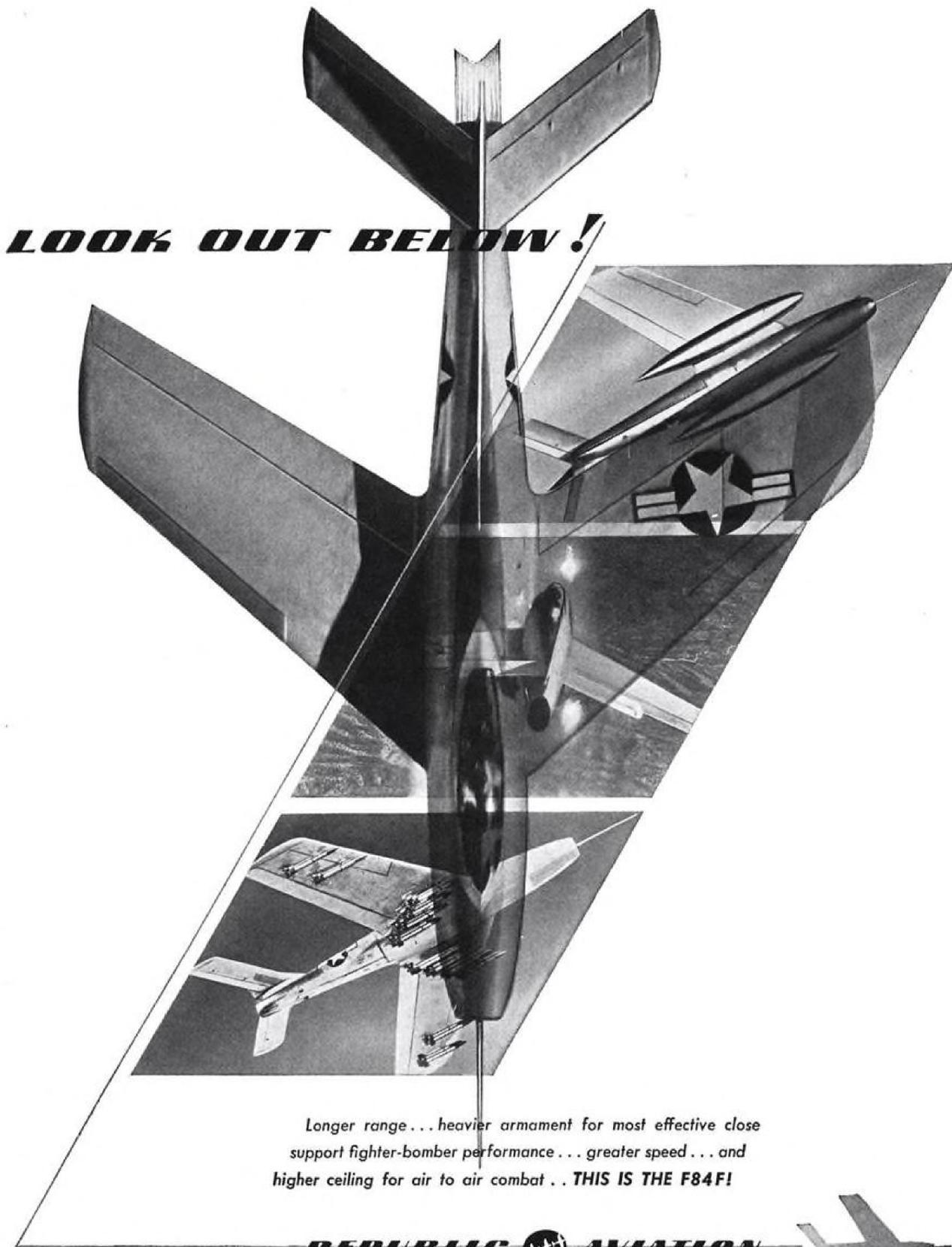
(Already under study at Allison—and at other companies—is a "spooling" arrangement for higher compressor efficiency. In this configuration, a low-stage compressor precedes a high-stage unit connected to the first turbine wheel, with the second turbine wheel connected to the low-stage compressor through hollow shafting.)

► **Combustion, Turbine**—Combustion chamber is designated a "cannular" configuration—a single can outer shell housing 10 individual liners into which air flows from the outer can.

Allison engineers have found that this arrangement gives a low pressure drop, and high combustion efficiency, and indicates greater promise for future development. The outer shell also affords a more rigid assembly than does the can-type combustor grouping.

Three turbine wheels have been used

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It is a tribute to Esso Aviation Products that Chief Pilot Zbornik keeps an eye out for the Esso Sign whenever he flies. With 17 years of extensive flying experience behind him, he is a good judge of the quality of aviation fuels and lubricants. And Mr. Zbornik's judgment is shared by many leading airlines, aircraft and engine builders, who make Esso Aviation Products their first choice.

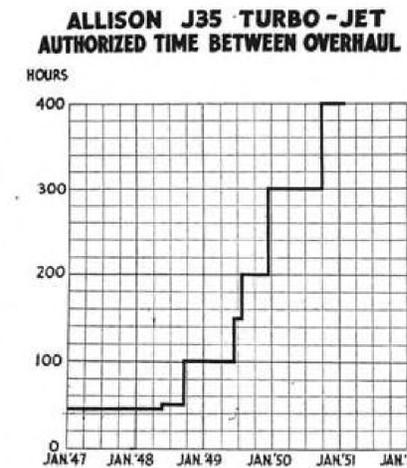
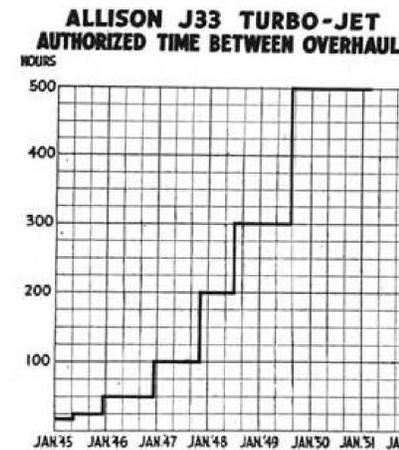


Taking time out for a relaxing chat while the DC-3 is being refueled with Esso Aviation Gasoline are (l. to r.) Howard Zbornik, Celanese Corporation of America's Chief Pilot; Clint Housel, Pilot; and Chuck Nelson, Hangar Manager of Newark Air Service, Inc.

C. J. Strickland, President of Newark Air Service, Inc.

AVIATION PRODUCTS

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because it was determined that a lesser number could not handle the load.

Tailpipe (without afterburner) is equipped with a variable-area nozzle.

► **Intake Features**—Close-off doors for the air inlet are provided to eliminate excessive drag in windmilling after emergency shutdown of the engine, and also to prevent extensive damage which might be caused by chewing action of broken parts.

The intake houses automatically retractable air inlet screens and "all-weather" features—de-icing provisions and automatic ice detector.

Improved cooling is considered by Allison engineers to have been responsible in a large measure for the new engine's boosted performance.

It has its own oil system and hydraulic system to operate the variable-area nozzle and air inlet screens.

► **Impressive Record**—Allison's achievements re-emphasize its top-row status as a contributor to U.S. air power. It has already rolled out its 10,000th jet

engine—more than any other jet builder in the field. About 60 percent of these engines are centrifugal types, about 40 percent axial flow. It is reported to be building more than 300 engines per month and its program is accelerating.

It has brought out a wide variety of engines—the J-33, J-35, the new J-35 and the T-38 single and T-40 twin turboprops.

And Allison turbine engines have chalked up more than 600,000 flying hours to date.

As of January, this year, authorized time between overhaul on Allison's J-33 was 500 hr.; on the J-35, 400 hr. And the company says that some of its engines have gone to 700 hr. before major overhaul.

Company activities and employment are climbing sharply. As of March, employment reached to more than 13,000 from a 4739 count shortly after V-J Day. By the end of this year between 16,000-17,000 should be on the company roll.



FLEXIBLE WING PROTOTYPE

The Rey, a French experimental prototype with articulated wings recently completed its first test flight successfully at Melun-Villaroche airfield near Paris. The outer sections of the Rey's wings are articulated with the inner sections by joints consisting of torsion disks and rubber coupling. These joints permit the outer sections of the wing to deflect through a three degree arc. M. Rey, in-

ventor of the airplane, estimates that his flexible wing eventually will make possible a 30 percent weight-saving in the construction of "Constellation-type" airplanes, thanks to reduction of strains resulting from the increased flexibility. He claims that the new wing would make it possible for pilots to maintain cruising speed during severe storms and give smoother ride.

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1. This new book embraces the latest theories on airfoil and wing designs, and gives a complete demonstration of the thin airfoil theory, followed by its extension to thick airfoil theory. Wing theory for quick wings is presented as an extension of the thin wing theory. Requires no knowledge of advanced mathematics and includes numerous examples and problems. By Alan Pope, Associate Prof. of Aerodynamics, Georgia School of Technology. 294 pages, 158 illus., \$5.00



INTERNAL BALLISTICS OF SOLID-FUEL ROCKETS

2. A wealth of information on military rockets using dry-processed double-base propellant and other solid propellants as fuel. Treats rocket motor design and performance, and bases all data on actual experimental results. Covers erosive effect of gas flow—momentum relations—frictional effects inside rocket motors—requirements for propellant grains, etc. By R. N. Wimpres, Industrial Engineers, Inc. 208 pages, 152 illus., \$4.50

SUPERSONIC AERODYNAMICS

3. Brings you a clear explanation of the fundamentals of supersonic aerodynamics, developing material essential for further theoretical investigations. Presents data on the nature of characteristic curves, in two and three dimensions, and on semi-empirical formulas for the drag coefficient and center of pressure of ogives. By Edward R. C. Miles, The Johns Hopkins University. 225 pages, 106 illus., \$4.50

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4. A graphic presentation of design details that will enable you to grasp the design features of many typical domestic and foreign aircraft and power plants quickly and easily. 788 illustrations and sketches of structural details show the reader starting a new design what has been done in a particular area such as wings, landing gear, control systems, etc. Provides data on land planes, seaplanes, single, twin, and four-engine aircraft, including latest foreign and domestic designs. By Leslie E. Neville. 534 pages, 8 1/2 x 11, 788 illustrations, \$10.00

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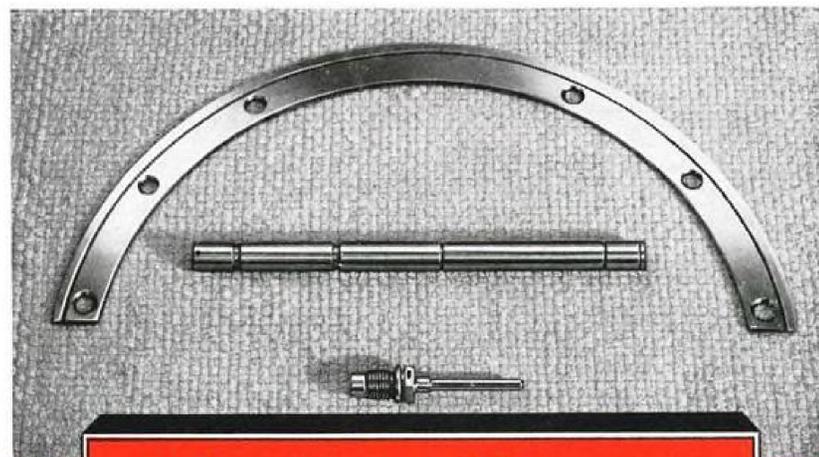
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Tests Resumed on French Aspin I

(McGraw-Hill World News)

Paris—The Air Ministry has resumed tests of the prototype of the new French variable airflow jet engine Aspin I, made by the Turbomeca Co.

Aspin I is designed to operate efficiently from sonic speeds down to the landing speeds of light personal planes. Its designer M. Szydowski, president of Turbomeca, claims that it will increase sharply the operational flexibility and economy of operation of high-speed military planes.

It also is expected to offer high-efficiency jet power for transports and personal planes.

► **Dual Airflow**—The secret of the engine is a variable dual airflow which permits routing only part of the air entering the intake through the combustion chamber and turbine. The rest of the air flows along a separate channel around the turbine, and mingles with the turbine exhaust.

The amount of air going through the turbine can be regulated by a set of adjustable vanes which split the air coming from the axial compressor into two streams.

This system already has been used with success in the centrifugal compressors which have been designed by Szydowski.

The variable dual airflow system, in addition to making the Aspin efficient at low speeds, facilitates starting and makes it possible to accelerate almost instantaneously from idling speed to maximum thrust, which aids landings and takeoffs. French airmen claim that the Aspin's rate of acceleration exceeds that of both single airflow jets and turboprop engines.

It is actually a compromise between the turboprop and the ordinary jet, eliminating important disadvantages of both.

Aspin is more powerful than the turboprop at high speeds; it delivers a much greater thrust than the straight jet at low speeds.

The relative weight of the Aspin isn't much greater than that of an ordinary jet engine. And it makes possible substantial weight saving through reducing the height of the aircraft landing gear.

Total weight of the experimental Aspin I prototype plus accessories is 264 lb. Maximum thrust attained after the latest improvements was 500 lb. Specific fuel consumption at 450-lb. thrust during tests was 63 lb./lb./hr.

► **Tests Satisfactory**—The Air Ministry recently completed a 1000-hr. endurance test of the Aspin. The engine was run between 35,500 rpm. and 36,500

rpm. for 150 hr. giving an average thrust of 450 lb. Then it was examined and found to be in perfect condition. The test was resumed and the engine delivered an average 400-lb thrust for another 850 hr. at speeds between 33,500 rpm. and 35,500 rpm. The Aspin still was in perfect operating condition at the conclusion of the tests according to official inspectors. The only repair required during the tests was the replacement of a defective sparkplug.

Tests now have been resumed following overhauling and improvement of the prototype. Turbomeca's engineers hope to be able to improve the performance of the Aspin rapidly and particularly to reduce the relative weight of the engine.

DH Prop Work Helped By Induction Heater

(McGraw-Hill World News)

London—De Havilland Propellers Ltd., Hatfield, Hertfordshire, has just installed a Philips high-frequency induction heating generator—certainly the largest in Europe and perhaps in the world—for use in rapid local heating and hardening of large steel propeller components (blades and hubs) which it is not feasible to handle by any other means.

This represents a new production process at de Havilland, necessitated by a new type of blade made from a grade of steel that has not previously been used.

