AVIATION WEEK

A McGRAW-HILL PUBLICATION

OCT. 19, 1953

50 CENTS



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Before you open the last air-lock door and enter this gyro room there's a sign that prohibits nail polish, cigarettes and a half dozen other everyday items.

It's not that we're stuffy. We just want our gyros to be the best made. Lint and dust could play havoc with a gyro's delicate mechanism. So could uncontrolled temperature and humidity. Which is why Honeywell gyros are assembled in an air conditioned, pressurized room guarded by a double air-lock.

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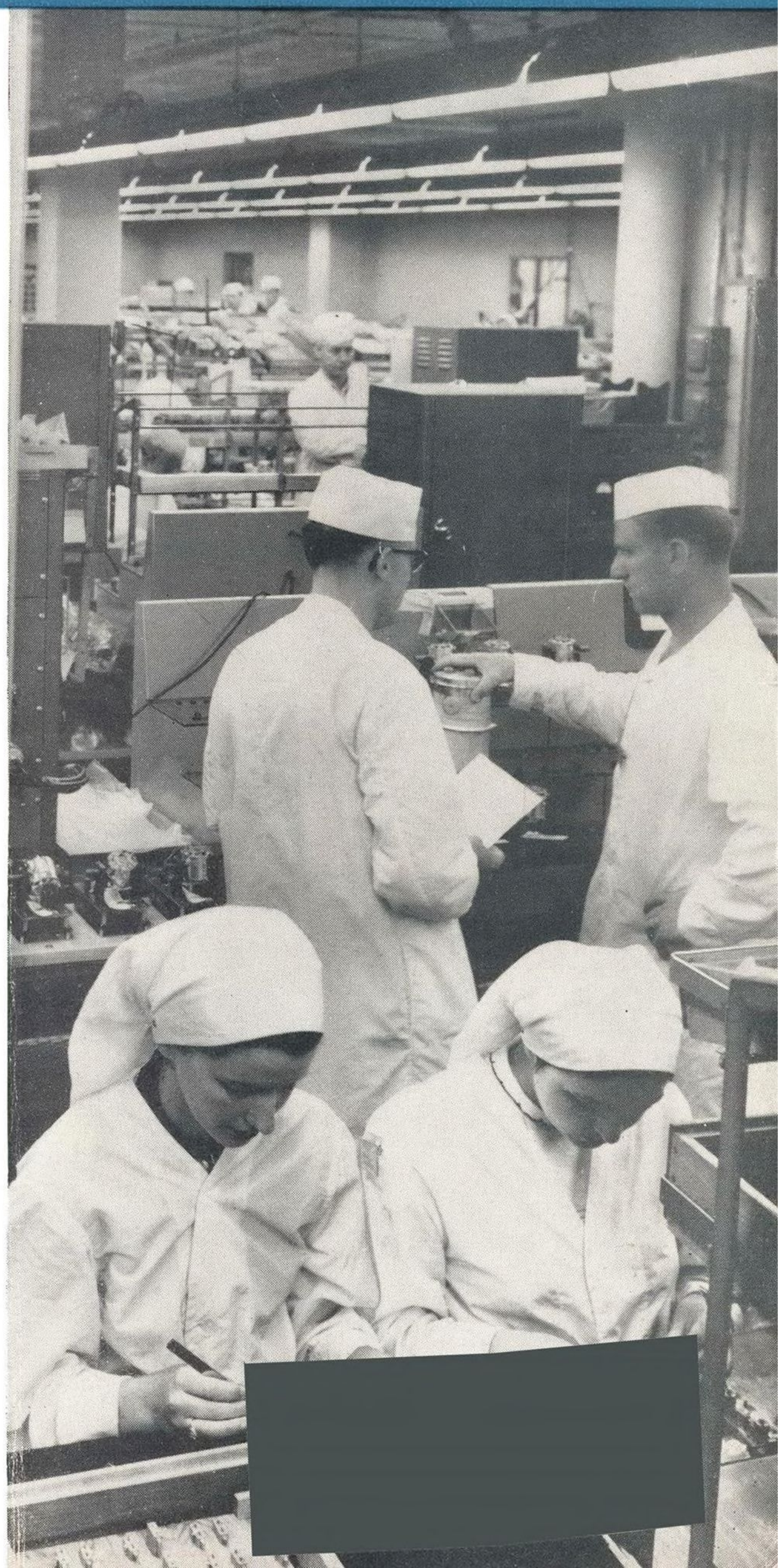
Honeywell's gyro line includes Vertical Gyros, Cageable Vertical Gyros, damped and undamped Rate Gyros and the highly sensitive, yet rugged line of Hermetic Integrating Gyros.

The Honeywell gyro "family" is an important part of our complete line of controls for everything that flies. We're continually working to improve it because automatic control is important to aviation's progress. And *automatic control* is Honeywell's business.

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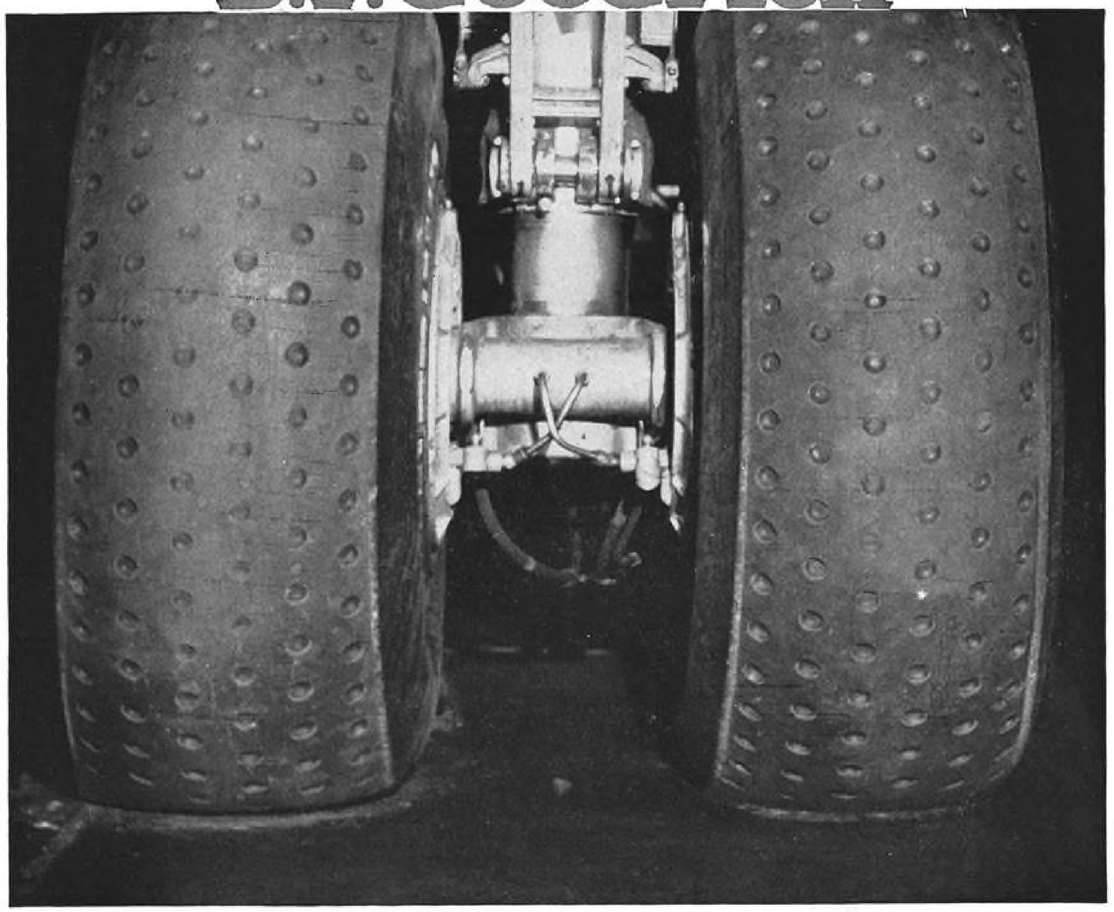
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On the basis of its test showing, Pan-American Airways is adopting the dimpled tire as standard equipment. Twenty-three other airlines have also standardized on the B. F. Goodrich dimpled tire—many, like Pan-American, as a result of their own test programs. They include: American, Braniff, Capital, Central, Continental, Empire, Frontier, Hawaiian, Lake Central, National, Northeast, Northwest, Philippine, Pioneer, Southern, Southwest, Trans-Texas, United and West Coast.

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Aviation Week

Volume 59 October 19, 1953 Number 16

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Table of Contents on Page 8 48,508 copies of this issue printed

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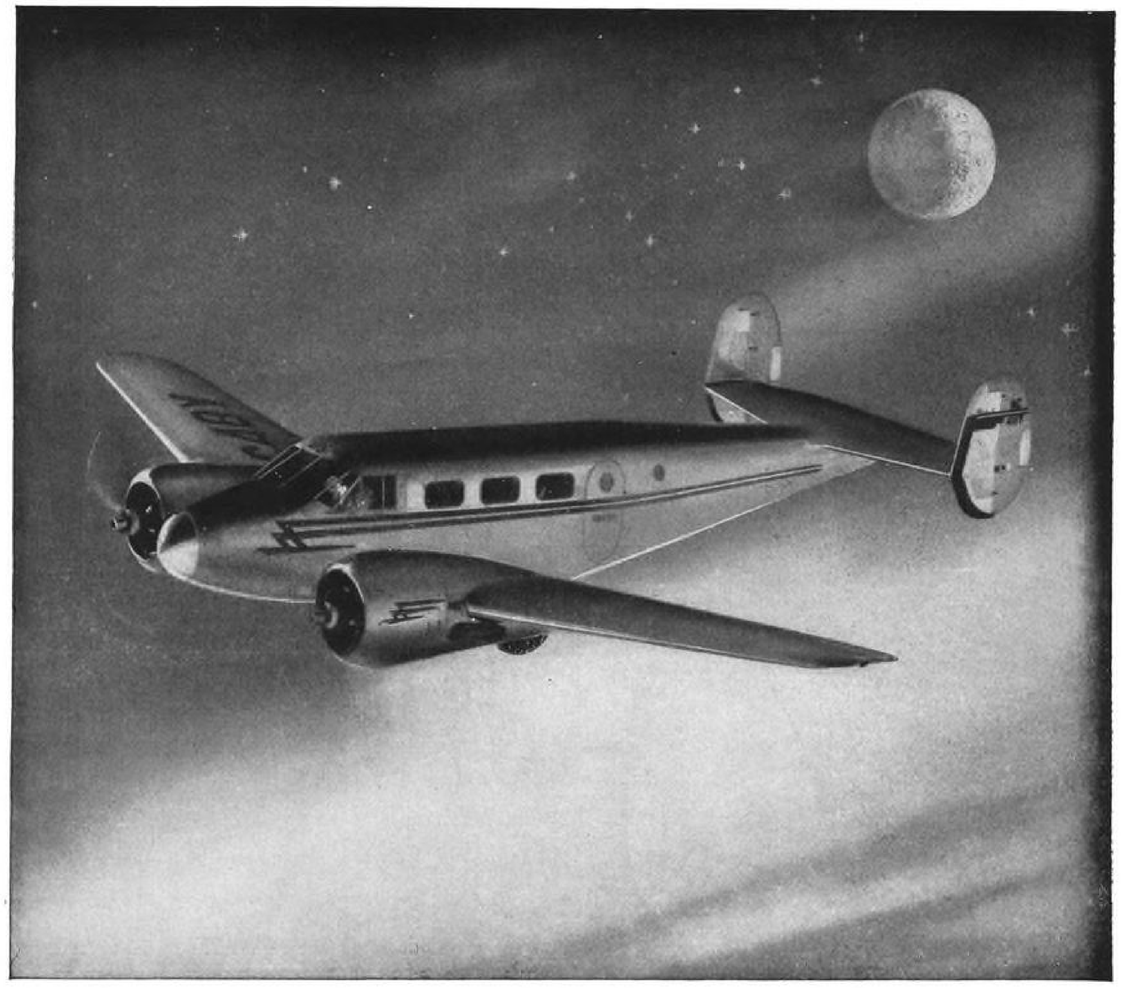
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NEWS DIGEST

Domestic

First carrier tests of the Douglas F4D are scheduled to start next week off the USS Coral Sea, operating in the Atlantic out of Norfolk. Lt. Cmdr. James B. Verdin, who pushed the Skyray to a new world's speed record of 753.4 mph. (AVIATION WEEK Oct. 12, p. 14), will pilot the Navy jet fighter during the operational trials. Navy also will test the McDonnell F3H Demon aboard a carrier for the first time and put Chance Vought's F7U-3 Cutlass and the Grumman S2F through additional trials.