The generator—termed the F280 model by Philips Electrical Ltd.—has a maximum output of 200 kw. on intermittent work and 150 kw. on continuous service, at a nominal operating frequency of 275 kcs.

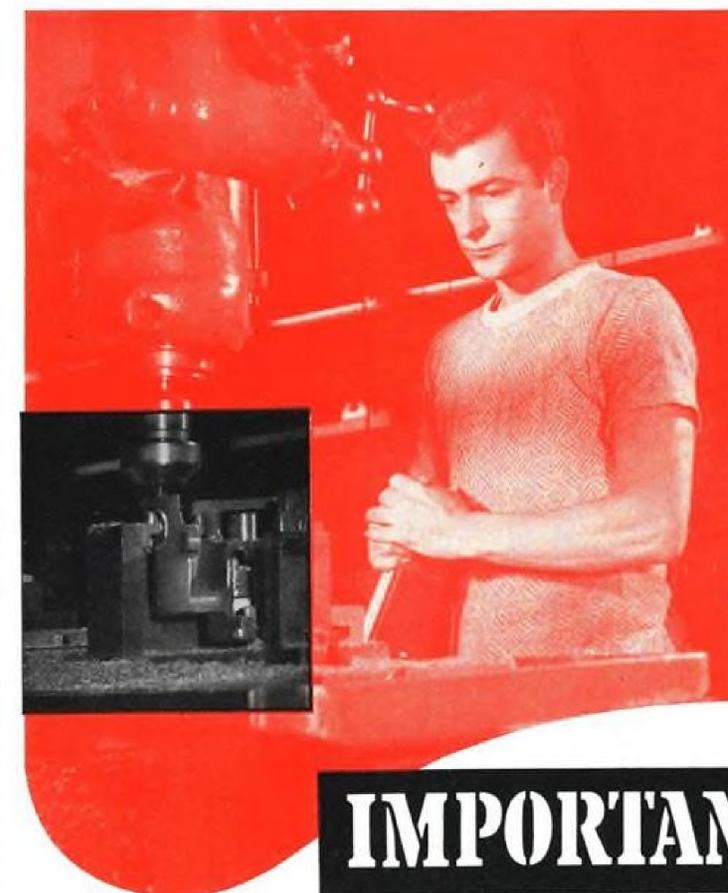
It is fitted with automatic power-output-level control, by means of a built-in variable coupling transformer, which compensates for changes in load when heating ferrous articles through the Curie point.

All working cycles of the unit are fully automatic. The generator can also be manually controlled.

It is designed for 380-440 v., three-phase, 50-cycle current, and requires a maximum power input of 280 kva. At 150 kw. output, the power factor of the equipment is 0.9.

A wide choice of automatic operating-time ranges can be effected by the fitting to the generator of two synchronous motor timers.

The equipment is 7 ft. in height, 4½ ft. in width and 12 ft. in depth, and weighs 3 tons. For ease of transport the heavy components are readily removable and the framework of the whole equipment divides into two sections.



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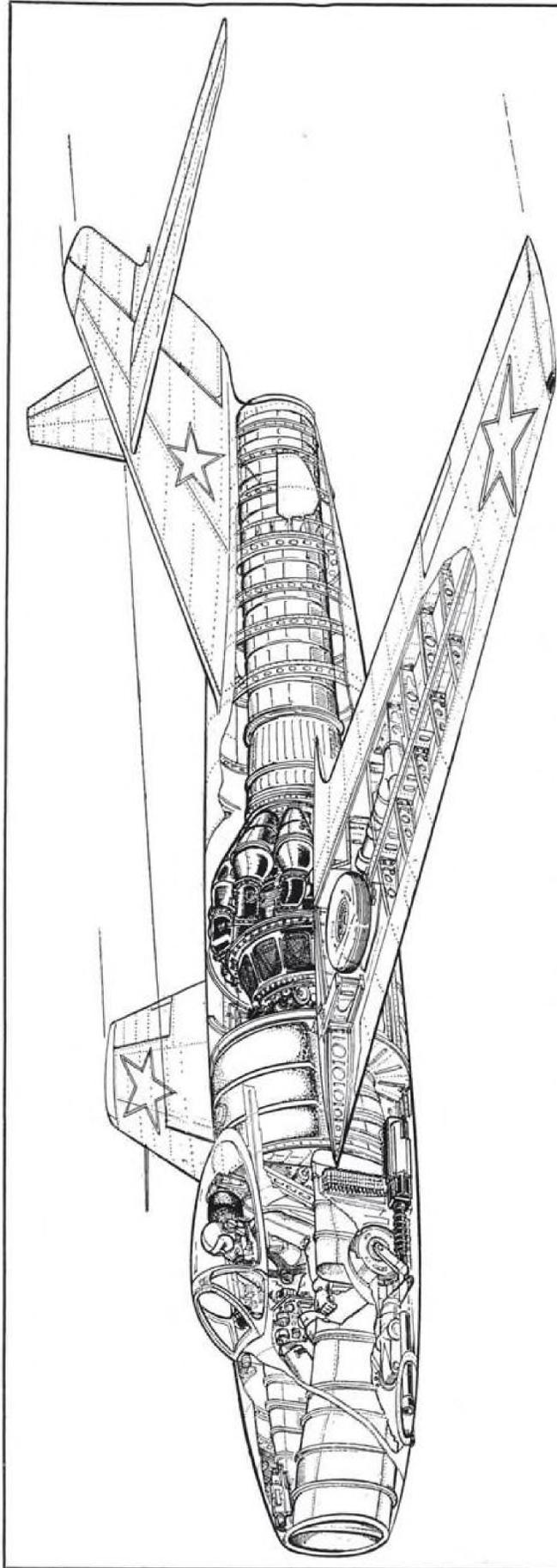
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Design Detail: Russia's MiG 15

Engineering dissection in this drawing by Tom Turner of the MiG-15 shows the structural possibilities of Russia's prime defensive fighter. Based on careful layout, interpretation of photographic detail and intimate knowledge of aircraft structure, this British engineer's drawing presents internal structure of the MiG in detail which has not yet been equaled.

Primary mission of the MiG is a defensive one—it is Russia's current bomber interceptor screen. This little Red craft is in squadron service throughout the Soviet zone of Germany and in other satellite countries.

As is well-known by now, the MiG is a sweptwing aircraft powered by a Russian-built development of the Rolls-Royce Nene turbojet. At the time these British engines were sold to the Russians, the static thrust rating was 5000 lb. It is certainly reasonable to assume that there have been engine improvements since then; these, coupled with the service use of an afterburner, must push the thrust of the combination toward the 8000-lb. mark. To this can be attributed the rapid getaway and climb characteristics which have been observed by UN pilots who have fought the MiG.

Best estimates of sea-level rate of climb credit the MiG with 8000 fpm.; at 30,000 ft., that figure is reduced only to 4000 fpm. Top speed at full throttle with afterburner is estimated at well over 700 mph.

Span is 32 ft. 6 in. and overall length is 32 ft. 9 in. Gross weight is reckoned at about 12,500 lb. Sweep angle of the wing is 38 deg., measured at the quarter-chord line.

Design philosophy behind the MiG is, of course, not known. But it probably stems from German thoughts on defensive fighter development:

- Short fuselages, to keep inlet and tailpipe lengths to a minimum and reduce duct losses.
- Sweptback wings, a German aerodynamic fetish.
- Large vertical tail, for control during takeoff and landing and necessitated by the short fuselage moment arm available.
- Minimum-sized horizontal tail, because the trend was to tailless aircraft, and conservative designers weren't quite ready to go all the way.

The MiG-15 is based on—not copied from—these German ideas.



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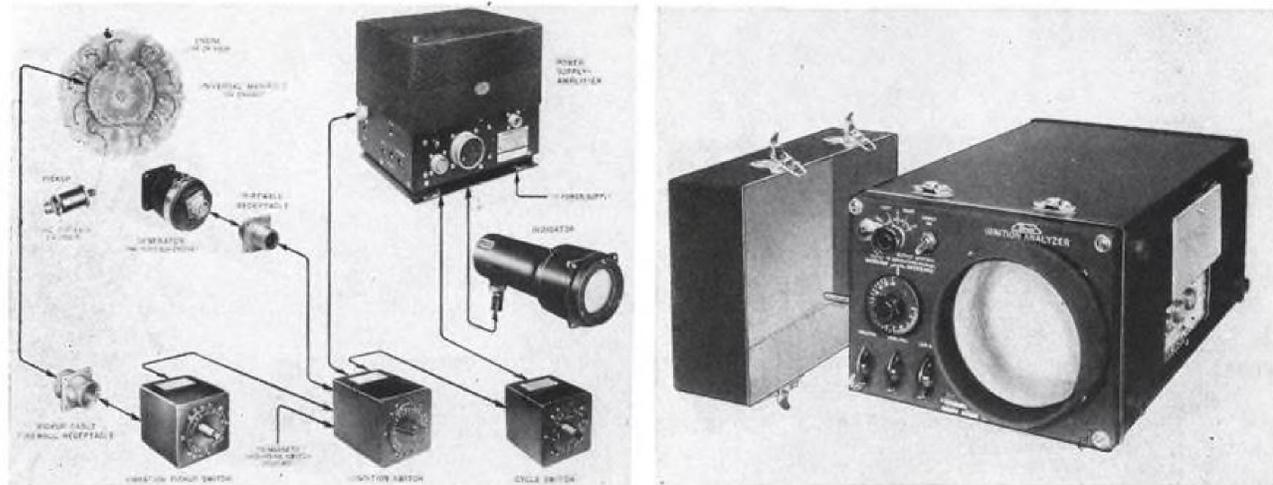
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EQUIPMENT



From Airborne Analyzers Such as These . . .

SPERRY device is comprised of units shown above. At the flight engineers' stations, the power supply, scope and three switches are mounted separately. In contrast the . . .

BENDIX unit has power, scope and switches contained in one package with the switches beside the scope. This also makes the Bendix device easily removable for use on the ground.

Evaluation Report

Engine Analyzers Gain Wider Acceptance

Past record makes them so necessary that military is specifying the devices for all new four-engine planes.

By George L. Christian

Engine and ignition analyzers are crystallizing in the equipment picture as indispensable monitors of engine performance. Measure of immediate importance the military attaches to the instruments are Air Force plans to equip all new production four-engine aircraft with analyzers. Emphasis is on planes mounting the P&WA R-4360 engine. Initial implementation of this program are contracts recently awarded Sperry Gyroscope Co. and Scintilla Magneto division, Bendix Aviation Corp. The former, representing a five-fold production increase, exceeds \$3 million, the latter \$800,000.

► **Military Installations**—Sperry units will equip such aircraft as B-36 and B-50 bombers; Scintilla units will go on C-97 cargo and transport planes. Both manufacturers state that the Navy is showing a lively interest in analyzers for single- and multi-engine aircraft.

Robert Boyer, Scintilla senior sales engineer, says that the Navy is making a complete production installation on Martin P4M-1 patrol bombers and is studying Scintilla units for use on single-engine carrier craft.

The importance of quickly analyzing engine trouble on a carrier-based plane is obvious, especially when many aircraft may be lined up waiting to take off. Boyer indicates that the Scintilla portable airborne unit is particularly adaptable to fighter installation. He estimates equipment cost at \$50 per plane; increase in weight, a few pounds—the only requirements being a synchronizing breaker assembly, some cable and one connector.

On the other hand Frank Breen, Sperry Applications Engineer who has had long experience with engine analyzers, points out that the Navy is obtaining excellent results with Sperry airborne installations in Martin JRM-1s and -2s.

► **Commercial Installations**—And the military are not the only believers in the worth of analyzers. Pan American World Airways, first commercial airline to make a fleet-wide installation (on Boeing Stratocruisers and Lockheed Constellations) comes out flatly for the Sperry instrument (which one of its engineers developed) stating that it markedly increases flight safety. Yearly saving for a Constellation with either analyzer are estimated at \$9000. Conti-

mental Air Lines reports savings with the Bendix unit.

Several other commercial carriers are evaluating the Scintilla and Sperry units.

Among the freight carriers, the Flying Tigers have bought six Scintilla instruments according to Boyer, for installation on C-46s.

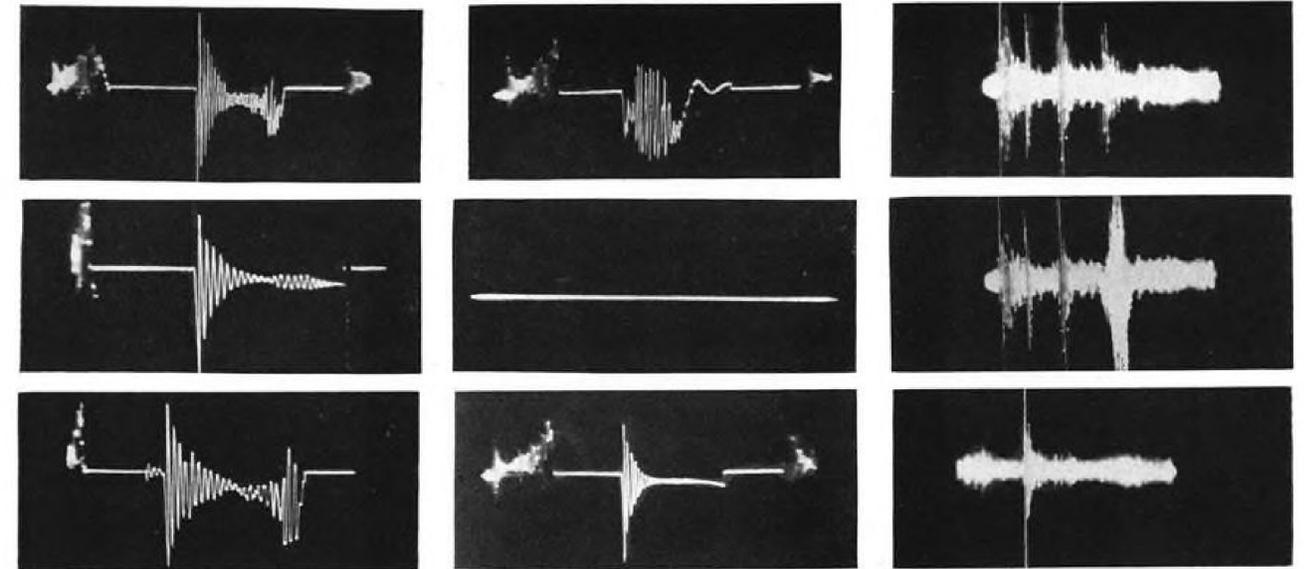
Scintilla, originally builders of portable analyzers have now launched an airborne unit (to be used on the C-97s, for instance). The portable instrument is now known as a "portable airborne" unit because it can be used in the air then quickly detached and put to some other use—automotive, for example.