Lt. Gen. Orval Cook last week appointed an advisory committee to assist him in developing methods of improving cooperation and collaboration between Air Research and Development Command and Air Materiel Command. Members: Ed Wells, vice president Boeing Airplane Co.; Dr. Edmund P. Learned, Harvard University; Dr. Marvin Kelly, president, Bell Telephone Laboratories; Brig. Gen. Floyd B. Wood, Director of Development, ARDC, and Col. William E. Sault, Office of the Director of Procurement and Production, AMC. Gen. Cook recently was designated USAF materiel czar with authority over both AMC and ARDC (AVIATION WEEK Oct. 5, p. 15).

General Electric has delivered to USAF the 10,000th J47 jet engine produced at its Evendale, Ohio, plant, and has turned out nearly 10,000 J47s at its Lynn, Mass., factory. GE awarded Ryan Aeronautical Co., San Diego, a new contract estimated at $1 million for production of engine aft frames.

Airlines face trouble in holding electronics technicians or recruiting new ones because of higher pay offered in television, industry observer reports.

Resort Airlines last week announced purchase of three 58-passenger DC-4s from National Airlines for more than $2 million, plans to use the transports to expand its Caribbean air cruise service. The carrier is negotiating a contract for maintenance and overhaul of its aircraft at NAL's New York and Miami, Fla., bases.

Eastern Air Lines has signed a $35-million aviation gas contract with Shell Oil Co., will take first deliveries Feb. 1.

Continued high subsidies to U. S. trans-Pacific airlines may be required because of increased competition from foreign flag lines, air carrier executives predict. Korean National Airlines wants a trans-Pacific route; Japan Air Lines is scheduled to start Tokyo-San Francisco flights next year, and British Overseas Airways Corp. may begin service parallel to Australia's British Commonwealth Pacific Airlines.



GE J73 Jet Shows Its Might

A Boeing B-29 Superfortress test bed operated by General Electric Co. is seen flying with its piston engines feathered, sole power source being the company's new J73 turbojet under the plane's bomb-bay. With only the J73 working, the B-29 can maintain 180 mph. The test engine can be retracted within the B-29. The new North American F-86H fighter-bomber has the J73 and it is also scheduled for other military planes.

R7V-1 transports, military version of Lockheed's Super Constellation, will be overhauled by Temco Aircraft Corp. under a Navy contract. First R7V-1 is scheduled to arrive at Temco's Dallas plant in February.

Beechcraft T-34A military trainer has been ordered by the Colombian air force.

Wright Aeronautical Division of Curtiss-Wright Corp., Wood-Ridge, N. J., marked its 34th anniversary Oct. 9.

New airport construction or expansion in the San Francisco Bay area should be banned if the increased air traffic would prevent maximum utilization of Oakland Municipal Airport and other existing field, the National Airport Use Panel recommends.

Selig Altschul, contributing financial editor of AVIATION WEEK and independent aviation consultant, will deliver the annual aviation lectures for the fifth consecutive year at the New York Institute of Finance. Air transport industry will be reviewed Oct. 20 in the Stock Exchange Building, and the aircraft manufacturing group will be discussed Oct. 27.

Rear Adm. Alfred M. Pride, commander of the Naval Air Test Center at Patuxent, Md., will assume command of the Seventh Fleet in the Pacific Dec. 1. He will be promoted to vice admiral. Pride succeeds Vice Adm. Joseph J. Clark, who is retiring.

C. H. Coates, pioneer in aircraft fire insurance, died Oct. 8 at Rockland, Fla. He was 81.

Financial

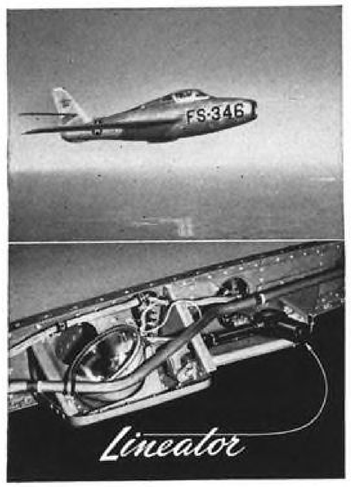
Western Air Lines estimates net income for the first nine months of 1953 at $966,000, compared with $915,000 for the same period last year. Operating revenues totaled $17,450,000, a 27% increase.

International

Gloster Meteors, making up half of Britain's jet fighter force, are grounded pending individual checks for suspected wing structural weaknesses. RAF ordered the Glosters grounded after investigations showed several recent crashes were caused by loose wing spar bolts.

Sabena Belgian Airlines Convair crashed shortly after takeoff from Rhein Main Airport near Frankfurt, Germany, on Oct. 14. First reports stated that all aboard were killed.

LINEATOR
fills Thunderstreak design need



Republic engineers needed an actuator for the landing light retractor in the F-84F fighter. With space too limited for any standard light retractor, they designed their own and specified the R-244M13 Lineator. Its compact design and 250-lb. rating do the job.

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The Aviation Week
October 19, 1953

Headline News

Cost Allowance Rules Change..... 12
Douglas Bars Early Jet Transport..... 13
RAF Strength in A-Bomb Force..... 14
Wilson Leaves New Policy in Air..... 15
Speed Rules Archaic?..... 16
Skeptics Endanger Air Power Lead..... 16
Examiner Urges Tiger-Slick Merger.... 16
C-123 Contract 17
F-100 Specs 17
Canberra, DC-6 Win Christchurch Race. 17
AITC Begins Saucer Report Study..... 18
Hughes Fills Gap From Walkout..... 18
F-86F Is 'Top' Fighter-Bomber..... 21

Aeronautical Engineering

A Look at Landing Gear Trends..... 28
Hisso Boosts Centrifugal Jet's Thrust .. 45

Financial

Aircraft Investors Getting Choosy..... 49

Production

Aircraft Work Force Levels Off..... 52

Avionics

F-86D 'Trainer' on Assembly Line..... 69

Equipment

Bristol Freighter Paces Bush Line..... 76
UAL Boosts Underground Facilities... 85

Air Transport

IATA Readies New Inter-Line Rates... 95
What's Happening to U. S. Population? 97
CIR Calls for Stronger Cabins..... 98
VHF Snag 100
Canada Lines Vie for Aircoach Traffic..102

Editorials

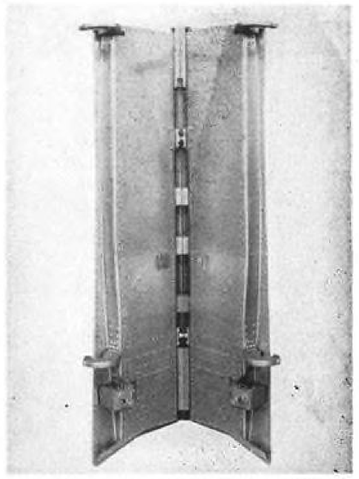
Aviation—Big-Time Employer.....110
Cheers for the C&O.....110

Departments

News Digest 7
Picture Page 9
Who's Where 11
Industry Observer 11
USAF Contracts 62
Letters 65
Filter Center 72
New Aviation Products..... 87
Off the Line..... 85
Also on the Market..... 92
CAB Orders 102
Shortlines 108
Aviation Calendar 108

Picture Credits

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Nose Wheel Doors for Grumman's "Albatross" Rescue Ship. Assembly and checking features were designed to guarantee interchangeability to the compound curvature of the aircraft hull.

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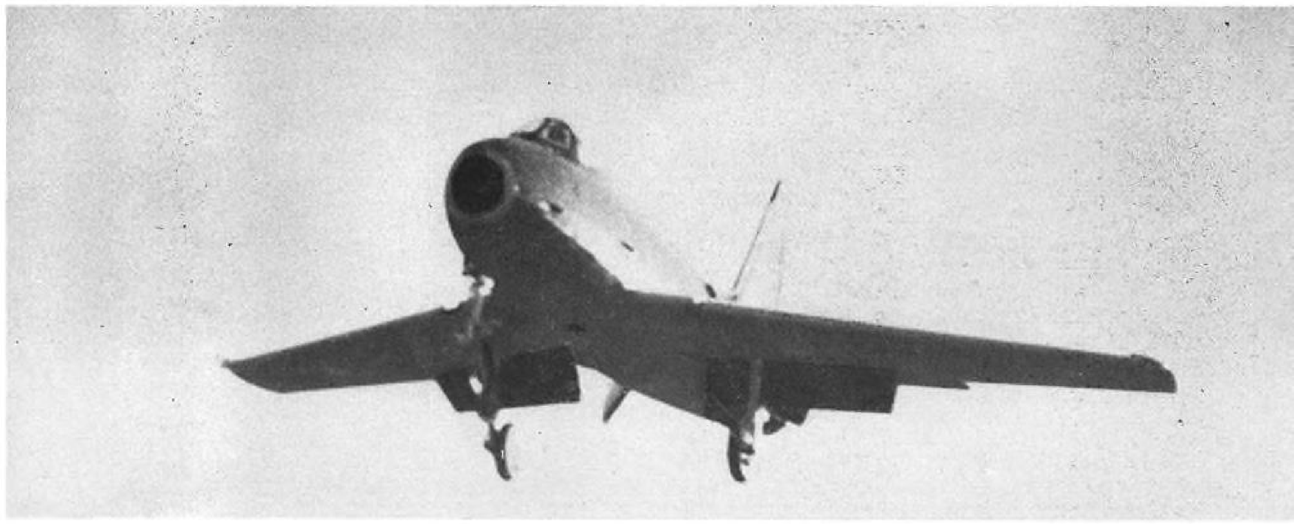
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Jet Tests Here and Abroad

SUN CATCHES DEMON—McDonnell XF3H-1 Demon Navy fighter reflects a sunburst from its tail during a recent flight test over Missouri. The sweptwing prototype Demon is fitted with a Westinghouse J40 rated at 7,000 lb. thrust-plus dry. Production Demons are slated to be delivered beginning late this year. Navy recently cut 91 Demons out of its current procurement schedules in a stretchout of the fighter's program, pending development of an improved powerplant (Aviation Week Sept. 21, p. 7).