► **Keen Competition**—Sperry and Bendix are keenly competitive in the analyzer field, as they are in so many others, including automatic pilots. But they agree that analyzers are essential to safe and economical aircraft engine operation.

To bolster its contention, Scintilla quotes these interesting observations:

• "In one typical month an airline had removed a great number of ignition units off schedule. Subsequent tests . . . showed that 73 percent of these units were satisfactory and never should have been removed from the engine. Similar records . . . showed that 94 percent of the [spark] plugs removed were good."

• "One airline estimated that its turn-around time was reduced 18 percent by



Come Distinct Patterns Such as These . . .

TOP—Normal ignition pattern of plug.
CENTER—A fouled spark plug shows up.
BOTTOM—Magneto out of synchronization.

TOP—No combustion in cylinder.
CENTER—Shorted primary condenser.
BOTTOM—Short in the secondary circuit.

TOP—Normal vibration pattern of engine.
CENTER—How detonation looks on scope.
BOTTOM—Exhaust valve closing wrong.

using the (Scintilla) analyzer."

• "Another discussed the value of checking the actual condition of the ignition system before crossing the point of no return."

• "An airline estimated total savings (due to analyzer) at approximately \$500 per month per airplane."

► **Scintilla Specialties**—"Ignition Voltage Control" is a unique feature of the Scintilla instrument. A variable shunt resistance, placed on the ignition primary circuit, allows a reduction of voltage supplied to the spark plug until it stops firing. This, says Scintilla "permits the mechanic to peer into the future and spot troubles before they occur . . . he can actually predict the remaining life of the spark plug."

The new airborne Scintilla analyzer installation requires the following components:

• **Breaker assembly.** This device, used to trigger the horizontal sweep circuit appearing on the oscilloscope, consists of a single lobe cam actuating an aircraft-type breaker assembly. The compact unit mounts on any existing 1/2 engine crankshaft speed accessory drive.

Scintilla says over 50 are presently in service; maximum time on any one is about 75 h. All having passed a 1500 h. laboratory test, the manufacturer does not anticipate any maintenance difficulties and unit should not require parts for 3 to 4 engine changes.

• **Radio interference filter.** The filter, usually made up of a choke coil and one or two condensers wired in parallel with the magneto primary condenser, is normally mounted to the firewall in the primary ignition circuit. It is re-

quired because the analyzer's associated equipment is not radio shielded.

• **Relay-resistor box.** This component contains isolating resistors for each engine ground wire and hermetically sealed relays to permit by-passing individual resistors at will.

• **Panel assembly.** Control center for the analyzer. It mounts an engine and condition selector switch, guard-protected individual relay operation toggle switches for each engine and power switch with fuse and pilot light.

The analyzer is not installed in portable airborne installations. Instead, a lead storage locker is mounted in the aircraft to which the analyzer may be quickly connected when required.

► **Scintilla Statistics**—Vital statistics of the Scintilla unit are: Weight—25.13 lb.; envelope dimensions—length, 19.30 in., height, 7.69 in., width, 11.19 in.; power source—115 v. single phase 60–400 cycle ac.; power usage—100 w.

Boyer said that although the Scintilla instrument is normally triggered by the engine-driven breaker assembly, provisions have been made to operate it from an induction pick-up or a three phase generator.

► **Scope Spot**—Scintilla quotes an Air Materiel Command report which states that the 5 in. effective scope size of its cathode tube, coupled with a horizontal gain control, "allows the pattern to be expanded to the operator's desires thus providing maximum ease of pattern interpretation. A complete ignition analysis can be conducted more rapidly with the Bendix equipment . . ."

To whet the competitive blade, Sperry pointed out that Bendix' triggering

device, the breaker assembly, had not been proven operationally.

Moreover, Sperry states that, for airborne equipment, the 2 1/4 in. scope has proved to be completely adequate. A full-scope individual cylinder pattern may be obtained at the flick of a switch. Added advantage is that the cathode tube will fit in a standard instrument cut-out.

But Scintilla claims that, because of design simplicity and standardization, cost of their analyzer is considerably less.

► **Sperry Specialties**—Sperry's Breen told AVIATION WEEK that his company's philosophy is to develop and market a complete system capable of probing every facet of powerplant operation and maintenance. To do this, Breen says, vibration analysis is essential. He points out that many an engine failure resulting in total destruction of the powerplant is completely divorced from ignition malfunction. He believes that to have a complete monitor of engine performance, the analyzer must read ignition and vibration and resonance characteristics.

J. W. Wheeler, Sperry's engineering department head for engine instruments, states that while four times as many ignition problems as vibration problems are picked up by the analyzer, savings derived from vibration analysis are ten times those attributable to ignition analysis.

► **Developing the Sperry**—The engine analyzer has its roots in detonation indicators and knockmeters developed many years ago. Ignition analysis began in 1945 (the same year Scintilla's

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NOZZLES

INJECTION
MANIFOLD
DUMP VALVE

STOP-
COCKS

AN
FITTINGS

600 psi
FUEL CHECK
VALVE

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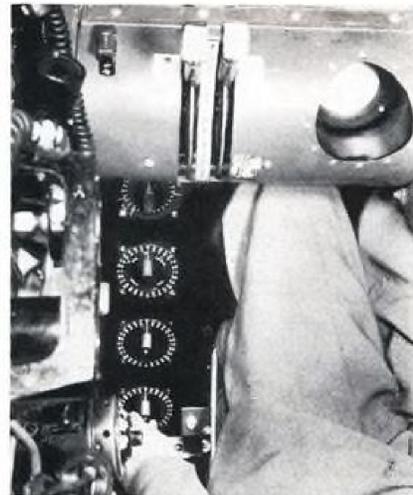
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SPERRY ANALYZER in B-50, scope upper right.

efforts were directed along the same lines) and the first airborne installation of the forerunner of the current Sperry analyzer was made in the summer of 1945 on a Sperry-owned Lockheed Hudson.

After many experiments searching for the best way to trigger the pattern appearing on the 'scope, Sperry engineers settled on a three-phase, engine-driven generator which locks the sweep to a pre-determined crankshaft angle. But any engine-driven accessory is no more accurately synchronized to the crankshaft than the wear and resulting play in drive gear trains allow. So a brand new timing device is being studied to act as an adjunct to the generator.

This experimental model of the "Crankshaft Timing Pick-up" consists of a rotating armature which attaches inside the rear case of the engine to the end of the accessory drive shaft. The pick-up is supported by the pick-up mounting bracket which bolts to existing studs in the accessory section. Purpose is to create a precise reference signal to indicate crankshaft position. Through switching, the angular difference between the crankshaft timing pick-up pulse and any other analyzer-presented event may be measured with an accuracy estimated at five times greater than now possible with the existing generator. Air gap between armature and pick-up is .010 in.

►Expanding Analysis—In trying to create as complete a machine for the purpose as possible, Sperry engineers have revealed several new attachments for their analyzer. These, although overlapping in function, expand its detective ability with a minimum of complication and addition of weight.

Two of these "gimmicks," both in the experimental state, are different versions of variable reluctance pick-ups. They require no outside power source and weigh but a few ounces. They are:

•Torque rate pick-up. The one unit required per engine is mounted in the torque oil pressure line as close to the torque cell as possible. Purpose is to measure rate of change of torque oil pressure and present the information synchronized to the position of the crankshaft.

Sperry engineers say it will locate mis-firing cylinders and/or resonances due to other causes when existing instruments, because of the very rapid but relatively slight change of torque oil pressure, fail to. While the vibration pick-up's main job is to detect detonation, valve malfunctioning, bent rods, etc., and is a cylinder-by-cylinder monitor, the torque rate pick-up probes what goes on in the crank-propeller shaft system.

•Exhaust pressure rate change pick-up. This second variable reluctance unit is used in the exhaust system. One pick-up will handle an average of five cylinders, depending on exhaust manifold configuration.

Its primary function is to detect leaking exhaust valves and lack of combustion by exhaust pressure fluctuation. Sperry asserts that this unit will increase the versatility of its engine analyzer.

Another Sperry development is a portable tester for analyzers used with instruments monitoring R-4360 engines. Only one hand-made unit exists today. Purpose is to check all functions of the analyzer without having to run up an engine.

Weight of the current unit is 27 lb. and dimensions are 8½ x 11 x 12 in.

The Scintilla-Sperry competition for the analyzer market is keen. And it will continue to be if Wheeler's proposition is true—namely that accurate and intelligent analysis of modern aircraft engine performance must depend on the use of electric monitoring instruments. Without them he says, troubleshooting is still pretty much of a hit-and-miss business.

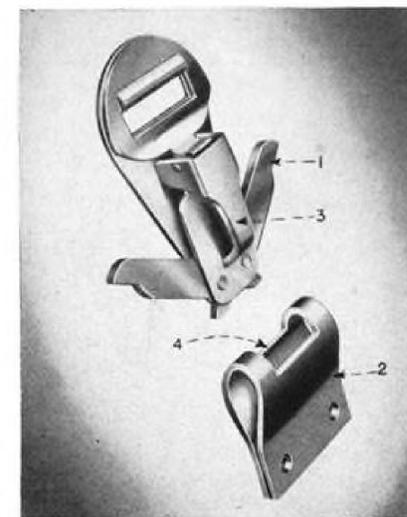
Aussies to Test New Flight Aids

(McGraw-Hill World News)

Melbourne—The Australian Department of Civil Aviation is importing two of the latest electronic flight aids for testing.

One is the Bendix Eclipse automatic electronic pilot which operates flying controls for blind landing. The other is a Sperry Zero Reader, a gyroscopic instrument which greatly simplifies instrument flying, especially during an approach to landing. This instrument is coming from England together with a gyrosyn compass and the necessary test equipment.

NEW AVIATION PRODUCTS

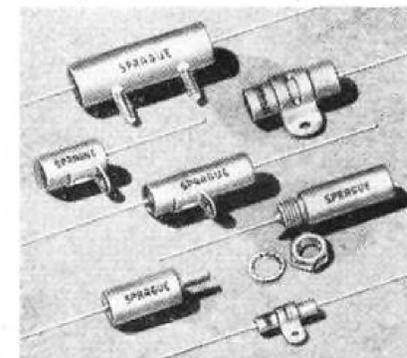


Jettisons Plane Load

Cargo can be tied securely to the plane, then instantly jettisoned by means of a quick release end fitting recently placed on the market by Gordon Brown & Associates.

Designed for use with "Brown-Line" tie-down equipment, the end fitting is built to accommodate straps and can be used for quick release of drop tanks, emergency equipment, life rafts and other loads.

A latch-type unit, the quick release consists of pivoted toggles (1) which mechanically lock in the spread position (shown) to the fitting (2) below. Lifting the quick release arm (3) unlocks the toggles which then deflect downward from weight of the load and pull through the center cutout (4) in the fitting to disengage. The release can be remotely operated through mechanical, hydraulic or electrical controls. Address: 407K Commercial Center St., Beverly Hills, Calif.



Capacitor Mounts

To help engineers overcome some of the shock and vibration problems encountered in mounting capacitors in military gear, Sprague Electric Co. has

provided new and diversified mounting arrangements for its line of subminiature, metal-encased paper capacitors.

Now being produced are hermetically-sealed, tiny, threaded-neck capacitors. Other versions are capacitors with side mounting studs and end-stud units. Also produced are units with brackets for horizontal or vertical mounting. Sprague says this is the first time the new mounting arrangements have been available as standard on its capacitors.

The firm also is marketing a new line of subminiature capacitors designed to operate continuously at 125 C. The units use "Vitamin Q," an organic polymer capacitor impregnant used exclusively in its products, according to the firm. These capacitors are supplied in voltage ratings from 100 to 1000v. dc. in both inserted tab and extended foil construction. Address: North Adams, Mass.

Seals Plane Surfaces

"Syn-Cote," a tough plastic coating made especially to protect metal, wood and fabric surfaces on aircraft, now is available from Roscoe Turner Aeronautical Corp., Indianapolis.

The product is a non-flammable material that can be sprayed on surfaces to form a pliable, non-porous sheet which seals against oxidization and corrosive effects of weather. It will not crack, check or peel, according to Turner. But it still can be removed easily when damaged surfaces must be repaired.

Syn-Cote won't soften in oil and resists gasoline, acids, salt water and alkalis, says the company. It also resists abrasive effects of sand and dust. A half gallon will cover the average lightplane, drying quickly to less than two pounds added weight.

ALSO ON THE MARKET

Portable hydraulic puller weighing less than 10 lb. develops 10,000 psi. "Power-Twin" design permits it to be used on jobs previously inaccessible with this type of equipment, says maker, Owatonna Tool Co., 404 Cedar St., Owatonna, Minn.

"Fastex" high-speed cameras in 8-, 16- and 35-mm. models, have lenses of high resolution, can be used for motion studies of mechanical, electrical and physical reflexes and vibrations. Cameras will take pictures up to 14,000 frames per sec., are made by Wollensak Optical Co., Rochester, N. Y.

LETTERS

Airship Recognition?

It must have been good news to the aeronautical world in general to read in your columns of Feb. 5th, the announcement by that most important governmental aid to aeronautics, the National Advisory Committee for Aeronautics, of its appointment of some 400 members of 27 technical committees for the current year, officially and realistically labeled—

“... ESPECIALLY IMPORTANT BECAUSE THEY CALLED FOR ADDED SERVICE TO THE NATION IN A TIME OF NATIONAL EMERGENCY.”

And so, scanning the 27 committee titles undoubtedly intended to cover the field of aeronautics comprehensively, even airship personnel might wistfully hope to find some recognition of their specialty since airships at least once upon a time were looked upon as members of the aeronautical family, and today do exist in the broad assortment of types the Navy has set up in this “time of national emergency.”

But, even though long accustomed to both studied and unthinking indifference to airships, it is nevertheless a bit disheartening to airshippers to see that this foremost advisor to aeronautics hasn't directly or even by implication recognized the field of aerostation or displacement aircraft, still so clumsily labeled “lighter-than-air” by so many. Yet, “seaplanes” and “helicopters,” both but different charter members of the winged aircraft family are given major independent standing.

Surely, of all authorities in the world, the NACA must recognize that airships are not even remote cousins of winged aircraft, and only by wholly unrealistic standards should be lumped with the latter.

Surely, the NACA must know also, since it is fully aware of the relative paucity of attention devoted to such craft, that displacement aircraft, as well as winged aircraft, have not by any standard reached the pinnacle of their development and still should have available the best of technical brains and facilities. To infer otherwise, by not now, “in time of national emergency” affording them recognition by way of special technical help, while flattering to airships and their limited personnel is nevertheless either stupid or highly indifferent, and the NACA certainly isn't the former.

Since at least one government agency, the Navy, recognizes and uses airships, isn't it only fair to the country which expects the best possible results from such craft, that airships too get from other tax-supported agencies also, the recognition and assistance to which presumably all the country's aircraft are entitled from the pertinent government funds? Or, is there unbeknownst to me, some mandate, understanding or policy that the funds entrusted to spending by the NACA shall go only for winged aircraft?

On the other hand, can it be that this one hand of the government doesn't know what the other is doing? Just whom are we kidding by this continued sort of treatment of the airship? Could it be the tax-

payer again? Let's hope the public soon gets interested enough to demand an honest look-see at the true airship picture.

C. E. ROSENDAHL
Flag Point
Toms River, N. J.

Irregular Hours

Anent the fights of “irregular” air carriers to secure certificates and their sundry reasons why they should have them, including the one that they can cut haulage rates and do without mail aid, it is here wondered if they have been so magnanimous as to lay out the whole picture?

Some short acquaintance with several of them surely justifies their being called “irregular” air carriers. When their low haulage quotations are based upon their ability to take advantage of job scarcities and then operate almost constantly in state of emergency, expecting flight crews to make two oceanic hops without sleep, thus totaling over 26 hours of wakefulness, they should know that they are setting up conditions of great financial and considerable personal risk to those who are loaded with the tasks.

Just recently one of these “irregulars,” in order to save a few bucks, proposed that its navigators should hop from Honolulu to Wake to Tokyo without relief. A 12-hour rest period at the turnaround would fit him for the return to Honolulu via Wake, which means he would navigate 11 hours per leg with 2 hours flight planning and eating between. Two work periods of about 22 hours each, with a rest period of a net 8 hours was all that was expected. . . .

In consideration of dozens of other slipshod ways and means of getting the haulage costs below what the “skeds” charge, I would say that these “irregular” carriers should be given some sort of scheduled operation which at least would bring them under the same Civil Air Regulations which now guide and control the scheduled operators.

It is firmly believed that the elimination of the old “barnstorming” attitudes often found among “irregulars,” control of flight hours, improvement of flight equipment and other improved controls would eventually result in a good reduction of the number of business failures now found in this business. Fewer flight personnel would be guilty of falling asleep at their tasks.

LESTER C. FOLLETTE
1435 Foothill Blvd.
San Leandro, Calif.

Statistical Reformer

The author of the piece in your Feb. 5 issue, entitled “New Yardstick for Transportation Safety,” seems much taken with the notion that violent deaths per se are less meaningful—statistically speaking—than the normal remaining life expectancy of the victims.

It may be news to the statistician, but we middle-aged duffers take a more sentimental view: we want to keep hanging on, no kidding.

If I understand the statistician's argument, an airline could grind a man to mincemeat on the short runway at LaGuardia, and claim that it doesn't matter so very much, because the old so-and-so was slowly disintegrating anyway, due to natural causes.

This novel approach to the problem of proving that air travel is safer than brushing your teeth suggests some reforms in common practice.

For example, if the airlines refused to sell tickets to anyone under 75 years of age, they might eventually prove that baby carriages are 2.09 times as dangerous as Strato-cruisers; the oldsters who got chopped up in overshoot landings wouldn't count.

One fault with the statistical method of proving to Jones that his death is less painful and tragic than Smith's, is that the statistician doesn't go far enough. A character factor should be fed into the computation. The sudden death of a virtuous taxpayer with 12 children obviously is worse than the violent demise of Public Enemy Number 658; and the loss of a leg is more injurious to a barber than, say, to a statistician, who doesn't have to walk around asking people how they'd feel about being bumped off, but can do it all with numbers.

I await with interest an advertising campaign by ATA, based on the new method of measuring misery. The slogan is inevitable:

DON'T WORRY ABOUT RIDING IN AIRPLANES — YOU'RE HALF-DEAD ALREADY

W. P.
Doylestown, Pa.

(W. P. is an aviation writer—but not the editor of an aviation magazine, who has the same initials—ED.)

Praise

Just a few words of appreciation and commendation for the splendid job you and your staff have done in the compilation of your 18th annual Inventory of Air Power which constituted your issue of Feb. 26.

While the entire issue indicates the thoroughness of a well-trained editorial staff, I would like to make specific reference to your presentation of the current helicopter situation. The writer (I understand Alex McSurely prepared this material) turned out a splendid analytical summary of the helicopter's history and present stage of development indicating an expert insight into this particular phase of the aviation industry.

As I say above, the entire issue is excellent, but I believe your handling of this new roto-wing progress merits specific mention.

DON RYAN MOCKLER
Helicopter Council
Aircraft Industries Association
of America, Inc.
610 Shoreham Building
Washington 5, D. C.

We . . . appreciated your article on Delta's Purchasing Department, which was prepared by Dalton White of your Atlanta Bureau, and used in your Jan. 15 issue. This was so complete that a lot of it was

AVIATION WEEK, April 2, 1951

Engineered!

**Don't guess on runway lighting; use
L-M Airport Lighting Engineering Service**

The planning of an airport runway lighting system is vitally important. So L-M offers you a complete runway lighting engineering service.

L-M has been in the airport lighting business for many years. Its engineers know lighting. More important, they know what the pilot must see, and do, when he is coming in for a landing. The *aviation* problems of a runway lighting system are even more important than the electrical and the optical problems.

L-M has an extensive staff of airport lighting engineers. Its field engineers throughout the country are backed up by experienced district lighting engineers. Back of them is a complete engineering staff of flyer-engineers at headquarters.

The service includes analysis of the problem, planning, consultation, specifying of equipment that will meet the requirements and come within the budget; and the supervision of installation and operation.

Get this Engineering Data Check Sheet

Ask the L-M Field Engineer for the L-M Airport Runway Lighting Data Check Sheet, or write Line Material Company, Airport Lighting Division, Milwaukee 1, Wis. (a McGraw Electric Company Division).

LINE MATERIAL... Airport Lighting

Here is some of the complete L-M Equipment for Small and Large Airports



L-M's famous 180,000 cp controllable-beam high intensity runway light, type L 818.



L-M high intensity unit with fixed focus, type L 819.



L-M medium intensity runway light for smaller airports, and for taxiways at larger airports.



L-M revolving beacon for Class I, II, and III airports.



L-M marker and obstruction lights, single or double.



L-M control panels for large and small airports.

tough as they come!



FAMOUS *Snap-on Vacuum Grip pliers



● Pick any Snap-on Vacuum Grip Pliers and you're set for years of faithful service. The way these professional pliers are designed, the way they're hammer-forged and oil-tempered and finished, the way they're inspected and tested—all the precautions taken with them—have just one purpose . . . to make them the finest pliers a man can buy. They handle better. They grip, twist, bend or cut better. They don't slip, in your hand or on the work. They last longer, because close-grained strength is forged and tempered into them. They're tougher.

31 types and sizes to choose from

Heavy-Duty Gripping Pliers ● Combination Pliers ● Lineman Pliers ● Diagonal and End Cutters ● Pin and Needle-Nose Pliers ● Midget Pliers ● Duck-Bill and Ignition Pliers ● Brake Spring, Brake Key, Battery, Water Pump, Snap-Ring and Catter-Pin Pliers ● Pliers in Sets, in Leatherette Kits, in varied Sizes. All are Snap-on quality, like the 4,000 other professional Snap-on tools. If you are a user of quality tools, send for the free, 104-page Snap-on Catalog.



SNAP-ON TOOLS CORPORATION

8020-D 28TH AVENUE
KENOSHA, WISCONSIN

* Snap-on is the trademark of Snap-on Tools Corporation

news to people within the Delta organization.

We . . . enjoyed George Christian's visit. . . . I predict his resulting article in your Equipment section will be both authentic and interesting.

JAMES H. COBB, JR.,
Director of Public Relations & Advertising
Delta Air Lines
Atlanta.

Club Insurance

Mr. Crawford's letter (AVIATION WEEK Oct. 16, 1950), Mr. Winser's reply (Feb. 5, 1951), and your editorial comments interest me.

As president of American Mercury Insurance Co., specializing in aviation insurance for Aircraft Owners and Pilots Assn. members, I am naturally interested and follow the activities of companies offering "club" insurance plans. I know of no bankruptcy ever costing policyholder losses. True, some plans have fizzled . . . due, analysis has shown, to inadequate administration, rather than excessive claims losses. True, also, these failures have cost someone money . . . but neither policy-holders nor claimants.

Americo (and its predecessor, G. C. Whalen & Co., Inc.) have served AOPA members for the first five years. Our plan has been kept flexible, changing several times in pace with the changing needs of private flying and the problems that face fixed base operators. Typical, is the latest (reported in AVIATION WEEK Nov. 13, 1950), our "Merit Rating" plan lowering premiums on better risks. Premiums are influenced (usually downward) by age, experience, occupation and safety record of the pilot, type of aircraft, location of home airport, amount and type of flying, etc. We know the reactions of our policy-holders to this change . . . they're enthusiastically favorable. Our loss ratio is satisfactory . . . we're enthusiastic, too.

We do agree in part with your answer to Mr. Winser regarding the "misunderstandings about aviation insurance." Personally, however, I feel that such confusions are due, in considerable extent, to the framing of aviation insurance by insurance men who do not specialize in aviation insurance. At Americo, where the writing of aviation insurance is the specific field of interest, much is being done to clarify terminology, simplify policies and relate coverages immediately to aviation needs.

Of necessity, this simplification has been gradual. We must be certain that such changes neither limit coverages nor entangle claims. That we're making good progress is indicated by the approval of AOPA's governing board toward our policies, and by the ever increasing number of AOPA-member policy-holders.

I'm enclosing an Americo insurance "kit," now accompanying AOPA member credentials. Please read it. If you find confusions, will you let me know? I feel as you do about these things, and I'll welcome your reactions.

G. C. WHALEN, President
AOPA 20628
American Mercury Insurance Co.
4420 Connecticut Ave.
Washington 8, D. C.

AVIATION WEEK, April 2, 1951

THE COLLIER TROPHY

Aviation's Highest Award...



"To MR. WILLIAM P. LEAR, Director of Research and Development of Lear Incorporated, for his outstanding achievement in the development, perfection, application, and production of the Lear F-5 automatic pilot and automatic approach control coupler system which makes possible the safe landing of jet aircraft regardless of extreme weather or visibility conditions."

The Collier Trophy is awarded each year by the National Aeronautics Association and presented by the President of the United States "for the greatest achievement in aviation in America, the value of which has been thoroughly demonstrated by actual use during the preceding year."

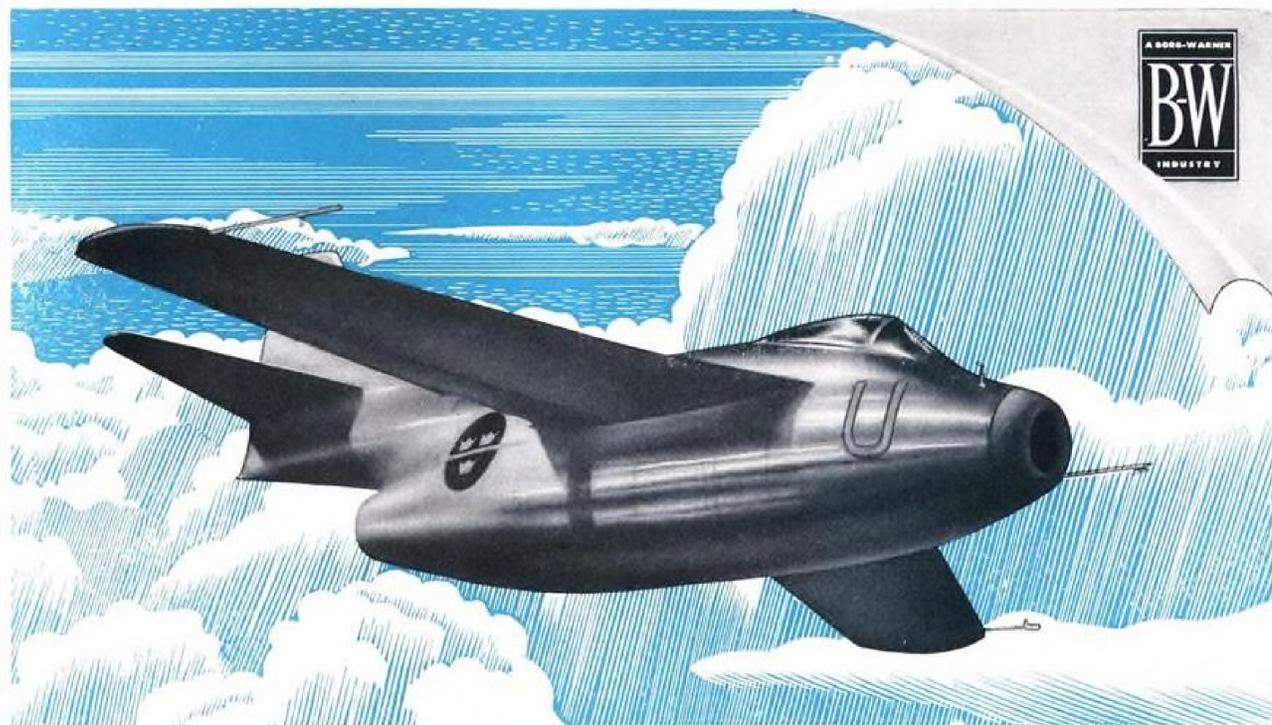
The Lear F-5 automatic pilot, the Lear automatic approach control coupler (for bringing aircraft automatically down the standard ILS beams to within a few feet of the runway without a human hand having to touch the controls), and Lear attitude indicating instruments, are now in quantity production for the U.S.A.F.



LEAR INC.



GRAND RAPIDS, MICHIGAN • LOS ANGELES, CALIFORNIA • ELYRIA, OHIO



Another PESCO FIRST...the Unloading Gear Pump ...flies with SAAB at transonic speeds

Lighter weight . . . longer service life . . . lower maintenance expense . . . smaller initial cost . . . four good reasons why Pesco's new unloading gear-type hydraulic pump is rapidly replacing conventional variable volume pumps on aircraft . . . particularly jets.