NEW FURY ALOFT—Prototype North American FJ-3 Fury (above), an FJ-2 modified to take a Wright J65 Sapphire of more than 7,200 lb. thrust is seen aloft during a flight test at the company's Columbus, Ohio, Division. The previous model, the FJ-2, is powered by a General Electric J47. The new Sapphire-powered FJ-3 is in production for the Navy at Columbus.

TACTICAL MISSILE TEST—Production Martin B-61 Matador pilotless missile is seen rocketing from its roadable launcher at the AF missile Test Center, Cocoa, Fla. The rocket motor under the tail is jettisoned after providing initial takeoff speed and the B-61's Allison J33 takes over.

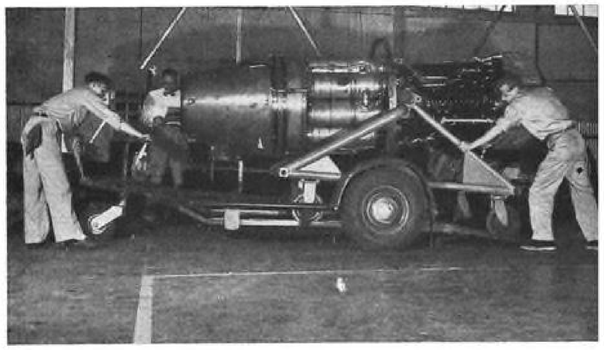




1. BEFORE SHIPMENT to G-E Strother Field Modification Shop, engine removal is handled by aircraft maintenance personnel. Engines are packed in "cans," then loaded aboard trucks.



2. ARRIVING AT STROTHER, engines are unloaded by experienced G-E crew. Shop is convenient to mid-West USAF bases and Boeing, Douglas, and Convair plants.



3. INTO THE SHOP goes this J47-23 on a specially-built dolly. Engine will get new parts to bring it up-to-date with latest models.

How G.E.'s Strother Field Modification Shop Helps USAF Achieve

Maximum jet engine life at minimum cost

As part of a world-wide jet service organization, a small, busy General Electric jet service shop near Winfield, Kansas, now helps our Air Force stretch out the service life of J47 engines.

G.E.'s Strother Field Modification Shop performs minor repair and modification work on J47 turbojets. The shop's efficient service and careful use of factory techniques help the Air Force get maximum service life from its J47s . . . and at minimum cost.

Work done at Strother Field ranges from repairs on engine parts such as cross-fire tubes, tailcones, combustion chambers, etc., to major engine modification. In "modification," new improved or re-designed parts are installed to bring previous years' J47 engines up-to-date with the latest G-E production models.

Like the Strother Field Shop, other G-E jet service shops are in operation at Los Angeles and Evendale, Ohio. In addition, G-E tech reps are available at 65 key locations within the U.S. as well as abroad. Their work assures top G-E engine performance at all times. Section 230-8, General Electric Company, Schenectady 5, N. Y.

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4. OUTDOOR TEST CELL at Strother makes certain that performance of newly modified engine is perfect. Efficient G-E service has helped USAF conserve manpower at nearby overhaul bases.

WHO'S WHERE

In the Front Office

Sir Miles Thomas, chairman of British Overseas Airways Corp., and **Lord Douglas of Kirtleside,** British European Airways chairman, will continue in their posts after termination of their appointments, due next year, Britain's Ministry of Civil Aviation announces. **Sir Arnold Overton** has been appointed to BEA's board, taking special responsibilities for finance and organization. **Basil Smallpeice,** BOAC controller, is new member of the carrier's board.

Raymond H. Rice, North American Aviation vice president-engineering, and **James S. Smithson,** vice president-manufacturing, have been elected to NAA's board.

Earl F. Slick, chairman of Slick Airways, is new director of Mack Trucks, Inc.

Charles F. Sharp has become vice president-sales of National Airlines.

David W. R. Morgan, vice president-general manager of Westinghouse Electric Corp's South Philadelphia plant, has been appointed to the Pittsburgh headquarters staff of the vice president in charge of the company's Industrial Products Division.

E. I. Whyatt has resigned as vice president-comptroller of Northwest Orient Airlines to join Gould-National Batteries as assistant to the president.

R. E. Harding, Jr., vice president-operations of Central Airlines, has taken an indefinite leave of absence. He is succeeded by **John L. Blackwell,** who has been promoted to acting operations manager.

Marvin S. Bandoli is vice president in charge of Proto Tools' new consolidated Sales, Marketing and Research Divisions, Los Angeles.

Changes

G. R. Edwards has been appointed managing director of Vickers-Armstrongs' Aircraft Division, including Wey Bridge and Supermarine works. **T. Gammon** is new general manager of the division.

Thomas K. Wells has been appointed general sales manager of Flexonics Corp., Maywood, Ill.

W. R. McLachlan has joined Avro Canada, Toronto, as general manager of the Gas Turbine Division.

Robert Cornog, Edward Kelley and **W. R. Clay** are new staff members of Rheem Manufacturing Co.'s research and development laboratories, Downey, Calif.

Joel L. Quinto, formerly of Wright Aeronautical Corp., has been appointed general manager of Carruthers & Fernandez, Santa Monica, Calif.

Walter J. Currie has become assistant manager of Lockwood Aircraft Service-International's administration department, New York.

Honors and Elections

Gen. Robert J. Smith, president of Pioneer Air Lines, has been appointed a member of the Office of Defense Mobilization's Committee on Manpower Resources for National Security.

INDUSTRY OBSERVER

► West Coast sources indicate North American Aviation, Inc., has come up with a new fighter proposal for USAF purporting to be a model improvement of the F-100 but actually as different from the F-100 as that aircraft is from the F-86 series.

► **Convair's F-102 delta-wing all-weather supersonic fighter prototype is scheduled to make its first flight at Edwards AFB today (Oct. 19) with Dick Johnson at the controls.**

► Douglas Aircraft has designed a new thin wing to improve performance of the DC-7 but still is undecided on what type powerplant to use with the new design. Curtiss-Wright is offering a 4,000-hp. version of the Turbo Compound R3350 piston engine which would give the airframe a cruising speed of about 400 mph. Pratt & Whitney is plugging for its T52 turboprop with a rating of about 8,500 eshp., giving the new Douglas a 500-mph. cruising speed. Either version of the improved DC-7 would be capable of nonstop transcontinental and trans-Atlantic schedules.

► **Two new versions of the Marcel Dassault Mystere 4 are taking shape in the firm's experimental shop at St. Cloud, near Paris. The Mystere 4B will be powered by a Rolls-Royce R.A. 7R Avon, and will use an air inlet resembling that of the North American F-86 Sabre. The Mystere 4N will be a two-man night-fighter version, bearing a marked resemblance to the Sabre F-86D. Both planes will use the wings and tail of the standard Mystere 4, but fuselages will be dimensionally much larger.**

► Two new versions of the Rolls-Royce Avon have been announced. They are the R.A. 21, rated at 7,150 lb. static thrust, and the R.A. 22, rated at 8,050 lb. thrust. They apparently are developments of the R.A. 7 type of Avon design and do not include the high-thrust features of the 9,500-lb.-thrust R.A. 14 and R.A. 16 types.

► **Four models of the Vickers Swift have been built during the development program for this sonic-speed RAF fighter. The Mk. 1 was the original two-gun version; Mk. 2 increased the offensive armament to four 30-mm. cannon. In the Mk. 3 version, afterburning was added to the Rolls-Royce Avon engine. The Mk. 4, currently the production aircraft, has all the features of the previous models, plus increased ammunition capacity and a variable-incidence tail.**

► Although most observers group all three British V-bombers—Valiant, Victor and Vulcan—together, the Valiant actually is only an interim design. It was planned around a much earlier design specification than the other two. Open secret in Britain is that an improved Valiant will serve as a super-pathfinder for the production Vulcan or Victor.

► **Sperry Gyroscope Co. Ltd. of England and de Havilland are working on an adaptation of the Zero Reader system for takeoff control of the Comet. The system will be adapted to give a precise angle indication during takeoff.**

► U. S. Army Ordnance is service-testing a quantity of about 50 anti-tank missiles developed by the French Sfecmas firm. Similar to the German X-4 missile produced near the end of World War II, the French missile is controlled in flight by a pair of wires used to transmit signals to the controls. Advantages: non-susceptibility to enemy jamming. In flight, the missile spins slowly for stability. Range is about two miles. An ingenious storage container for the missile forms its launcher when unfolded.

► **The de Havilland 110 prototype, now in Royal Navy colors, has been extensively reinforced with external skin doubler plates. Portions strengthened include the ailerons, horizontal tail and wing panels immediately inboard of the ailerons. Dive brakes have been redesigned. British observers believe the final development of this airplane will be more conventional—probably a single tail and single engine layout—than the present twin-boom, twin-engine configuration.**

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Pentagon Rewrites Cost Allowance Rules

- **New regulations on negotiated military contracts may clarify, standardize and liberalize auditing procedures.**
- **Industry leaders will check final draft, written in business language to eliminate individual interpretation.**

A new set of cost allowance principles applicable to all types of negotiated military contracts is about to emerge from the Pentagon.

Top civilian auditors of the Defense Department have completely re-written Section 15 of the Armed Services Procurement Regulations in an effort to clarify, standardize and in many cases liberalize auditing procedures on such controversial items as fringe benefits for labor, pensions, advertising, depreciation, executive salaries and charitable contributions.

► **Last Step**—Final draft of the new allowances virtually is complete and will be submitted to the industry and key congressional leaders for comment in the near future.

Some Pentagon officials hope industry and congressional comment will be received and final legal changes made in time for publication in the Federal Register early in January. Publication in the Register would be the final legal step in implementing the new rules.

► **Little Interpretation**—One of the main purposes of the new regulation is to standardize military auditing practice on controversial items.

One of the major complaints of industry on cost-plus-fixed-fee contracts is wide variance between interpretations of these cost allowances by auditors.

The new regulation contains twice as many words as the current Section 15 in an effort to be so specific that there will be little room for individual auditor interpretation and no necessity to issue supplementary interpretations.

The new regulations are written in business language rather than the legal phraseology previously used.

For example, the word "necessary," now used throughout the current Section 15 and generally interpreted as "minimum," virtually has been eliminated in the new draft. It has been replaced by such phrases as "usual business practices" and "in accordance with contractor's established practice" and "previous business expenditures."

► **Controversial Items**—The new draft indicates that an effort has been made to eliminate some of the major objections by manufacturers to the current regulations and also to plug some of the well-recognized loopholes that have led to what Defense Department considers "flagrant abuse" of the regulations.

Here are some of the major controversial items covered by the new draft:

• **Executive compensation.** The former yardstick of "reasonableness" still applies, but the new draft emphasizes that compensation must include all direct and indirect expenditures and benefits.

A new sentence states specifically that this includes "accrued and 'set-aside' benefits." This was added as a result of a test audit that concluded that top executive salaries of both prime and subcontractors often were "excessive" when compared to non-defense firms.

The audit claimed that during its efforts to establish a reasonable yardstick for measuring executive compensation, it found accrued or set-aside compensation frequently was excessive by 50% or more.

• **Advertising.** For the first time there is a suggestion that advertising, other than in trade and technical journals, might be acceptable in special cases.

Advertising in trade and technical publications continues to be allowable "according to usual business practices" but must be designed to aid production of defense materials.

This will be helpful particularly for subcontractors and components manufacturers that can advertise for special services, tools, materials and even for more military business.