Among the first to take advantage of the many benefits of Pesco's latest contribution to more efficient, more dependable aircraft operation is the famous Swedish SAAB Aircraft Company. Its new SAAB-29, designed to fly at speeds up to the transonic speed range, depends on the Pesco Unloading Gear Pump for all hydraulic operations including landing gear, wing flap, brake operation, etc.

Always alert to the demands of aircraft makers for reductions in weight, elimination of service and maintenance problems, and lower costs, Pesco research engineers are continually

searching for ways to improve present equipment as well as develop new products to meet these important requirements.

It is this constant research that keeps Pesco aviation products standard equipment on military and commercial aircraft. If you have a problem in aircraft hydraulics or fuel handling, perhaps this experience can help you. A Pesco engineer will gladly discuss your problem with you . . . without obligation, of course.



Pesco Model 011799 Unloading Gear Pump. Weight 8.6 lbs. Maximum continuous operating pressure 1500 p.s.i. Capacity 2 g.p.m. at 1500 r.p.m. Features Pesco's exclusive, patented "Pressure Loading" principle. Other models available for pressures to 3000 p.s.i.



PRODUCTS DIVISION

BORG-WARNER CORPORATION

24700 NORTH MILES ROAD

BEDFORD, OHIO

FINANCIAL

Components Firms Share Air Boom

Bendix Aviation and Thompson Products reports show increases for 1950 in total sales and profit.

Manufacturers of aviation components are participating fully in the accelerated aircraft procurement program. This is revealed by the current annual reports released by two of the leading factors in this group—Bendix Aviation Corp. and Thompson Products, Inc.

Bendix, for its fiscal year ended Sept. 30, 1950, shows net sales and other operating income of \$219,419,794, the highest in its postwar history. The increase of \$36.7 million over 1949 sales is due largely to the gain in billings for aviation products.

Sales of aircraft products in 1950 totaled over \$105 million or 49 percent of total volume as compared with \$84.8 million or 47 percent in 1949.

► **Profit Up**—Profit margins for Bendix increased to 7.7 percent of net sales for 1950 compared with 6.1 percent in 1949. Larger sales and improved profit margins are manifested in the 1950 earnings of \$16,954,116 or \$8.00 a share compared with \$11,086,781 or \$5.24 per share for 1949. Earnings during 1949 were affected by an 11 weeks' strike at the company's largest division. But 1950 had to absorb a higher total tax bite.

Bendix fared very well in settling its federal income and excess profits taxes for the war years 1940 to 1946 inclusive.

The company had previously set up a tax provision of \$3,760,154 for this period. Instead, it received a refund of \$1,086,971. In effect, it picked up in the process an aggregate of \$4,847,125, which was credited direct to surplus.

The financial position of Bendix improved considerably during the past year. Net working capital amounted to \$83.7 million at Sept. 30, 1950 compared with \$73.3 million the year before.

At the same time, the equity of stockholders at Sept. 30, 1950 increased to \$101.6 million or \$47.98 per share. This represented an increase of more than \$11 million over the 1949 fiscal year-end.

For its 1950 period, Bendix paid out a total of \$4.75 per share in dividends. This represented around 60 percent of available earnings. Such a distribution is somewhat larger than that paid by the airframe builders but a closer approximation to general industrial cor-

porate practice where established earnings exist.

► **Aviation Interest**—The company's ever-widening interest in aviation developments receives prominent mention in the annual report. Many divisions of Bendix are declared to be actively engaged in aircraft engineering and development in collaboration with the military services and manufacturers and users of such equipment. The engineering and production assignments are reported to be concerned with the guidance, control and operation of aircraft as well as the control and operation of both reciprocating and jet engines.

Among other things, the company asserts that its equipment is in growing demand for new types of radio communication and navigation systems for aircraft, "a growing number of radar developments for both military and civilian use and products in the rapidly developing fields of guided missiles, rockets and pilotless aircraft."

During its past fiscal year, Bendix spent about \$24 million for engineering. This includes both company-financed programs and government-paid projects in "many fields."

Total unfilled orders for Bendix at Sept. 30, 1950 came to about \$336 million compared with \$165 million a year earlier. The bulk of this increase occurred during the latter part of the fiscal year and was in aviation engineering and research project classifications. The company notes that "procurement of this type generally runs far in advance of delivery."

To meet its increased bookings, the company has embarked upon a new program of plant expansion and subcontracting.

► **Thompson Story**—Very much of the same story is revealed by Thompson Products, Inc. in its annual report for the year ended Dec. 31, 1950. Total sales last year aggregated \$123,312,550, against \$107,608,803 for 1949. Sales of aircraft products for 1950 were \$50,972,690, about the same as for 1949. But aircraft billings accounted for 40 percent of the total Thompson sales in 1950 and 46 percent of the total in 1949.

The management states that a comparison of the full year's figures on aircraft sales fails to give an adequate idea as to what has been happening in this

division. Due to reduced military appropriations, there was a decline in aircraft business during the early months of 1950. By mid-year, this situation had changed radically and the government was hurrying plans for greatly increased aircraft expenditures. As a result, the demand for aircraft components rose rapidly and Thompson has had to increase its capacity substantially for the production of these products. Here, too, as in the Bendix experience, note is made that "there is always a lag between the receipt of orders and actual shipments." Rate of deliveries, however, began to climb during the latter part of 1950 and are expected to increase for many months to come.

Net earnings for Thompson were \$8,252,459 or \$7.51 per common share for 1950. This compared with \$6,014,748 or \$5.37 per common share in 1949.

Profit margins on net sales were 6.7 percent in 1950 and 5.6 percent in 1949. The management attributes this showing to higher operating efficiencies, economies from the use of new and better equipment, improved plant layouts and other measures.

► **Net Worth Gains**—Further improvement in Thompson's financial position is evident in the gain in working capital to \$32.7 million at the 1950 year-end as compared with \$30.2 million a year earlier. The net worth of the company showed an even greater gain, from \$41.8 million to \$47.4 million during this same period.

Dividends on the company's common stock, allowing for the previous stock-split, amounted to \$1.46 per share during 1950 as compared with \$1.25 for 1949. The 1950 distribution represents less than 20 percent of available earnings.

In what appears to be an attempt to anticipate any criticism of this dividend policy, the management states that reinvestment of a large part of earnings has become a necessity if unwarranted amounts of indebtedness or dilution of the common stock equity is to be avoided. More than \$25 million of total earnings since 1935 are declared to have been reinvested to meet plant expansion requirements.

Jet engine components continue to represent a large part of the total aircraft sales of the company. New aircraft products, however, are represented as gaining wide acceptance and accounting for a growing portion of shipments.

Bendix and Thompson are both important suppliers to the automotive industry. But the aircraft group promises to make further inroads in 1951 billings and surpass 1950 sales in this category by a substantial margin for both companies.

—Selig Altschul

AIR TRANSPORT

CAB Now Wants Ocean Coach

New policy statement calls for low-fare trans-Atlantic scheduled service in the summer of 1952.

Certificated international airlines will probably start scheduled low-fare air coach service across the Atlantic the summer after next—international conditions permitting. The Civil Aeronautics board, in a new trans-Atlantic charter policy statement, at last admits there is something to the trans-Atlantic air coach service urged by Pan American World Airways since 1948.

There will now be no more exemptions for special irregular charter operators and agencies. Starting on May 1 CAB will strictly regulate all charter flights.

After two years of opposition to Pan-Am's trans-Atlantic coach fare application, CAB now wants the regular airlines to tap the U. S. mass-market for tourist travel abroad—not just keep the present high-priced market. But on the matter of subsidies (if needed) to start the service, CAB says little. But PanAm, in its campaign for CAB permission, has, in the past, offered to absorb any losses. On the other hand, Trans World Airlines and most of the foreign lines of IATA have opposed the coach idea, saying it couldn't pay.

► **Two Documents**—The Board issued two documents on the subject: a policy statement on trans-Atlantic fares and charters, and a new economic regulation for all charter operations of regular airlines—domestic and international. The Board's policy reversal plots a new future for international travel.

One factor that probably forced the CAB about-face on the plan was its support by CAB Chairman Delos Rentzel. He figures it will build international carrier fleets—thereby increasing the first line of military air transport reserve. (AVIATION WEEK, Mar. 5). ECA also gave it a boost. Tourists were England's biggest single dollar source last year.

The Board's new regulation will put domestic and international charter operations under rigid CAB control—starting May 1. CAB urges foreign carriers to obey the same rules; otherwise, says CAB, "the Board must reconsider its charter policy."

Charter operations of "indirect carriers" are out now, says CAB. The Board points back bitterly to tourist experiences last summer, when charter operators left paying customers stranded abroad. These non-certificated charter

operations were unnecessary, asserts CAB. Statistics now show that the regulars could have carried all the load that crossed last summer—which is what the scheduled carriers claimed all along.

If peak demand exceeds regular carriers' capacity, they can charter planes from other operators, says CAB.

The nonsked and agency charters did prove two things last year, CAB implies: low fares draw a crowd abroad; high-density travel can probably pay off at substantially lower per-person fares.

This would open the field of European travel to income groups not ordinarily interested in international travel, including the large number of former G.I.'s who saw the Continent as members of the Army.

► **No Hurry**—CAB is not going overboard on low-fare trans-Atlantic travel. The Board wants a year or more to "study" the thing. Says the Board policy statement: "since comprehensive data must be assembled and careful study be given to this problem prior to the establishment of any reduced fare service, it does not appear feasible to sponsor any such service for the 1951 summer season."

► **CAB Initiative**—Though the Board is not pushing low fares now, it says it will see they get a try in 1952: "the Board is taking positive action in this connection . . . by initiating studies of the possibility of an economic low-fare service, and it is hoped that other governments and the carriers concerned will do likewise."

► **Self-Sufficient?**—CAB is urging carriers like Pan American and Trans World to try summer air coach service across the Atlantic next year. But CAB says the airlines must "assure (themselves) returns adequate for the attainment of the greatest practicable measure of economic self-sufficiency." The question then is: Who decides what coach fare will give the carrier the best return on his investment—the carrier or CAB?

Presumably, the Board's new international policy is merely an extension of its domestic coach fare policy. That probably means the board will set the fares.

► **Charter Policy**—The new CAB regulation for charter trips and special services by certificated airlines means:

- All charters are now regulated.
- Tariffs must be filed.

- Charter volume per month cannot exceed 2½ percent (1/40) of the scheduled revenue plane miles flown the preceding 12 months.

- No charters are allowed to or from Alaska.

- Certain limits are placed on frequency of domestic charter operations outside an airline's own certificated service points.

- International charter flights to another airline's territory are forbidden unless CAB gives special permission.

► **Airline Initiative**—A little-known fact is that Pan American is the pioneer of air coach service. In September, 1948, PAA started year-round coach service New York-San Juan. Many airlines criticized this experiment, but PanAm found it so good the company has since extended it throughout South America, along with Panagra.

CAB sources say the strenuous opposition of foreign carriers has been the main reason for past CAB opposition to air coach. CAB figured foreign airline opposition would be too strong to buck. That is why CAB says air coach cannot start until a year from this summer.

But CAB sources also still worry over profitability of air coach the year round across the Atlantic. Reason is that the business is highly seasonal. June and July it goes abroad and August and September the tourists come home. So there is both seasonal and directional unbalance on the route.

4 Airlines Announce Executives '50 Pay

Four U. S. certificated airlines have announced 1950 salaries for top executives and directors. Including 1949 salaries, where available, in parentheses, they are:

- **Delta Air Lines, Inc.** C. E. Woolman, pres. and dir., \$24,500 (\$24,000); C. E. Faulk, chm. of board and dir., \$12,000; Charles H. Dolson, v. p. oper., \$16,333 (\$16,000); Laigh C. Parker, v. p. traffic and dir., \$18,250 (\$18,000); L. B. Judd, comptroller, asst. secy. and dir., \$10,941.67 (\$10,800); Travis Oliver, treas. and dir., \$1,200; C. H. McHenry, secy. and dir., \$1,200; Catherine Fitzgerald, asst. treas., \$4,250.

- **Mid-Continent Airlines, Inc.** J. W. Miller, pres. and dir., \$26,766.56 (\$25,000); J. C. Collins, v. p., secy. and dir., \$9,633.20 (\$9,999.84); J. A. Cunningham, v. p. oper., \$14,100 (\$13,000); H. W. Coburn, v. p. traf. and sales, \$12,099.84 (\$10,999.84); W. L. Walker, treas., \$9,900 (\$9,000); C. H. Calhoun, v. p. eng. and maint., \$12,099.84 (\$10,999.84); W. D. King, asst. treas., \$6,350 (\$5,800); P. H. Carr, asst. secy., \$5,450.

- **Northeast Airlines, Inc.** George E. Gardner, pres. and dir., \$18,000 (\$17,900); A. A. Lane, v. p. oper., \$14,400; Robert L. Turner, v. p. sales, \$8,000; Hamilton Heard, treas., \$12,000; R. H. Herrnsteln, asst. treas., \$7,500 (\$7,200).

- **Hawaiian Airlines, Ltd.** Stanley C. Kennedy, pres., \$27,525.81 (\$27,500); Alexander Smith, v. p. and secy., resigned, \$15,275.82 (\$14,000); Ford Studebaker, v. p., \$14,109.21 (\$14,000); David Watson, treas., \$11,150.89 (\$11,000); Brian Cooke, asst. treas., \$7,240.96.

What P.O. Spent for Air Mail

—1950 Fiscal Year (preliminary, subject to adjustment)—			
	Revenue	Expenditure	Loss
Domestic Air Mail.....	\$74,120,038	\$109,621,623	\$35,501,585
Foreign Air Mail.....	27,334,124	78,286,451	50,952,327
TOTAL	\$101,454,162	\$187,908,074	\$86,453,912
—1949 Fiscal Year—			
	Revenue	Expenditure	Loss
Domestic Air Mail.....	\$65,385,603	\$102,646,667	\$37,261,064
Foreign Air Mail.....	25,694,375	73,418,670	47,723,295
TOTAL	\$91,079,978	\$176,065,337	\$84,984,359
—1948 Fiscal Year—			
	Revenue	Expenditure	Loss
Domestic Air Mail.....	\$53,586,950	\$80,662,381	\$27,075,431
Foreign Air Mail.....	23,815,519	51,571,220	27,755,701
TOTAL	\$77,402,469	\$132,233,601	\$54,831,132

SOURCE: Post Office Dept.