Advertising also is allowable in periodicals within the contractors' particular industry where the publications, are believed to be of benefit to the industry because of dissemination of technical information. The phrase in current regulations, "for the support of these publications," has been deleted.

Another clause provides that for all commercial products purchased, a proper proportion of regular advertising expenditures must be considered allowable costs. It is not quite clear as to how this would apply to military purchase of airline-type transports.

Final paragraph of this section says no cost of other advertising shall be allowed and then makes one important exception: If a contractor can prove he has lost goodwill and business contacts as a result of producing defense products, he will be allowed to regain business prestige by advertising, provided the cost is "reasonable" and does not exceed the amounts expended in previous years. Contractor must prove there was a market for his commercial products at the time he was completely or partially occupied in defense production.

• **Labor benefits.** Cost of fringe benefits to labor will be allowed in certain cases even if they are not included in labor contracts. Contractor must prove these benefits help to reduce manufacturing costs, expedite production and improve the quality of defense production.

• **State and local taxes.** Generally, these taxes remain allowable, and considerable improvement in phraseology is evident in the new version. State income taxes still are not allowed; but in cases such as in Pennsylvania, where a tax on manufacturers is levied on the basis of income and profits and legally is called a franchise tax, the tax cost is allowable.

The new draft offers no support for a current effort by the Association of State Tax Commissioners to get legislation allowing taxes such as those being attempted in California on "permanently affixed facilities and equipment" placed in a contractor's plant and owned by the federal government.

• **Depreciation.** This always has been a controversial item, and critics of the present policy will find little improvement in the new regulation. There is nothing to indicate that reserves can be set up for facilities on a replacement basis. Depreciation on facilities will be authorized on a current price level provided some acceptable federal index is found, and the contractor then agrees to continue using this index until his facility is completely depreciated.

The fact is recognized that facilities incur greater wear and tear and faster obsolescence during periods of emergency defense production than normally occur during commercial operations.

However, as a result of a special report, a new paragraph has been added specifically prohibiting allowance of "double depreciation." This means that on equipment believed by auditors to be fully depreciated, no rental or users fee would be allowed as legitimate cost.

Part of the special report interpreted as largely responsible for this attitude reads: "We believe that such items should be disallowed as cost for the reason that during World War II the government generally allowed as costs a normal depreciation on emergency facilities so that the unexpended balances were fully amortized through the provisions of the federal income and excess profits tax laws relating to accelerated amortization of such facilities. It is our view, therefore, that contractors generally have obtained substantially full recovery of their costs for emergency facilities through tax laws and renegotiation during the period 1942-46."

An attempt also was made in the depreciation section to close a loophole that has caused federal auditors considerable trouble in recent years. This is the practice by contractors of selling plants to non-profit organizations, community companies or family groups and then signing rental agreements that permit greatly accelerated amortization.

• **Magazine subscriptions.** The confusion among individual auditors regarding expenditures for business and technical services and subscriptions to useful magazines has been clarified.

The proposed new regulation reads: "The cost of subscriptions for trade, business, professional or technical periodicals or services is allowable when incurred in accordance with contractors established practice and costs are reasonable."

Many of the old disallowances are continued with the usual emphasis. Interest on loans is not considered reimbursable under any circumstances. Cash discounts are not supported by the new regulations and federal income and profit taxes are not allowable.

The new cost principles definitely will apply to all types of negotiated contracts. Special paragraphs spell out the exact application to cost reimbursement, fixed price and incentive type contracts. Provision also is made to use the new draft to supplant the cost allowance features of Section 8 of the procurement regulations covering terminated contracts.

► **Complete Revision**—Decision to broaden the new draft to include terminated contracts is believed to be the result of a report by civilian auditors who recently completed an audit of the canceled machine tool contract of the Fisher Body Division of General Motors Corp.

This contract was the first sizeable contract terminated since Section 8 was incorporated into the procurement regulations.

The civilian audit was extremely critical of Section 8, particularly as it applied to subcontractors.

The auditors recommended virtually a complete revision of present regulations governing the termination of contracts.

Douglas Rules Out Early Jet Transport

Donald W. Douglas made it clear this month that Douglas Aircraft Co. will not attempt to compete with Boeing Airplane Co. for the early U. S. jet transport market.

"We do not now plan to begin construction on these newer turbojet types," he told a meeting of the Fresno, Calif., Chamber of Commerce commemorating the 50th anniversary of powered flight.

"In our business, the race is not always to the swiftest nor the first to start."

► **Leading Entry**—For the immediate future, Douglas Aircraft will depend upon the DC-7 as the company's leading entry in the commercial transport field, its president said.

The Douglas jet transport design has been designated the DC-8. Designation for the company's turboprop design is DC-9.

"I have always held the conviction that airplanes should make money as well as headlines," Douglas said. "Commercial jet transports for the jet age must be operationally efficient, dependable, and economical before they can hope to supplant the highly developed, proven and profitable types of air transports current in production."

► **Satisfactory Answers**—The aircraft building veteran pointed out that such transports as DC-6Bs and DC-7s have not yet reached, or even approached, the limit of their usefulness.

"This is the reason," he said, "why we intend to continue without a letup our careful studies and design work of jet-propelled passenger airlines.

"But, at the same time, we do not now plan to begin construction on these newer turbojet types until we have satisfactory answers, or considerably more progress, in such problems as initial purchase and maintenance costs, size of the market, noise control, economical fuel consumption, adequate range for transoceanic operations, suitable landing fields, and safe traffic patterns in metropolitan areas.

"There may be some distinction in being the first to build a jet transport. It is our ambition at Douglas to build the best and most successful."

► **Profitable Service**—When jet transports are in operation in this country, Douglas predicted, they will carry 60 or more passengers at speeds above 560 mph. across the United States in 4 to 5 hr.

But present airliners provide carriers with safe, profitable service, compared to more expensive, experimental, untested performance of jets for the next few years, he said, adding:

"I have great confidence in the future of the jet transport but feel we should not neglect improvements and advantages available to us right now."

His speech did not rule out the possibility that Douglas will build a commercial turboprop transport in the near future.



FIRST T-28B LEAVES NAA'S DOWNEY LINE

First T-28B trainer to leave the production line of North American Aviation's Downey, Calif., plant made its initial flight one week ahead of schedule. The T-28B is programmed for Navy and is powered by a 1,425-hp. Wright R1820 Cyclone. Top speed is 346 mph. Seen on hand for the plane's flight are, left to right: Lt. Cmdr. R. T. Parramore, BuAer representative from Washington, D. C.; Tom Clancy, T-28B assistant project engineer; Cmdr. E. L. Simpson, Jr., resident BuAer representative, and Jim Barker, T-28 manufacturing superintendent.



AVRO VULCAN long-range delta-wing atomic bomber (above), teamed with Handley Page Victor and sweptwing. . . .



VICKERS VALIANT, represents RAF concept of high-altitude sonic-speed fleet designed to evade interception.

RAF Centers Strength in A-Bomb Force

By David A. Anderton

London—The Royal Air Force, often erroneously linked only with defensive aerial warfare, rapidly is strengthening its offensive power around new atomic capability.

Radical design approaches have been linked to the traditional concept of strategic bombing that fathered the RAF in raids on the Rhine industries during World War I.

Result: A series of similar sonic bombers designed for operation at altitudes near 70,000 ft., relying on weather, altitude maneuverability and electronic counter-measures for protection and able to operate out of any airfield in Britain.

Around these new medium bombers —the Vickers Valiant, Avro Vulcan and Handley Page Victor—RAF Bomber Command will fashion a counter-offensive force which is based on the ". . . flashing riposte of the rapier rather than the dull thud of the bludgeon."

▶ **Direct Attack**—Some observers report that the recent concentration of effort on bombers in Great Britain marks a trend away from home defense, supposedly RAF's basic mission.

"Actually we've always been a bomber force," said one high air officer. "The only reason anyone ever thought otherwise was because of the complete emphasis on defense during the 'Battle of Britain.'

"In the event of war, the RAF has three major jobs: The first is the direct air attack against the enemy; the second is to stop him from walking across Europe; and the third is to mine the sea lanes and sink his submarines."

Under current organization of Britain's air force, Bomber Command would handle the first job and share the second with Fighter Command. The third task would be the responsibility of Coastal Command.

▶ **Improving Picture**—Today, RAF equipment doesn't match the requirements of these jobs. Several hundred English Electric Canberras make up the only jet bomber force based in Great Britain.

Major fighter strength is a similar number of Canadair-built North American F-86E Sabres stationed at advance airfields behind the Rhine, now replacing the English Channel as Britain's first line of defense.

Tomorrow the picture should improve. Super-priority production is beginning to make itself felt in the tangible output of Hawker Hunters, Vickers Supermarine Swifts and Valiants.

First squadrons of the fighters should be in service before the summer of 1954; bombers will follow shortly after.

▶ **Strong Counterblow**—"We want to be able to use this force as a deterrent," said an RAF staff officer. "But if the bell rings, then we want to be able to make a strong counterblow. That's better than any defense."

Major blow with nuclear weapons would be struck by the medium V-bombers. RAF thinking is that the combination of speed, altitude performance and range built into the new bombers will give them tremendous flexibility of operation.

The bombers will be able to take off from any airfield in Britain. They will be capable of attacking the enemy from any direction because of their extreme range, estimated at 5,000 to 7,000 mi. without aerial refueling.

Cruising at near-sonic speed and at altitudes above 60,000 ft., they will make difficult targets for interceptor aircraft. Use of electronic countermeasures should frustrate radar homing devices used by the enemy, whether in aircraft or missiles.

Weather and darkness will be used as cover; the attack force can ride upper-altitude winds to increase range in both directions.

▶ **Quality, not Quantity**—But numerically, the force will be far inferior to the 1,000-plane raids of World War II. Keynote of the whole RAF philosophy is economy of effort. They simply can't afford to buy quantities of bombers any more than they can afford the administration, logistics and geographic problems that would go with a large force or with bombers in the 300,000-lb. category.

By the same token, all planes must get through to the target and back home. There can be no one-way missions, and no bomber or crew can be considered expendable.

This explains the great reliance on every possible natural cover and dependence on aircraft and avionic performance.

▶ **Limitations**—Geography is the biggest bugaboo facing a designer. Physical space limitations will not permit 10,000-ft. runways. As a result, the designer has to choose a low wing-loading to get required takeoff performance.

Altitude maneuverability, second most important design criterion, also is improved by low wing-loadings. This leads to the British bomber design concept of the large, thick wing with buried engines.

Despite all the fine detailed arguments about pods versus buried engines —voiced at the recent Anglo-American aeronautical conference (Aviation Week Sept. 28, p. 19)—the final answer is the "tight little isle" itself dictates that the powerplants shall go inside the wing contour.

The current Valiant, Vulcan and Victor represent about the end point in British bomber size.

"We have much more flexibility with these medium bombers than we would have with the heavy ones," said an RAF officer. "We don't want to build any more elaborate bases than we now have if we can help it, and the three Vees can operate from any field in British hands."

▶ **Calculated Risk**—Today the RAF stands in about the same position, with respect to a possible enemy, as it did in 1938. First squadrons of Hurricanes and Spitfires were forming then, and heavy piston-engine prototype or preproduction bombers were flying.

But the RAF was building its defensive capabilities at that time to buy time to prepare the counterblow.

Now the national economy of Britain won't permit a similar action; defense must give way to offense.