Mail Payments

PO loss on domestic air mail drops slightly, but foreign loss goes up.

Pan American World Airways gets the lion's share of government mail business in the 1950 fiscal year. The carrier received \$46 million in mail revenue—approximately \$2 million more than the 16 domestic trunk carriers, combined, received for domestic airmail service; \$4 million more than the Big Five, combined, received for domestic and international airmail service.

Total mail revenue of the Big Five, for domestic and international service, was: TWA, \$14.5 million; American and American Overseas, \$9.5 million; Northwest, \$8.4 million; United, \$7.0 million; Eastern, \$3.2 million.

► **PO Loss**—Air mail service, domestic and foreign, cost the Post Office Department a loss of \$86 million, in the 1950 fiscal year—\$1.5 million more than the 1949 deficit and \$31 million more than the 1948 deficit, according to preliminary PO figures.

The loss on domestic service was down. A \$35-million deficit for the 1950 fiscal year compared with a \$37-million deficit the previous year. The 1948 fiscal year deficit was only \$27 million.

But the loss on foreign air mail service was up. The 1950 fiscal year deficit is estimated at \$50 million, compared with \$47 million for 1949, and \$27 million for 1948.

Post Office expenditures for air mail service include an apportionment of overhead cost, as well as payments to carriers. Air Transport Assn. objects to the department's overhead apportionment method, claims that if the air-mail service did not have to bear an

Who Got It

(In Millions, Amounts Less Than \$100,000 not Listed)

	1950 Fiscal Year	1949 Fiscal Year
All Domestic Trunk Carriers	\$44.8	\$54.0
American	\$5.3	\$5.5
Eastern	3.2	3.7
Northwest	3.0	4.1
TWA	5.5	8.0
United	6.7	9.1
Braniff	2.3	2.9
Capital	4.4	5.8
Chicago & Southern... ..	1.8	1.8
Colonial	1.1	1.2
Continental	1.6	1.4
Delta	2.4	2.4
Inland	0.7	0.7
Mid-Continent	1.6	1.4
National	1.7	2.0
Northeast	1.5	1.7
Western	1.8	2.1
All Local Service Airlines	\$16.1	\$12.7
All American	1.8	1.1
Bonanza	0.3	...
Central	0.4	...
Empire	0.6	1.1
Frontier	2.0	2.1
Mid-West	0.3	...
Piedmont	1.3	1.2
Pioneer	1.5	1.8
Robinson	0.6	0.3
Southern	1.0	...
Southwest	1.1	1.3
Trans-Texas	1.9	1.2
Turner	0.2	...
West Coast	0.7	0.6
Wiggins	1	...
Wisconsin Central	1.2	0.9
Helicopter Air Service	0.2	...
Los Angeles	0.4	0.4
All International Carriers	\$73.5	\$70.4
American Overseas	4.2	4.1
Braniff	1.7	1.2
Chicago & Southern... ..	1.5	1.4
Colonial	0.2	0.4
National	0.1
Northwest	5.6	5.2
Panagra	3.8	3.9
Pan American	46.6	42.6
TWA	9.2	10.7
United	0.5	0.6

	1950 Fiscal Year	1949 Fiscal Year
All International Carriers	\$73.5	\$70.4
American Overseas	4.2	4.1
Braniff	1.7	1.2
Chicago & Southern... ..	1.5	1.4
Colonial	0.2	0.4
National	0.1
Northwest	5.6	5.2
Panagra	3.8	3.9
Pan American	46.6	42.6
TWA	9.2	10.7
United	0.5	0.6

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Northwest	5.6	5.2
Panagra	3.8	3.9
Pan American	46.6	42.6
TWA	9.2	10.7
United	0.5	0.6

SOURCE: CAB

undue burden of general department expenses, it would show a profit.



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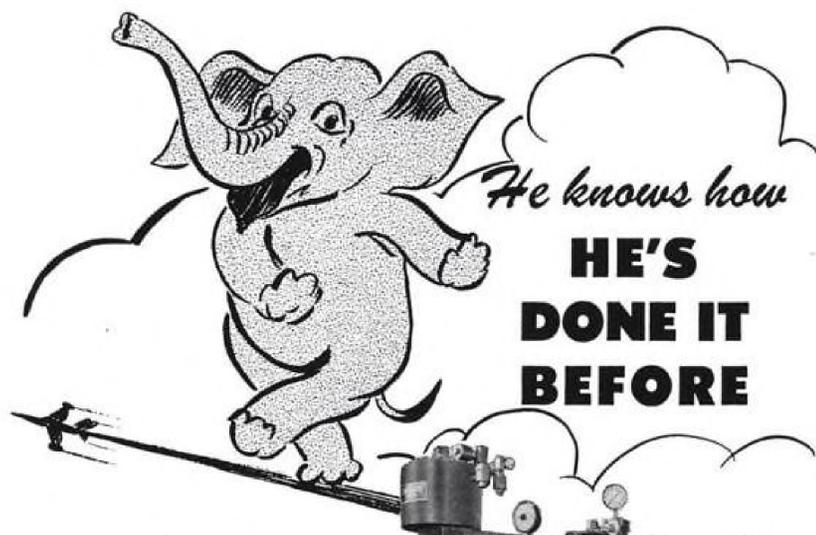
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Position _____

Company _____

Address _____

City _____ Zone _____ State _____

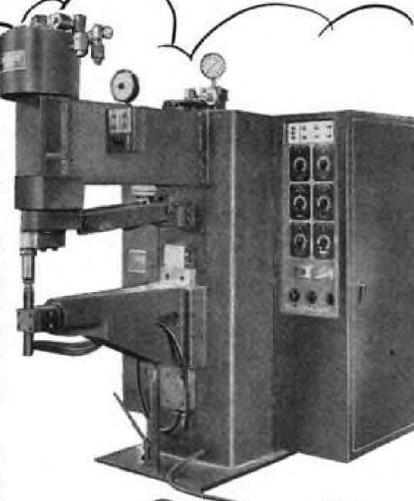


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ATA Is Opposed to Widening CAB Rule

Civil Aeronautics Board's proposed new legislative program is going to have to buck stiff opposition from the airline industry.

"What it adds up to," Air Transport Assn.'s general counsel, Stuart Tipton, observed, "is that the Board wants to run the airlines, instead of letting the airline managements do it."

Airlines are solidly and unalterably opposed to three of the CAB proposals (AVIATION WEEK Mar. 26, p. 17). They are: authority to compel carriers to initiate new services, tell them what type of equipment to use, control security issues.

As to the Board's request for authority to control frequency of service and rates of international carriers, airlines do not think it's needed, Tipton said.

► **Tough Bargaining**—The Board claims negotiation of bilateral agreements with foreign governments is made difficult because CAB can't guarantee that U. S. carriers will abide by limited service and rates agreed upon. Tipton countered that this argument isn't realistic: "CAB can tell carriers their certificates will be revoked if they violate terms of agreements."

The carriers are against the Board's demand for authority to compel equipment interchanges among international carriers, Tipton continued, "because this can be better worked out between the managements, than by having the matter dictated by the board."

The ATA spokesman marked down the Board's plan to write subsidy limitations in route certificates as "the wrong approach."

"Future developments that might justify more or less subsidy can't be foreseen at the time a route certificate is granted. The logical approach, after provision has been made for separation of subsidy from mail pay, would be to determine from time to time what routes are being unwisely subsidized," Tipton said.

ATA "may be in favor of the Board's request for authority to order ticket agencies to cease and desist from unfair or deceptive practices," the general counsel indicated, "if it is kept narrow. We don't want the Board given such sweeping power that it could wipe out private competition and initiative in ticket selling."

ATA strongly supports, as it has for several years, the Board's request for jurisdiction to regulate contract carriers. But Congress has repeatedly shied from making a decision on the controversial issue, and does not seem likely to tackle it again this year.

CAA, NWA, Martin Get Accident Blame

The CAB blames Civil Aeronautics Administration, Northwest Airlines and Martin Aircraft Co. in its analysis of the NWA takeoff accident at Billings, Montana, Sept. 4, 1950.

The hydraulic system failed just after takeoff roll started. Probable cause was found by CAB to be failure of an "ermeto" hydraulic fitting due to improper installation. The brakes failed just after the pilot started to cut off his takeoff run (the failure sent smoke into the cockpit, alerting the pilot to discontinue takeoff).

Criticism of CAA, and Martin comes from this fact, as stated by CAB after investigation: Section 4B.337 requires that a brake system must be designed so that the pilot can stop it on an alternate system if the other system fails.

CAB says this requirement was in regulation form before the 2-0-2 was certificated by CAA.

The CAB goes on to say that a failure similar to the one causing the Billings accident happened a year before at Chicago: "the government (meaning CAA), the manufacturer, and the operator were fully aware that the design of the Martin 2-0-2 hydraulic system did not satisfy the regulation inasmuch as the separation of the fitting that occurred on that flight resulted in a loss of pressure in both the main and emergency hydraulic systems the same as it did at the time of this accident."

CAB concludes its analysis: "Accordingly, it is concluded that the failure of the manufacturer to comply with section 4B. 337, the failure of the government to require compliance at the time of certification, and the lack of positive corrective action required by the government, all were contributing factors."

And CAB runs it into CAA: "One month after this accident occurred, the Administrator of Civil Aeronautics required by an airworthiness directive that the hydraulic fuses be installed as described in the Glenn L. Martin service Bulletin 105."

Air France Orders Six Viscounts

Air France has become the first European continental operator to order turboprop airliners. The French government airline has completed negotiations with Vickers Armstrongs for six Vickers Viscounts for its London-Paris and European services.

The carrier probably was influenced by the prototype's performance during

its tour to the continent last year, when it made a flight from Northolt, England, to Le Bourget, Paris in 22 min. Operated by British European Airways, the plane has already carried more than 1500 passengers in demonstrations.

Aer Lingus (Irish Airlines) recently ordered four Viscounts at a cost of about \$590,000 each. BEA will take delivery on its first of the Rolls-Royce Dart-powered craft next year.

ACC Names Panel of Industry Advisors

The Air Coordinating Committee has appointed a new advisory panel of industry leaders to pitch in with expert advice on top policy problems.

Called the ACC Advisory Panel, members of the group will meet on demand.

ACC Chairman Delos Rentzel found the need of such an advisory "brain trust" shortly after he took over as ACC and CAB Chairman last fall. ACC has selected members of this panel to get a balanced industry viewpoint.

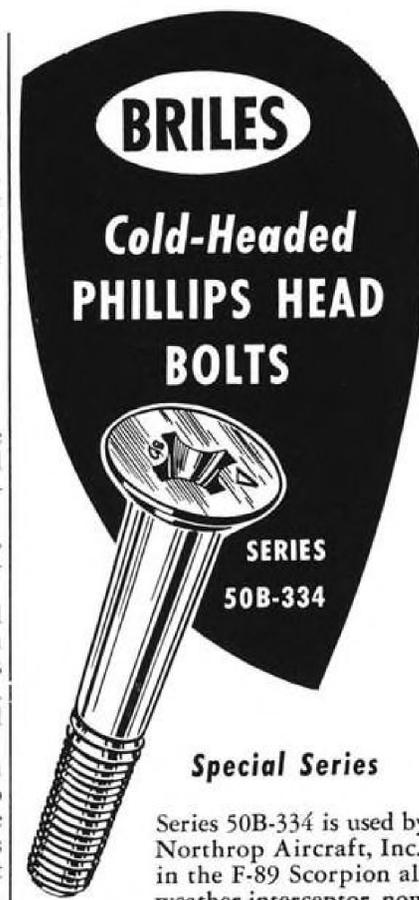
Members of the panel: Transit Van Corp. President John R. Alison; Babb Co. President Charles H. Babb; George Pierce Baker of the Harvard Business School; Sperry Gyroscope Co. President P. R. Bassett; Lockheed Aircraft Corp. President Robert E. Gross; Wisconsin Central Airlines President Francis M. Higgins; United Aircraft Corp. President H. M. Horner; Transocean Air Lines President Orvis M. Nelson; United Air Lines President W. A. Patterson; Rear Adm. L. B. Richardson, Fairchild Aircraft Corp.; Panagra President Andrew B. Shea; Slick Airways Chairman Earl F. Slick; Chicago & Southern Air Lines President S. A. Stewart; Cessna Aircraft Co. President Dwane L. Wallace; and Hartford Times Publisher Francis S. Murphy.

Tests on Production Super Connies Soon

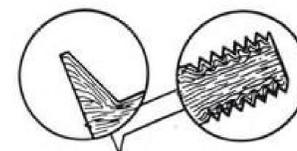
The Super-Constellation is expected to start CAA certification tests when the first production model for Eastern Air Lines comes off the Lockheed line about June.

Lockheed is now installing 2700-hp. Wright CA1 Turbo-Cyclone engines on its test model, which is a regular Connie made into an L-1049 Super Connie by adding 18 ft. to the hull and making other changes. The company will go on making its own flight tests on its test model, but little of that data counts toward certification of the production model.

Eastern Air Lines is scheduled for delivery of its first Super Connie in October.



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Short-Haul Prototype Legislation Asked

The Air Transport Assn. and local service airline consultant James Ray are pushing for a new aircraft prototype law. It would pay for design and construction of three new prototype planes—a jet transport, an airfreighter, and a 20-passenger short-hauler.

But only the short-hauler has any chance this year, most observers say. The Aircraft Industries Assn. and the Air Force both say this year would not be a fair year to start a civil transport design competition.

Reason is the manufacturers' heavy military design and production schedule. If one manufacturer should take the time and devote the skill to winning a government-sponsored prototype contract now with such a start he would probably dominate the field for the next decade. This, AIA feels, is not fair. And Air Force feels such a commercial effort at this time would dilute the military program.

The argument for pushing through a short-haul plane construction appropriation now is this: Airlines operating the obsolescent DC-3 are losing \$15-\$20 million a year on the deal. That is the extra cost of running the DC-3 compared to a modern plane, ATA estimates. Taxpayers pay that loss through mail pay subsidy.

It might cost only about seven or eight million dollars to build a new short-hauler prototype which might save the taxpayer \$15-\$20 million annually, short-hauler proponents argue. The Air Force cannot officially back a short-hauler prototype bill now, having no specific requirement drawn up for the plane. But AF admits unofficially that it would buy some if they were built; there are many places the plane would fill a military need, is the way they put it.