So the buildup of Bomber Command represents a calculated risk, based on the British belief that war will not come now. If that belief is correct, the next few years should see an invigorated RAF capable of adding its atomic strength to that of the USAF as a joint deterrent to war.

Wilson Leaves New Policy in Air

The aircraft industry failed to get a promised clarification of the new Defense Department policy on progress payments (Aviation Week Oct. 12, p. 14) from Defense Secretary Charles E. Wilson at his regular press conference last week.

Industry officials had been assured by top Defense Department officials that Wilson would clarify the policy that gave the aircraft manufacturers and their bankers a bad case of the jitters when first announced early this month in a directive signed by Assistant Defense Secretary Charles Thomas.

Thomas attended Wilson's press conference and participated in an extended discussion of logistic problems handled by his office. But neither the Defense Secretary nor his assistant would offer any additional comment on the progress payment policy.

When specifically questioned on this policy. Thomas said it was "just good business practice" and cut off further discussion.

▶ **Double-Talk?**—Meanwhile, aircraft officials had been assured by USAF materiel officers that the new policy was aimed at preventing industry from overbuying for future production and accumulating excessive inventories.

There was a general feeling of relief throughout the industry early last week as a result of USAF clarification and the promise that Wilson would make a public statement on the subject.

His failure to do so set the industry to wondering whether the Pentagon really meant what it said in its assurances or was merely giving the industry double-talk while the policy was being implemented.

Aircraft Industries Assn. had no official comment on the situation.

▶ **Falling Enthusiasm**—There was general agreement after Wilson's failure to offer any public clarification that the aircraft industry would have to wait and see how the policy was administered.

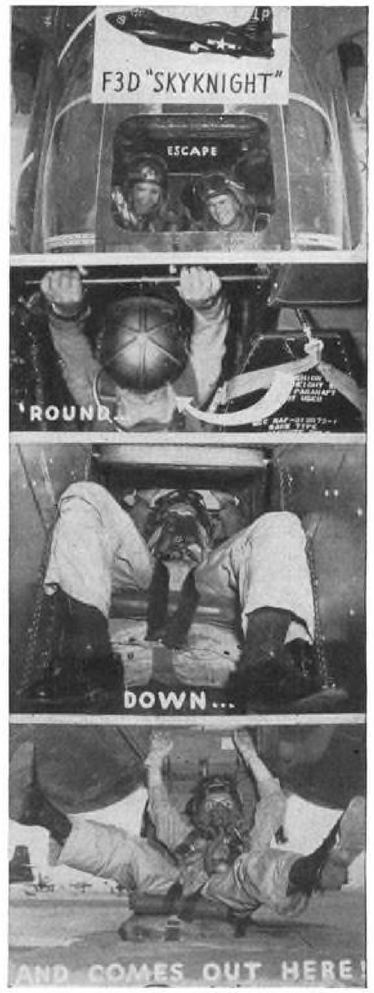
One industry observer commented:

"If this new policy is administered in such a way as to cause considerable upheaval and hardship, the Pentagon will undoubtedly find that the industry will lose much of its enthusiasm for fixed-price contracts and insist on cost-plus-fixed-fee contracts in the future."

▶ **Contractor Concern**—Industry was hopeful that the policy would be administered on a voluntary and selective basis, with restrictions applied only to large corporations such as General Motors, General Electric, and others with ample working capital available.

It was estimated that about 25 defense contractors have approximately 90% of the funds outstanding on progress payments, while there are more than 1,000 other contractors and subcontractors that rely on these payments to finance their defense production.

Under existing contracts the Navy specifies progress payments as a contractual obligation up to the specified percentage of the total contract value, while USAF merely indicates that progress payments "may" be granted up to specified percentages.



GOODBY SKYKNIGHT

Crew evacuation from the cockpit of a twin-jet Douglas F3D Skyknight all-weather fighter is seen being practiced in the above photo sequence. The series shows the pilot, having left his seat, grasping the escape hatch cross-bar, then exiting through the tunnel and landing on a mattress. This drill is required every three months of members of Squadron VMFT(N)-20, Cherry Point, N. C. Crew is required to leave the aircraft in less than 15 seconds.

Speed Rules Archaic?

Portland, Ore.—The Federation Aeronautique Internationale does not anticipate any change in requirements for the low-altitude world speed record in the near future, president Cornelis Kolff said last week.

Changing the rules is an involved international process, the chief of the world's governing body for aeronautic records told AVIATION WEEK.

"And it is not at all certain that a change is desirable," Kolff commented.

► **Truer Test**—Following recent speed runs by British and U.S. aircraft, some industry sources criticized the international rules that require supersonic aircraft to remain close to the ground and to top the previous record mark by a 1% margin.

Some also felt that measurement of speed in miles per hour rather than Mach numbers was archaic.

But National Aeronautic Assn.'s outgoing president, Harry K. Coffey, said the organization will not press for a rule change at this time. Pointing out that low-altitude performance is a much more severe strain on an aircraft, Coffey commented that many think "it is a truer test of an airplane."

► **Any Altitude**—The question of rule changes was not on the agenda of the NAA convention here but was a subject of much informal discussion. An FAI meeting in Istanbul, Turkey, next fall will take up the question of rules, Kolff said.

Both the British and French probably would be opposed to any change in the rules for the low-altitude speed run, NAA officials commented.

Rules already are in existence for "any altitude" speed record, Charles Logsdon, NAA timing official, pointed out. These require only two passes in level flight over a 15-25-km. course at any altitude.

"This in time may be considered the most important of the speed records," Logsdon predicted. Present difficulty is with accurate measurement of highspeed flight at any altitude, he said, and importance of this event will grow with availabilty of timing devices. —WJC

Twining Report to NAA Convention:

Skeptics Endanger Air Power Lead

By William J. Coughlin

Portland, Ore.—Gen. Nathan F. Twining, USAF Chief of Staff, told the National Aeronautic Assn.'s annual convention here last week that the U. S. position of leadership in the air "has never been more dangerously threatened than it is today."

"There has never been a time when we needed to take more drastic action to keep our position of leadership," Gen. Twining warned.

► **R&D Importance**—The Air Force chief outlined a program that promised increased importance for research and development activities of USAF, calling for:

- **Increase in technical** and scientific accomplishment.
- **Continuing program** to educate the population of the U. S. in the meaning and importance of air power.

"There are still many skeptics who refuse to recognize that this is the age of flight," the general said, "and there are still many people who resist the progress of aviation. . . .

"The fight to keep America first in the air is not over; it has really just begun."

► **Return for Investment**—Without mentioning any air power critics by name, Twining warned:

"Everybody talks about what defense costs, but nobody talks about what it buys.

"We have got to talk more and more about what we are getting in return for our investment in defense and what it means to the country to establish and maintain a clear superiority in the new weapon of air power."

The USAF Chief of Staff was guest of honor at the NAA annual meeting.

Other guests included Rep. Carl Hinshaw of California; Cornelis Kolff, president of the Federation Aeronautique Internationale, Holland; and lightplane long-distance flyer Max Conrad.

► **Non-Partisan Force**—Hinshaw called for greater support from the aviation industry for NAA.

He pointed out the importance of NAA as a non-partisan force for U. S. air power of all types and pleaded for greater coordination of all segments of aviation by NAA.

The congressman also called upon the association, with support from the airlines and the aircraft industry, to advise Congress upon aviation issues.

"I can think of no organization whose opinions would be more sympathetically received by congressional leaders than the opinions of the non-partisan, nation-wide membership of the National Aeronautic Assn.," said Hinshaw.

He also noted the importance of NAA as representative in the U. S. of the Federation Aeronautique Internationale, world governing body for international aeronautics records.

► **New Officers**—Thomas G. Lanphier, Jr., vice president of Convair, was elected president of NAA, succeeding Harry K. Coffey of Portland.

Other officers include: Jack Hughes, first vice president; Arlene Davis, secretary; Edward C. Sweeney, treasurer, and Charles Logsdon, assistant secretary-treasurer.

The session elected the following to the NAA board of directors: George Haddaway, William Long, J. H. Kindelberger, Dave Johnson, June Welsh, Leslie Bryan, Gen. Lucas Beau, Flavel Temple, James Ramsey, Art Kelly, Thomas Lanphier and Dot Lemon, alternate.

Examiner Urges Tiger-Slick Merger

Merger of Flying Tiger Line and Slick Airways was recommended for Civil Aeronautics Board approval last week by Board examiner F. Merritt Ruhlen.

Washington observers expect the Board to move quickly to hear oral arguments and make a final decision before mid-winter.

Certificates of the two cargo carriers restrict them to airfreight only on scheduled operations. In recent months they barely have broken even on airfreight schedules, competing with certificated airlines hauling passengers as well as mail, air express and freight. Through merger they seek to reduce overhead costs and improve their competitive position.

Their certificates come up for CAB renewal consideration next year. American Airlines sought to have the renewal question consolidated with the merger application, but the Board followed its established policy of expediting consideration of normal merger cases whenever applications are submitted.

Vote on Directors

Allegheny Airlines, Inc., will decide at its annual meeting Oct. 27 at National Airport whether to raise its board membership from nine to 11 directors.

If Allegheny's stockholders vote to increase the number, the airline will appoint Willard F. Rockwell, Jr., president and director of Rockwell Manufacturing Co., Pittsburgh, Pa., and William Zeckendorf, president and director of Webb & Knapp, Inc., New York, N. Y.

C-123 Contract

- **Fairchild wins AF order with fixed-price bid.**
- **Production is scheduled to begin next summer.**

A fixed-price, non-redeterminable bid—10% lower than its closest competitor—last week won for Fairchild Engine and Airplane Corp. the Air Force contract to build approximately 160 Chase-designed C-123B Army assault transports.

Production will begin next summer at Fairchild's Hagerstown, Md., plant.

► **First Fixed Price**—USAF said the contract was the first awarded on a fixed-price, non-negotiable basis since before the Korean war.

Consolidated Vultee Aircraft Corp., long believed to be the leading contender, was the only other company among five bidders to specify a fixed-price, non-redeterminable contract.

Fairchild president Richard Boutelle called the contract "our kind of business" when the company submitted an uninvited, 11th-hour bid for the C-123B at Wright-Patterson Air Force Base, Ohio, last month.

In awarding the contract, Air Force Secretary Harold E. Talbott said the only possible change in the undisclosed price would be a downward revision because of Fairchild's experience in production of transports.

► **Delayed Award**—Five weeks before the decision was made, Air Materiel Command officials had recommended to Talbott that Fairchild be awarded the contract.

Final decision was not made until last Monday, when company officials were notified at the Pentagon that their bid had won.

Top-level controversy in the military is understood to have delayed awarding the contract.

► **C-119 Stretchout**—Fairchild is completing about 300 C-119Gs still under contract. These include 88 C-119s that Willys Motors had left to complete before its contract was canceled in June. These contracts are scheduled for completion in 1956.

The production stretchout from 25 planes per month to between 15 and 17 ordered last spring will delay completion of the C-119s and has forced Fairchild to lay off from 600 to 700 employes to date. More are slated for release by the company before the end of the year.

► **New Toolup**—The company's first move in the next few days will be to bring the only C-123B ever built to its Hagerstown plant from Edwards AFB, Calif., where it has been undergoing Air Force tests.

Tools and parts produced at Willow Run, Mich., by Willys before its contract was canceled will be shipped by truck to Hagerstown.

Actually, Fairchild will tool up for only half of its contract at present. The company has a good skilled labor force experienced in C-119 production, which officials feel will greatly simplify building the C-123.

► **Stroukoff Advice**—Immediate speculation arose within the industry as to the future affiliation of Michael Stroukoff, head of the newly formed Stroukoff Aircraft Corp. and designer of the C-123.

It is known that Convair and Fairchild have been meeting with Stroukoff in attempts to gain his advice (AVIATION WEEK Sept. 21, p. 14).

Now that Fairchild has the contract, it is possible that Stroukoff may be employed as a consultant, although company officials declined comment last week.

Observers believe the Air Force may instruct Stroukoff to send his USAF research and development contract for a boundary layer control for the C-123 to Fairchild, thus giving the latter firm all departmental work on the assault transport.

Other bidders for the C-123 were North American Aviation, Glenn L. Martin Co., and Lockheed Aircraft Corp. Kaiser Motors' subsidiary, Willys Motors, also was invited to bid but declined because its Willow Run facilities now are occupied by General Motors Corp.'s Hydramatic plant.

Commercial rights to the C-123 are held by Chase Aircraft Co., now owned by Kaiser Motor Corp. (AVIATION WEEK Sept. 7, p. 14), as a result of the split of Michael Stroukoff and the Kaisers. Kaiser formerly owned 49% of Chase.

F-100 Specs

Los Angeles—Newsmen will get a look this week at the first in USAF's stable of new supersonic fighters. What they will see will be North American Aviation's F-100 Super Sabre, powered by a Pratt & Whitney J57 engine with afterburner.

Wingspan is 36 ft. and length is 45 ft. Wings are swept back 45 deg. and an unusual control system gives it a high rate of roll and tight-turning capability. This system includes inboard ailerons. The fast-climbing fighter has very thin wings, which make it apparent its fuel supply is carried within the fuselage.

Its pitot tube spears out ahead of the nose to avoid the supersonic shockwave. Designed to take an even more powerful engine than the J57 when it becomes available, the F-100 is much heavier than its F-86 predecessor. Ceiling, however, is well over 50,000 ft. First production aircraft is due off the NAA assembly line at Inglewood, Calif., this week.

Canberra, DC-6 Win Christchurch Race

London—A Royal Air Force Canberra P.R.3 jet bomber won the London-Christchurch, New Zealand, speed race Oct. 9, flying the 12,270-mi. course in an elapsed time of 23 hr. 51 min. for an average of 494.5 mph.

In the transport section, a KLM Royal Dutch Airlines DC-6A Liftmaster—carrying a 14-ton payload, including 64 fare-paying passengers—took the handicap with a gross time of 49 hr. 57 min.

► **Last Race?**—Originally expecting 19 entries from six countries, the race committee distinctly was disappointed when only eight aircraft competed.

Observers here speculate that this may be the last big international air race. A prize of $28,000 for the winner in each section is an inadequate attraction for real international competition, they say.

Withdrawal at the last moment of the Vickers Valiant four-jet bomber reflected strong feeling in the aircraft industry and in some sections of RAF that the value of such planes is far too great to risk in races.

► **41-Min. Edge**—RAF's winner, powered by twin Rolls-Royce R.A.3 turbines, beat out Australia's Canberra B.2 by 41 min. The total time included 1 hr. 23 min. spent on the ground at four refueling points.

Of five Canberra starters, only three finished the gruelling race.

The favored P.R.7 pulled up at Perth, Australia, with fuel filter and generator difficulties. The Rolls-Royce R.A.7-powered bomber was leading the field with a margin gained by flying 3,611 mi. direct from Ceylon to Perth and bypassing Cocos Islands.

The second Canberra to drop out of the race was crippled at Cocos when a tire burst as the bomber touched down for a landing.

► **362-Mph. Average**—The U. S.-built DC-6A crossed the finish line more than nine hours after a British European Airways Vickers Viscount landed at Christchurch.

But the turboprop-powered Viscount, carrying BEA chairman Peter Masefield, registered an effective payload of less than 5,000 lb. and had four extra fuel

tanks in the fuselage—giving the race to KLM's entry under handicap rules.

The British-built transport averaged 311 mph. to the DC-6A's 362 mph.

The only other competitor, a Royal New Zealand Air Force Hastings, dropped out in Ceylon with engine trouble.

ATIC Begins Study Of Saucer Reports

A statistical analysis of about 3,000 "flying saucer" reports received between 1947 and 1952 is being conducted by Air Technical Intelligence Center at Wright-Patterson AFB, Dayton, Ohio, in an effort to refute the myth.

ATIC believes approximately 90% of saucer reports received this year can be explained. At least 80% of those received in 1952 also can be explained.

The center's official analysis within the next few months is hoped to determine definitely the origin of all reported saucers.

In 1952, nearly 70% of the reports came from civilians and about 30% from military personnel. Thus far in 1953, half have come from civilian observers, the rest from the military.

ATIC believes this is due to the decline of publicity about flying saucers until recent publication of two books attempting to explain them as warships from another planet.

► **Debunking the Claims**—Officially, Air Force debunks any such claims. Chief causes of the saucer observations, ATIC believes, are astronomical phenomena, aircraft or weather balloons similar to the Moby Dick (AVIATION WEEK, Aug. 24, p. 28), that test upper-air winds and cosmic radiation.

Balloons are launched from nearly every airfield in the country at 3 and 9 a.m. and at 3 and 9 p.m. to altitudes ranging from 60,000 to 100,000 ft. Varying in size from 30 in. to 116 ft., the balloons swell as they gain altitude because of the change in atmospheric pressure.

Made of rubber or polyethylene, they have very good reflective qualities and carry small lights for night launches that can be seen at high altitudes over great distances.

Birds, light reflections and refractions —such as sun and moon dogs—and papers caught in updrafts account for a smaller number of the reports.

► **Source Breakdown**—Of 2,000 reports received through military channels since Jan. 1, 1952, ATIC has determined that 15.4% were balloons, 15.2% aircraft, 17.8% astronomical, 6.3% birds, light reflections, etc., 1.6% hoaxes and 5.8% radar.

There was insufficient data to evaluate 23.6% of the reports, and 14.3% are unsolved.

Sources since January 1952: civilians, 39.7%; USAF pilots and aircrew members while flying, 11.1%; airline pilots while flying, 2%; non-airline civilian pilots while flying, 4%; tower operators, both civilian and military, 1%; balloon observers, 2.5%; civilian scientists and engineers, 3.2%; military personnel, 24%; and radar returns, 12.5%.

► **Erratic Planet**—The planet Venus has caused much concern to observers who believed they were seeing saucers.

In May, 11 persons noticed a bright, white hovering object over northern Wisconsin that lasted about eight hours.

Astronomers found the reports closely paralleled the course of Venus on that date. In March, the planet was low on the western horizon and, at times, appeared to change color and move erratically because of hazy atmospheric conditions.

It accounted for 29% of all sightings that month.

Not all have been reported in this country. Highest percentage have been noted in Japan and Korea.

As high as seven out of 10 of all reports in the Orient definitely have been attributed to Venus, which confuses even the most experienced pilot by its intense brightness.

When it has completed its analysis, ATIC expects to be able to report that there is no existing danger to the U. S. from interplanetary travelers and that there is nothing to cause undue speculation or hysteria.

Safety Record

Scheduled airline safety last month continued at its near-record level of less than one fatality per 200 million passenger-miles for the past 12 months.

Fatality index of .49 per 100 million passenger-miles the 12 months ended Sept. 30 compares with .90 for calendar 1952. International lines had no fatality in more than 14 months, according to Air Transport Assn.'s monthly safety digest.



AIRLINE PRESIDENTS WITNESS MAIL TRIAL

Presidents of the four airlines participating in the one-year experimental air shipment of first-class three-cent mail between Washington-Chicago and New York-Chicago are seen with the U. S. Postmaster General at inauguration of the service Oct. 6 in Washington, D. C. (Aviation Week Oct. 12, p. 20). Left to right: J. H. Carmichael, Capital Airlines; Ralph S. Damon, Trans World Airlines; Postmaster General A. E. Summerfield; C. R. Smith, American Airlines and W. A. Patterson, UAL.

Hughes Fills Gap Made by Walkout

Los Angeles—Appointment of William C. Jordan as vice president and general manager of Hughes Aircraft was announced last week by owner Howard Hughes.

Jordan, who resigned as president of Curtiss-Wright and Wright Aeronautical Corp. in 1949, replaces Gen. Harold L. George, who quit Hughes after a dispute with its multi-millionaire owner (AVIATION WEEK Sept. 28, p. 15).

Jordan is a director of Menasco Mfg. Co., Burbank, Calif.; Lagonda National Bank, Springfield, Ohio; Aircraft Tapered Sheet, Inc., Los Angeles, and Hiller Helicopter Co., Palo Alto, Calif.

He is also chairman of the board of the export-import firm of B. M. Heede, New York, and president of Seymour Tool and Engineering Co., Seymour, N. D.



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USAF F-86F peels off for steepest possible dive, releasing bomb at maximum speed.

F-86F Is 'Top' Fighter-Bomber

Sabre surpasses USAF expectations in new role, is able to carry out every type of combat attack mission.

By A. W. Jessup
(McGraw-Hill World News)

With the 18th Fighter-Bomber Wing, Korea—Want to build a fighter-bomber?

Take the best fighter-interceptor you can get your hands on. Alter it to carry bombs, rockets and napalm, and there's the finest chance that you will have a fine fighter-bomber.

That's how the U.S. Air Force got its first combat-operational jet fighter-bomber—Lockheed's F-80 Shooting Star. And it is how it got the latest, most versatile and best jet fighter-bomber—North American's F-86F Sabre.

► **Last Laugh**—Back in 1950, most air officers laughed when Col. M. L. Martin, then at Nellis AFB, suggested that the F-86 would make a good fighter-bomber. Today, it is Martin's turn to laugh. As commander of this wing's 18th Fighter-Bomber Group, he put the Sabre through its fighter-bomber paces during the final weeks of the Korean war.

The Sabre more than measured up to his predictions, North American's expectations and USAF's hopes for every type of mission from low-level attacks on enemy mortar positions in the front lines, to interdiction of trains, trucks, bridges and supply points, to dive-bombing strikes right on the south bank of the Yalu River.

► **Without a Peer**—Pilots of the group claim the Sabre is without peer for dive bombing. They cite missions flown five days in a row as the war ended, against Uiju Airfield just south of the Yalu and only a few miles from the big Communist base at Antung, Manchuria.

Taking off from this base, the Sabres carrying two 1,000-lb. bombs each climbed to 30,000 ft. going north. Just off of Uiju, they rolled over into straight in 30,000-ft., 70-deg. dives at the field, lining up with specifically assigned targets as the Communist positions came "up" into detail view. Bombs were away and onto the targets, and the Sabres pulled out well before Red ack-ack got into action.

Every aspect of this attack was ideal for accurate dive bombing. The Sabres were in the steepest possible descent, and the bombs were released at maximum speeds (terminal velocity for the Sabre with auxiliary gas tanks and the critical velocity for the type bombs used are almost identical), thus minimizing wind effects and giving the bombs the straightest trajectory to the targets.