So a short-haul aircraft prototype construction bill may possibly go through this year; a jet transport and an air freight plane must await a let-up in military pressure on the manufacturers for orders.

Air Express Rates Go Up 20 Percent

Air express rates rose an average of 20 percent as Civil Aeronautics Board and the airlines were forced to knuckle to the Air Express division of Railway Express Agency.

The 20-cent-a-ton mile increase is provided in the new Jan. 1 contract of REA with the airlines.

The airlines get none of the increased revenue.

Previously, on the average shipment,

airlines got 35 cents a ton mile, the REA 25 4/10 cents. Now the airlines still get 35 cents, but the REA gets 35 cents.

The rate increase should have little visible effect on volume in the present mobilization period. But under normal economic conditions, customers naturally shy from a 20 percent boost in shipping cost. As to diversion to air freight, little is likely, as the difference between the two services is so great. Air express now costs four times as much as air freight, while it formerly cost three times as much.

Last year, air express volume increased eight million ton miles—from 27 million in 1949 to 35 million in 1950; this is a 29 percent gain. Air freight volume increased 21 million ton miles—from 94 million in 1949 to 115 million in 1950, a 22 1/2 percent gain.

SHORTLINES

► **Air Express**—The 27,172 shipments of air express through New York the first week of March were 21 percent more than a year ago; revenue was up 32 percent. . . . Month-of-February shipments totaled 138,223, 63 percent over 1950.

► **Air Transport Assn.**—ATA in its amicus curiae brief to CAB on behalf of Western and Inland mail rates, says if the Board confiscates profits they made on sale of route 68, "it will deprive carriers of a major incentive to accomplish voluntary route adjustments."

► **Air France**—French government-owned flag line is distributing a comic book promoting American student travel to France on the airline and through France on the French National railroads.

► **Braniff International Airways**—Braniff last year netted \$1,228,000—an all-time high for the line, and exceeding the four previous years' total. Domestic net profit of \$1,336,400 was reduced \$108,300 by the international operations net loss of \$108,300. Operating revenues of \$21,366,457 gained 10 1/2 percent while expenses increased only 7 percent.

► **Buffalo Municipal Airport**—American and Capital say they'll accept higher airport rates if they get a guarantee of needed improvements.

► **Continental Air Lines**—The 1950 net profit of the carrier was \$191,246—over five times that of the year before. The line operated 99.57 percent

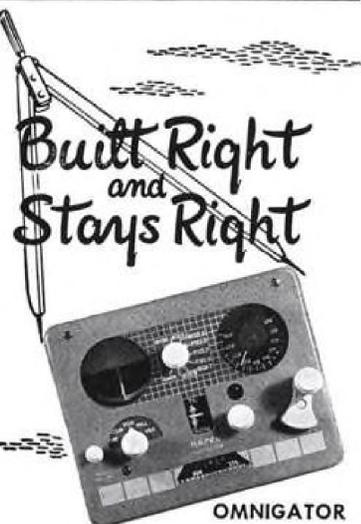
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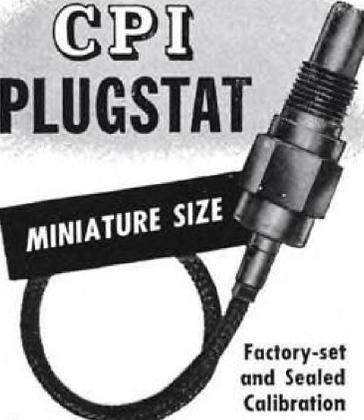
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of its scheduled mileage for the year.

► **Frontier Airlines**—CAB Examiner Herbert K. Bryant recommends renewal of Frontier's certificate for three more years. He also urges dropping of some uneconomical stops, such as Canon City and Colorado Springs, Colo., and some stops at inadequate airports, such as Leadville and Salida, Colo.

► **International Civil Aviation Organization**—ICAO is negotiating with Middle Eastern nations to set up an Eastern Mediterranean flight information center.

► **Mid-Continent Airlines** — MCA netted \$22,120 in January, 1951, compared to \$5912 a year ago.

► **Pan American World Airways**—PanAm is trying to standardize service on its three divisions. Each division has developed its own service procedures as it went along. . . . PAA has granted pay raises to 4200 employes. Stewards and ground personnel get 6 cents more per hour; stewardesses get \$5 more a month. Employees also get a cost-of-living escalator clause.

► **Philippine Air Lines**—Carrier made a 1950 net profit of \$354,739, compared with a 1949 loss of \$1,422,385. The 1950 operating revenues come to \$13,865,969; 1949 ran \$12,529,761.

► **Piedmont Airlines**—Piedmont has a final CAB mail rate of 47.73 cents a mile for Feb. 20, 1948, to June 30, 1950. This, says the company, is the lowest mail rate ever established for a newly certificated carrier.

► **Slick Airways**—Air freight carrier reports a net profit of \$506,608 for 1950. Traffic volume increased 88 percent to 45,657,828 ton miles.

► **Trans-Canada Air Lines**—TCA in 1950 had a net loss of \$1,526,412 on overseas services and a profit of \$201,206 on North American traffic. This compares with 1949's \$2,898,149 loss on overseas and \$1,419,444 loss on North American.

► **United Air Lines**—UAL made a net profit of \$6,429,723 in 1950, or \$2.90 a common share. This compares with the 1949 net of \$2,249,405, or 88 cents a share. Gross revenues of \$104,095,000 include only \$7,837,000 in mail pay.

► **Western Air Lines**—WAL reports operating revenues for 1950 are \$14,246,494—up 23 1/2 percent over the previous year.

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RA-9327, Aviation Week
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PW-9336, Aviation Week
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SW-9366, Aviation Week
330 W. 42 St., New York 18, N. Y.

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29	5903A	Bearing
130	8288	Follower Assy.
27953	8427	Screw
30	9030	Bolt
1276	10759	Bolt
1600	11210	Cover
100	11762	Guide
7	26456-2	Bearing
1157	35787-5	Bushing
2174	35787-10	Bushing
39	35807-8	Stud
814	35814	Blower Assy.
3967	35817	Spring
280	35855	Cap
2446	35924	Washers
4200	35932	Gasket
6	37751	Cover
15	37993	Housing Stud
28	38314	Rod Assy. Comp
20	45213	Cover
182	46400E	Liner
30	48346	Cylinder
1	48347	Cylinder
1475	48360	Bearing
53	48362	Shaft
175	48363	Shaft
3	48388	Sump
100	48389	Fitting
209	48390	Retainer
56	48392	Sump
533	48447	Bushing
107	48457	Adapter
76	48458	Bushing
390	48461	Gear
149	48468	Bearing
90	48468B	Bearing
389	48469	Bearing
470	48470	Bearing
75000	51506	Plug
395	54847	Clamp
71	56721	Cover
71	57006	Cover
10	68375	Gear
16	68837	Clamp
78	76236	Gear
5	77453	Housing (Reduction)
565	81397	Tube
10736	84185	Cover Assy.
261	84235	Pipe
155	84281	Spacers
1351	84282	Adapter
12	84284	Adapter
1178	84289	Bearing
113	84487	Housing
87	84567-8	Stud
77	84591C	Nose Housing
178	84602	Bracket
251	84687	Pinnon
30	84702	Shroud
397	84752	Bearing

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Quantity	Part No.	Description
35	RA-10-DB	Receiver
20	TA12B	Transmitter
150	DA-1F	Dynamotor
162	3611-B	Amplifier
35	MR-9B	Control Box
7	AS27A/ARN-5	Antenna
9000	45	Bulb
11000	1667	Bulb
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300	AN3135-1	Bulb
97	FT213	Mount
54	FT293	Mount
80	BX42-7	Dynamotor

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Qu.	Part No.	Description
22	AN 5531-1	Tachometer Generator G. E. 2CM5ABW
1000	AN 5780-2	Wheel and flap position indicator G. E.—individual cans
400	AN 5780-2	Weston model 882-P/N111602 Description as above
1500	AW 2-65B	U. S. Gauge Air Pressure Gauge (0-2000 lb.)
250	2E-492CandF	Pesco fuel pumps
700	TFD 8600	Thompson fuel booster pump
125	D-7818	Adel anti-icer pumps
170	2P-771-A	Pesco fuel pump AN4102-1
30	TFD-2100	Thompson fuel pump AN4102-1
250	AN4014	Erie Meter Systems D-3 hand wobble pump
300	1H260k and KA	Pesco Hydraulic hand pump
478	D9530	Adel selector valves
233	D9530-2	Adel selector valve
428	D9560-2	Adel selector valve
744	D10044	Adel selector valve
2200	AN 4078-1	37D6210 Solenoid United Aircraft etc.
2000	AN 3096-4	Grimes Light assembly
800	AN 3096-5	Grimes Light Assembly
380	AN 3096-6	Grimes Light assembly
75	EE 709-M2	Air associates Motor
115	P4CA2A	Parker Primers
80	AN 3213-1	Scintilla Ignition switch
568	A-9 (94-32226)	Ignition Switch
687	RS-2	Mallory Selector boxes
490	AN 6203-1	Vickers Hydraulic Accumulator
88	572-3A	Eclipse Distributor Valve
90	JH-950R	Jack & Heintz Starter Motor for JH5 starters
492	S841 (94-32253)	Electric box
17	FA122	Flasher Exterior lights Wallace & Tiernan

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STRICTLY PERSONAL

NAUTICAL BUT NICE—Delta Air Lines minions call the building that houses top management offices, "The Wheel House."

* * *

EXPERTS ON HOT AIR—Somehow CAB takes time out between saying farewell to departing chairmen and swearing in new ones to come up with momentous changes in the Civil Air Regulations. A new amendment to Part 22 goes so far as to put pilots of hot air balloons in a special category. It exempts them from navigation, meteorology, minimum experience and solo experience requirements which are in force for other lighter-than-air pilots, says Alex McSurely of our Washington office.

* * *

A THOUGHTFUL DEFINITION FOR TODAY—Lieut. Col. John Bussey of Wright Field informs Doktor Von Fluglen that he has his own definition of "equivalent safety." Says he: "It meets the intent to all pretense and purposes."

* * *

PLEASE DO NOT FEED THE PILOTS—Trans-Canada Air Lines says it got this helpful note from a new customer:

"I was very intrigued with my first flight but felt cheated at not having seen, face to face, either the pilot or the co-pilot of the plane. One way to remedy this, I think, would be to move the cockpit back into the center of the aircraft. In this way passengers could circle the glass cage, make suggestions in sign language and in general construct a close bond between themselves and the men in uniform. It would also relieve the loneliness and monotony which these men must feel, flying thru space all by themselves."

* * *

AND WHAT DID THE TRIBUNE SAY?—A reporter for Strictly Personal was in Indianapolis at Allison's press showing of their new jet engine the other day and overheard Wayne Thomis of the Chicago Tribune ask a hurried question of Allison's Director of Engineering, R. M. Hazen, who replied, "Look, our mouths are sealed; we can't tell you as much as already has appeared in Av Week."

* * *

THE POSTMAN READ TWICE—Delta Digest says believe it or not but a letter found its way to the airline's office with this address on the envelope: CAROL THATCHER McHENRY AND HUSBAND, MAC, AND FAMILY. HAPEVILLE, GEORGIA. NOTE—DON'T KNOW THEIR STREET ADDRESS, BUT THIS MAC IS CONNECTED WITH AN AIRFIELD, MAYBE MANAGER, HIS MOTHER-IN-LAW IS VISITING HIM NOW, HER NAME LOUISE THATCHER. SHE IS GRAND-MA TO JOHN STEWART McHENRY, BORN DECEMBER 11, 1950."

* * *

Supplied with all that information, the postman left the letter with Delta's Personnel Dept., which forwarded it to Flight Supt. R. L. McHenry.

* * *

HE WAS BROKEN UP OVER THIS—This is turning out to be a Delta Air Lines edition but we think you ought to read this one over our shoulder from the Digest, too:

"Capt. George Wells, noticing apparent interruptions in his radio contacts while flying over Alma, Ga., called Alma radio to advise that the transmission was broken as though the Alma microphone had a short. Alma replied that there was nothing wrong with the radio. The operator had hiccups."

* * *

CRASHING INTO THE READERS DIGEST—For the second time, one of Hy Sheridan's contributions to this column has been picked up by the Readers Digest. The latest, in the current issue, repeats the one about: "There are two kinds of women—one who wants to correct a man's mistake and the other who wants to be one." Why don't YOU send us an original contribution of whimsey?

* * *

GIVE THE LITTLE GIRL A HAND—One of our readers over at the Texas Co. phoned the Strictly Personal Editor the other day to point out an American Airlines First. On Flight 341, Feb. 7, from New York to Washington, the Convair had a sizable crowd assembled for a chance at the little room in the rear. Finally the stewardess made standby cards, with numbers, so the passengers didn't have to wait standing. Her name was Dell Follett and we congratulate her. We bet it eased the Convair's CG, not to mention the passengers.

—R. H. W.

AVIATION CALENDAR

Apr. 7-8—Tenth annual Holiday on Wings personal flyers excursion flight to Coronado, Calif., sponsored by Los Angeles Junior Chamber of Commerce.

Apr. 16-18—Society of Automotive Engineers aeronautic and aircraft engine display, Hotel Statler, New York.

Apr. 19-21—Airport Operators Council annual meeting, Hotel Peabody, Memphis, Tenn.

Apr. 23-24—Semi-annual meeting of the Air Industries & Transport Assn. of Canada, Harrison Hot Springs Hotel, Harrison, British Columbia.

Apr. 23-26—Meeting of American Assn. of Airport Executives, Radisson Hotel, Minneapolis.

Apr. 24—Fourth session on communications by International Civil Aviation Organization, Montreal, P. Q.

Apr. 24-26—ATA annual engineering and maintenance conference, Hotel Drake, Chicago.

Apr. 26-29—1951 annual forum of the American Helicopter Society, including flight demonstrations of representative service copters, Washington, D. C. Chairman is Bartram Kelley, Bell Aircraft Corp., P. O. Box 1, Buffalo 5, N. Y.

Apr. 27-29—Annual meeting of the Northeast Assn. of Collegiate Flying Clubs, Great Barrington, Mass.

May 12-13—Airlines Medical Directors Assn., eighth annual meeting, Hotel Shirley Savoy, Denver, Colo.

May 13-14—Airline Medical Examiners Assn. fourth annual meeting, Hotel Shirley Savoy, Denver, Colo.

May 14-16—Aero Medical Assn. 22nd annual meeting, Hotel Shirley Savoy, Denver, Colo.