Moreover, the Sabre dive-bomber can carry out its mission unescorted even against the Communists' best interceptor, the MiG-15. Hitting Uiju, the F-86s threaded the needle, diving through flights of MiGs. The Sabres dropped their bombs successfully, then tangled with the MiGs as the latter

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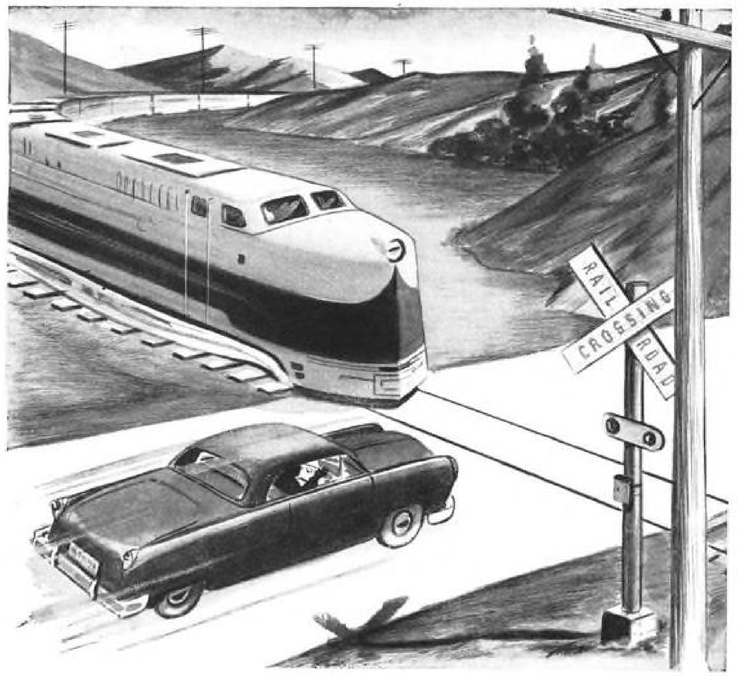
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dove down, too late to stop the Sabre attack.

And what the Sabres did against Uiju, could have been done as easily against the MiG bases at Antung and Ta Tung Ko.

► **F-86F Details**—The fighter-bomber F-86F differs only in minor respects from the interceptor Sabre. External gas tank pylons have been moved outboard, to make room for bomb pylons and rocket rails. The tail actuating section has been beefed up with armor plate to protect the aircraft against ground fire.

All of the F-86s here either have 6-3 wing (hard leading edge) or are being modified. Use of the slat wing no longer is necessary, now that long runways are available in Korea (this one, of concrete, approximates 10,000 ft., and the Sabres take off with a bomb load in about half its length).

The wing is called 6-3 because it increases the wing width 6 in. at the root and 3 at the tip (AVIATION WEEK Sept. 7, p. 15). In addition, the wing incorporates wing fences, two on each side, similar to the fences on the MiG-15. The fences are about 35 in. long by 5 in. high.

Takeoff characteristics are changed. Higher speed is required. Pilots also have to be careful about getting nose high and stalling.

Change in the wing makes possible an increase in range. It is now possible to install fuel tanks, each side with a capacity of 65 gal., or 130 gal. overall. With the wet wing, range can be increased many miles, perhaps to that of Republic's F-84. Preliminary experiments reveal that there is no change in characteristics.

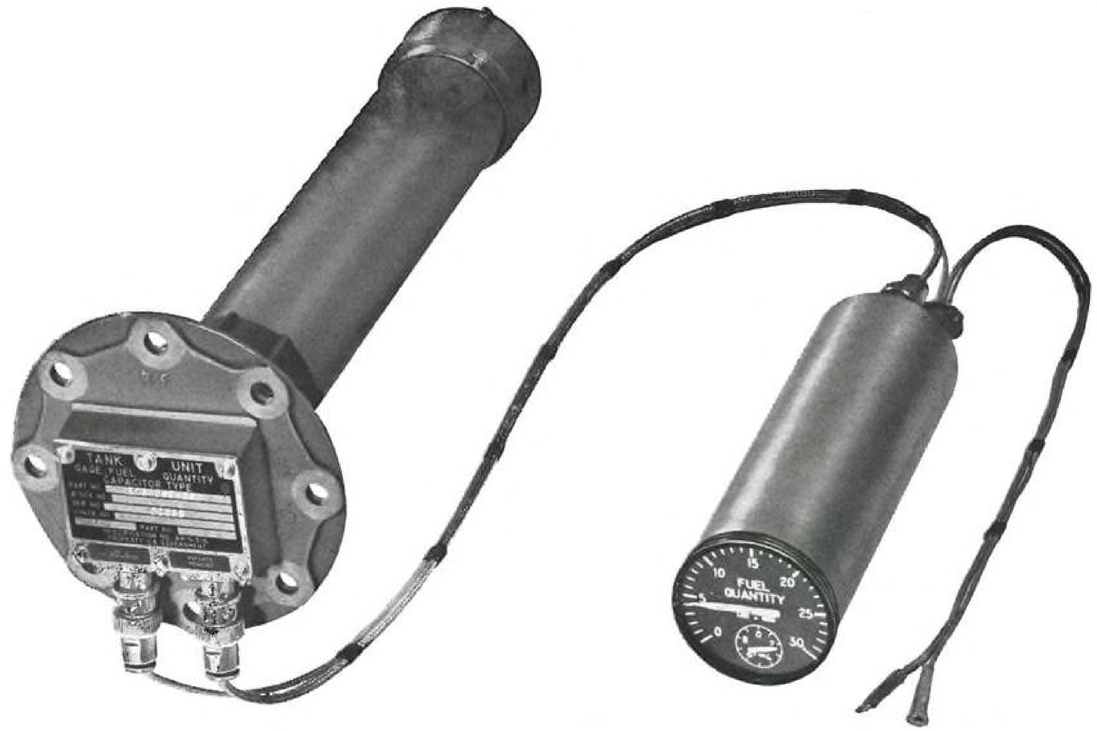
► **Bomb Loads**—Besides increasing its fuel load, pilots want to expand the bomb load. They see no reason why further relocation of external fuel pylons would not make room for another bomb pylon on each side. Then the Sabre could take off with four 500-lb. bombs, or a varied bomb load for greater flexibility. Now the load has been limited to two bombs, either 1,000- or 500-pounders.

One major improvement in the F-86F is the relocation of the hydraulic systems.

In the older Sabre models, normal and emergency systems ran parallel at many points, so that it was easily possible for a single enemy hit to knock out both systems. Now the lines are well separated, and the odds of losing both much reduced.

Pilots no longer suggest that the emergency system be eliminated to save weight, in large part due to this fact, and because many pilots have limped to their home fields on the emergency system.

► **Growth Pains**—The Sabre fighter-



"Plug-in, plug-out" simplicity in Avien's "TWO-UNIT" FUEL GAGE

This "repackaging" of Avien's capacitance-type fuel gage is 50% lighter and needs no field adjusting.

Up until now, most fuel gaging systems needed four units: a tank unit, an indicator, a bridge-amplifier and a shockmount.

No field calibration was required for the Avien tank unit or indicator. Avien held them to such close tolerances, the adjustments for individual installations were actually "built-in."

The bridge-amplifier (the "black box") was a different story. This intermediate unit was supplied as a common part, for universal application. And that's where field calibration *had* to be made.

There was only one answer, as far as Avien was concerned. The "black box" had to go.

Now, in the Avien Two-Unit system, the necessary components for the bridge and amplifier functions have been built into the indicator case. The "black box" is eliminated, and so are many parts which were necessary to make the "black box" universally applicable.

The Two-Unit Gage gets installation down to "plug-in, plug-out" simplicity. No more field calibration is necessary — and that means that all units designed for the same aircraft are interchangeable. Avien units are now all "shelf items."

To install the Two-Unit Gage, you *don't* need trained personnel, you *don't* need specialized equipment, and you *don't* need calibration instruction or data.

This new "package" brings savings all along the line. The basic system is reduced in weight by 50%. Installation time is cut. Less wiring and connectors are needed. Less maintenance is required. Trouble-shooting becomes easier. And fewer parts must be stocked for maintenance and repair.

As in the previous system, additional functions for fuel management can be integrated into the basic gage — and with less complexity than ever.

The Avien Two-Unit Gage is now available to meet your manufacturing schedules. The indicator is available in either large or small sizes, with all varieties of dial configurations.

Every month, Avien produces over ten thousand major instrument components for the aviation industry.

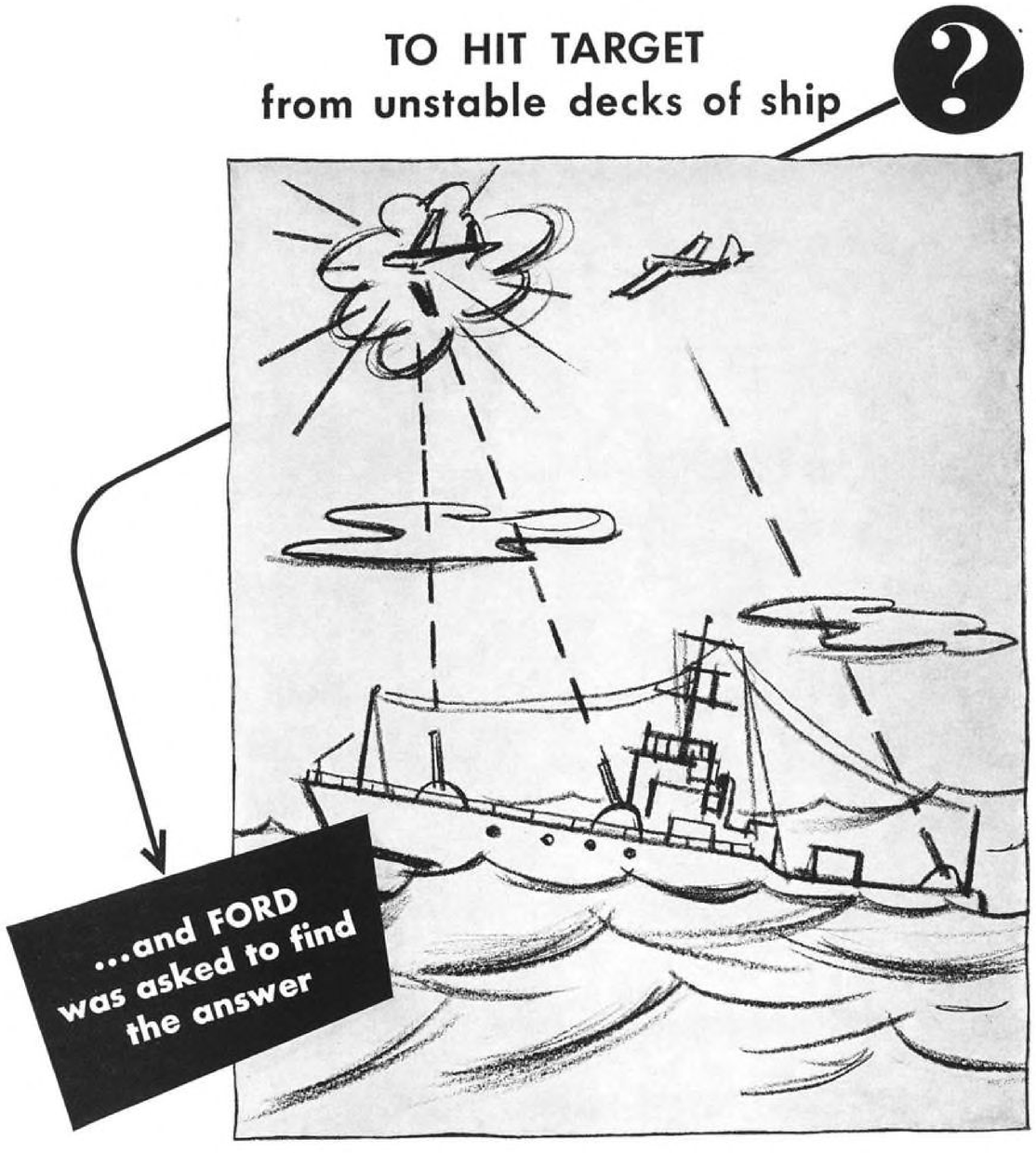
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bomber was just tossed into Korea. Nevertheless, its troubles have been minor and probably less than anyone expected.