May 16-18—1951 spring meeting of Society for Experimental Stress Analysis at National Bureau of Standards and Wardman Park Hotel, Washington, D. C. Send inquiries to Dr. Edward Wenk, Jr., David Taylor Model Basin, Washington 7, D. C.

May 17-19—Annual convention of the Women's Aeronautical Assn., of the U. S., Little Rock, Ark.

June 11-15—Second annual conference on industrial research, conducted by Columbia University Dept. of Industrial Engineering, New York.

June 13-16—Aviation Writers Assn. convention, Hotel Commodore, N. Y.

June 15-July 1—International aviation display, Grand Palais and Le Bourget Airport, Paris.

June 18-22—Private seminar on organization and operation of company standardization work, to be held by Dr. John Gaillard, Engineering Societies Bldg., New York.

June 18-July 6—Three-week Air Age Institute course, Parks College of Aeronautical Technology of St. Louis University, East St. Louis, Ill.

PICTURE CREDITS

9—(Flying Suit) AMC; (F. D. 1) INP; 25—Allison div., GM Corp.; 34—(left) Sperry Gyroscope; (right) Bendix Scintilla; 35—Sperry Gyroscope.

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SECTION 3

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EDITORIAL

Now You See Them; Now You Don't

You may recall the single-handed battle AVIATION WEEK put up to strip the mystery from Air Force negotiated contracts and who got them. After a long campaign, we persuaded Air Secretary Symington to let us print them.

Then when Korea exploded, the lists were suppressed again. Security!

Another appeal to Secretary Finletter and Undersecretary McCone brought out the lists again. We printed them.

On Feb. 23 the lists were sent without the dollar figures. Companies who won negotiated contracts were listed, with the products sold, but not the contract amounts. A week or so later the contract lists arrived with the

UNITED STATES AIR FORCE
EXTRACT OF CONTRACT DATA
23 FEBRUARY 1951

NOTICE: By direction of the Munitions Board, the Dollar Value on each contract has been deleted for security reasons. Every contract appearing on this report is in excess of \$25,000.

amounts restored. Then a week later the figures were missing again and they still are. This time it's the Munitions Board that pulled the iron curtain across all negotiated contract purchases bought with your money and ours.

Munitions Board claims these figures tell the enemy too much. Its excuse is that to divulge the dollars spent even on things described as sketchily as "special wrenches," "printing presses," and "steel tubing" gives priceless information (no pun) to the Communists.

This, of course, is ridiculous. There must be more to it all than this. In Washington things are never as they seem.

One plausible theory on this latest over-zealous regard for "national security" is offered by our sister McGraw-Hill publication, Business Week. Its Washington bureau says the Administration now realizes that small business' share in defense will be less than previous announcements have promised. The Administration's official policy is to get contracts out to many companies and thus "broaden the base" for defense production. The Administration theory is that this will set the stage for a quick all-out effort, when and if big war. "It's a good idea, but it's running into snags," says BW.

The people who are balking are the armed services. Breaking up big orders and spreading them around among inexperienced contractors takes time and runs up costs. "So the services are insisting on doing business with 'old' contractors, arguing that this way the government gets the most for its money."

Business Week recalls the Administration's publicity fuss about spreading out contract information through Commerce Dept. field offices so small producers would know what and how much the government is buying. This tied into the base broadening idea.

"But now, information is being withheld for 'security.' Policy is to give out no data on the size of contracts, for fear it will help the enemy. But it also tends to hide big business' share, compared with small business. So congressional committees will take a look at Defense's reasoning."

The BW theory is given support by a little research. We have an official press release of Jan. 10 reporting that in the fiscal year ended June 30, 1950, "small business firms

received 73 percent of orders placed by the military services." The release proudly boasts that "many special services have been put into effect to make it easier for small business men to find out what products are being bought, the locations of the offices buying them, and how to go about obtaining military contracts."

Who issued the boastful press release? The same Munitions Board. It doesn't intend to issue another such report—nor furnish the data for anyone else to do so!

We are not prepared here to argue the relative merits of placing orders with small business or large business. Nor do we care to print dollar amounts on the relatively few secret contracts where such figures would mean something to the Commies. But to eliminate all dollar figures on all negotiated contracts of all three services—or any one—on the excuse of national security is an insult to the public and the press. Inviting some more Benny Meyers to set up operations behind secret contracts can be a threat to national security too. The contract lists should be open and above board.

We hope Congress looks into this subterfuge and orders the Munitions Board to forget politics—in this particular instance, anyhow.

'No Vested Right to the Mail'

Postmaster General Donaldson follows up his department's recent announcement that more mail will be taken off trains and put on trucks with this cogent statement of intent and policy:

"An integrated transportation system carries the mail faster and at less cost to the government, which in turn, means less cost to the taxpayer.

"That means that there is no vested right to the mail traffic by any single form of transportation. No industry has a natural right to the business.

"It is the plan of the Post Office Department that in the future the U.S. mails will be carried speedily and cheaply by the medium of transport best suited to do the job. . . . We can no longer permit the welfare of a railroad or of the community it serves to be the single determining factor if transportation by other means at materially reduced costs to the Post Office . . . can be obtained."

Long Beach Builds the C-124

At least three times in the past—most recently Mar. 12—AVIATION WEEK has incorrectly reported that the Douglas C-124 transport is built at the Douglas Santa Monica plant.

Wilson Silsby, public relations manager of the Long Beach division, says our misplacement of credit "cuts us of the Long Beach division to the quick."

He adds that the C-124 was "conceived, born, and is being built here at the Long Beach division with the exception of outer wing panels and tail stubs subcontracted to Santa Monica. This probably means nothing to the public which has no interest in distinguishing between our divisions. But we do have a healthy esprit de corps and like to get recognition for our accomplishments. Do you mind helping us hold up our heads in the future?"

We are sorry. It isn't considered smart in journalism to overpublicize one's mistakes. But our competitors make them, too, so let them remain respectfully quiet while we confess to this one of ours. We hope never to repeat it.

We want the world to know that Long Beach builds the C-124.

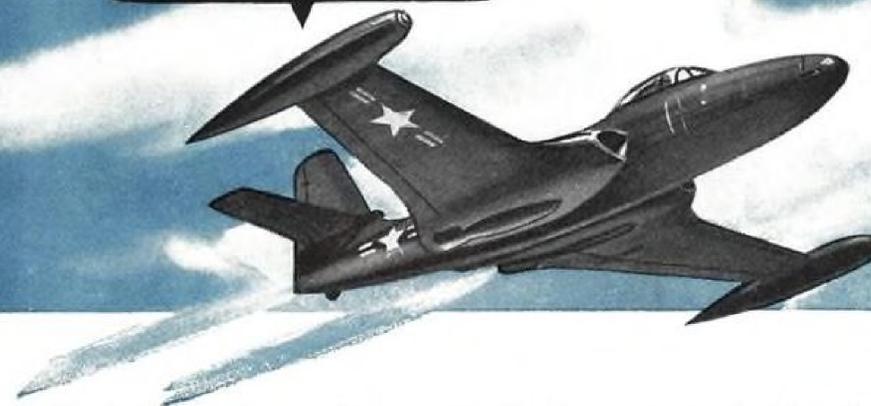
—Robert H. Wood

AVIATION WEEK, April 2, 1951

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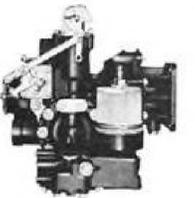
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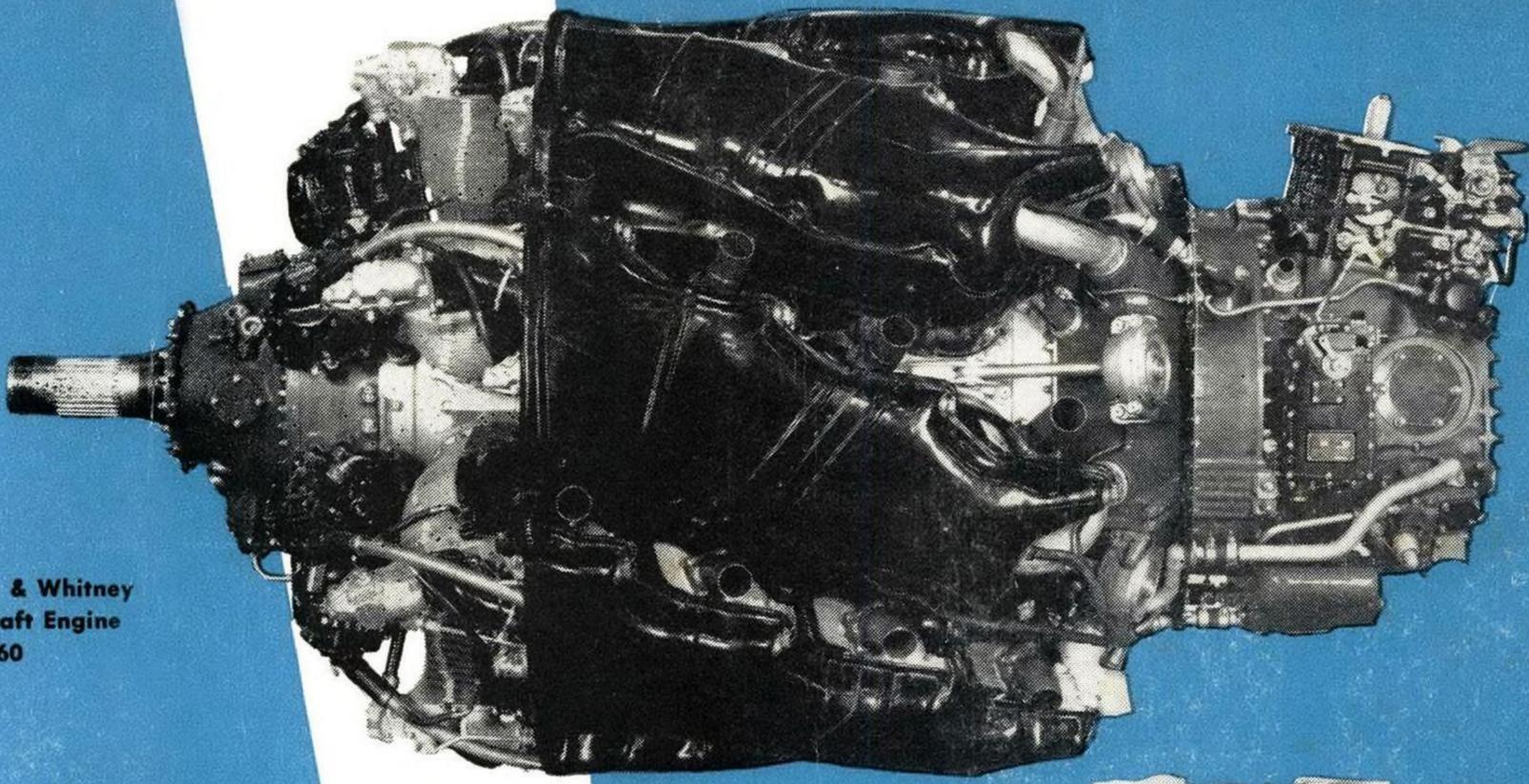
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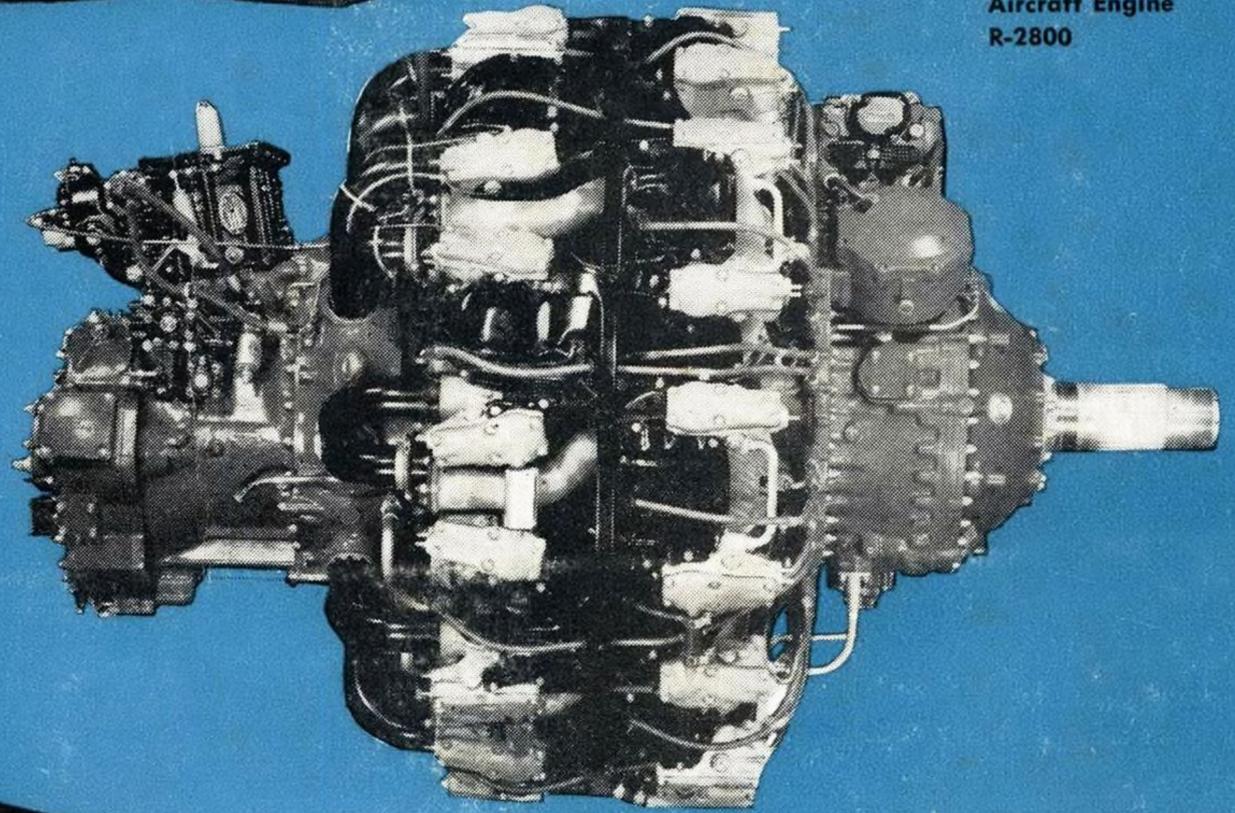
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