The list shapes up like this:

(1) When the external fuel tanks were moved outboard under the wing, it changed the release characteristics of the tank which was aerodynamically designed for the center position. A new design of some control is necessary to eliminate the damage done when the tanks smash into the plane. A "Stuka" fin, which is expected to thrust the tank down and away when it is released, will be tried soon.

(2) The bomb pylons were attached with very finely threaded bolts. Frequent removal of the pylons to turn the airplane into a fighter-interceptor brought about thread-stripping, or it delayed changes. Coarser threaded bolts and inserts are now being installed to permit faster and safer changes.

(3) No provision has been made for jettisoning bomb pylons in flight. There is considerable drag, which pilots would like to eliminate, created by the pylon. They suggest that some method be devised for blowing off the pylons.

(4) For a long time, the bomb-arming wire system was damaging flaps and wings. When the bombs were dropped, the wires remained fastened to the solenoid in the wing and the end flapped back under the wing, holding flaps and wing. One mission of 11 planes came back with nine having this type damage. An armament sergeant devised a method which automatically released the wire when the bombs were dropped.

(5) Fuel regulators cause considerable trouble. This was traced to the flapper valves which were made of neoprene and were wearing out against the metal seats. In theory, the pressure of the system being used (regular or emergency) should keep the valve tightly closed. But the pressures were so near even that flapping resulted in heavy wear. Replacement of the neoprene with a metal-to-metal seal has been recommended.

(6) **Difficulties in getting** at the liquidometers is a headache for maintenance personnel. Liquidometer points frequently carbon up as a result of arcing. The leading edge must be taken off to get at the liquidometers in order to clean them and make proper adjustments.

(7) **Warning lights and "eyelids"** on the D-1 oxygen regulators frequently act up. When they are functioning improperly, even though oxygen feeds properly, pilots refuse to take off. A D-2 system now coming out is supposed to eliminate these problems.

(8) **Landing gear indicators** have thin cases which frequently bind and prevent proper functioning of the indicator.

► **J47 Performance**—General Electric's J47-27 powerplant performed better under combat conditions than it did in the United States and than GE technical representative Robert E. Santos expected.

Santos said it was twice as hard keeping 27 F-86Ds, equipped with the J47, going at Tindle AFB as it is handling 75 F-86s in this wing.

Since February there have been only four damages from hot starts, eight cases of broken buckets (one per week was expected), one compressor rub, but no



USAF ACCEPTS FIRST PRODUCTION MENTOR

First production model of the T-34A Mentor primary trainer was delivered to USAF early this month from the Beech Aircraft plant, Wichita. T-34A is all-metal low-wing monoplane with tricycle gear, powered by 225-hp. Continental engine. It has top speed of 189 mph., cruising speed of 173 mph.; empty weight is 2,170 lb., gross 2,900 lb.; wingspan is 32 ft. 10 in.; length 25 ft. 11 in., height 9 ft. 7 in. Air Force Lt. Col. Arthur J. Middleton (center) accepts plane from Mrs. O. A. Beech, Beech president, and Lynn Richardson, vice president-military sales, at the Wichita factory.

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complete compressor failure. One engine had 337 hr. on it, many had reached 200 hr. and still were powering the fighter-bombers.

▶ **Engine Maintenance**—One-hundred-hour inspections and major maintenance are handled at Remco (rear echelon maintenance combined operations) located at a base in Japan, and staffed by the maintenance personnel from all the F-86 wings fighting in Korea. Here, the wing conducts minor repairs, replaces combustion chambers and accessories. It cannot touch compressor wheels, buckets or the upper half of the compressor.

Maintenance complains of inability to test tailpipe temperatures exactly, or within 20 deg. Combat bases probably should have accurate potentiometers.

Engine changes take about two hours, one to get the old engine out and one to put in the new one. It takes about eight and one-half man-hours.

A major complaint from piliots is engine surging. Maintenance personnel believe this is not serious, since there is no record of failure from this. But the pilot feels it when he runs up the engine and naturally doesn't want to go on.

It is believed that the trouble centers in the fuel regulator. Pistons and cylinders revolve, friction-free, in the regulator, but bubbles of air probably form a cushion causing the mechanism to bounce and record fuel pressure fluctuations. A dash pot is being tested in the same regulator.

The fighter-bomber men don't like to get engines which have been used by fighter-interceptors. They think the "aces" fill their tailpipes with "rats and mice" (restrictors) to build up higher tailpipe temperatures and obtain an "illusion" of higher speeds. But this cuts bucket life and puts a heavier load on the engine.

▶ **Radar Sight**—The A-4 radar sight with which the F-86F is equipped has proven easier to maintain and more reliable than the A-1, first used in Korea. The big help is the ability to interchange all components in packages. Incommission rate has been kept at 95%.

For dive bombing runs, the Sabres have adopted the rocket rather than the bomb function of the sight and find it excellent.

Chief of the sight maintenance has been a South African Air Force sergeant to whom American officers give highest praise. The man has had 25 years' electronic experience, once was an officer in charge of all SAAF communications. He is a member of the SAAF squadron which is part of this wing.

The SAAF first flew F-51s in Korea and, when the 51s ran out, switched to F-86Fs. The SAAF had the 86s on loan, but they paid for every one cracked up or lost in combat, as well as for all parts and fuel used. Cost consciousness on the part of all the South Africans wins the highest praise of the Americans. They say the SAAF will do anything to save money, even spend money.

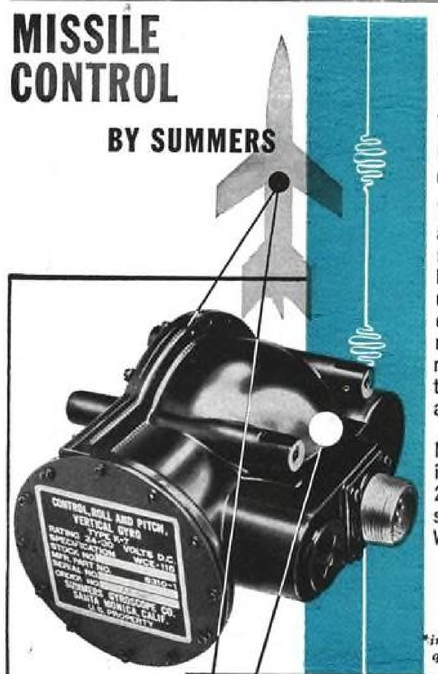
The fighter-bomber pilots here had preferred having 20-mm. cannon for air-ground attack. As good as the 50-cal. machine gun is, it doesn't pack quite the destructive, explosive power of the 20-mm. against trucks, locomotives and heavy metal installations like power stations.

Some method of adjusting the gun mountings in flight would be helpful. Guns adjusted for air-to-air combat are sighted up in relation to the flight-line as is the sightline. But for ground strafing, gun line should be depressed some in relation to the flight-line. This adjustment can be made on the ground; but Sabre pilots never could be sure whether they were tackling MiGs or locomotives after the bombs were dropped.

Dollar for dollar it looks as if the Air Force has gotten a maximum of punch and protection out of the F-86Fs in this wing.

These fighter-bombers have the flexibility of being able to tackle the toughest ground targets in fast, dive-bomb runs and to whip the Russian MiG, all on the same sortie.

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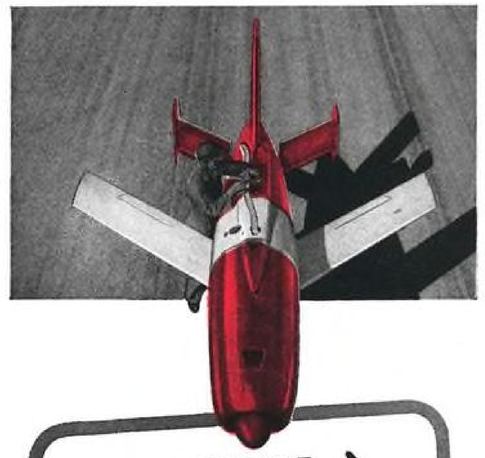
To keep our air and ground defenders' shooting sharp is the job of the Firebee, America's new high-performance pilotless jet plane. A product of Ryan Aeronautical Company's advanced aeronautical engineering, the Firebee was developed as a joint project of the U. S. Air Force, Army and Navy. It is now being manufactured for use by all three services.



The Firebee carries no human pilot, yet this remote-controlled target plane has phenomenal performance like a modern fighter. It is launched either from the ground or from a "mother" plane and is recoverable by a highly efficient parachute system that lowers it gently to the ground.

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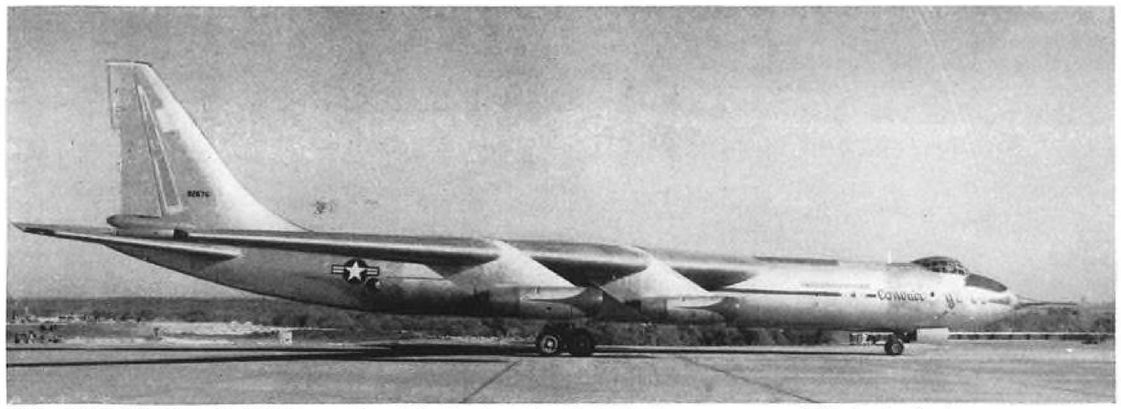
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TAIL GEAR UP—Convair's YB-60 sweptwing all-jet bomber takes off and lands on nose gear and 16 wheels of main gear.



TAIL GEAR DOWN—Special gear prevents aft center of gravity and jet-thrust moments from tipping the big plane backward.

Engineer Analyzes Landing Gear Trends

In the flood of information on aeronautical progress, comparatively few specific details have been revealed on the subject of landing gear.

This little-spotlighted equipment has undergone considerable change in the past few years as increasing aircraft weight, faster landing speeds and thinner wings have complicated gear housing.

An analysis by Wendell E. Eldred, senior design group engineer with Consolidated Vultee Aircraft Corp.'s Fort Worth Division, plots these changes. This analysis was presented before a group of aircraft industry engineers at the recent national aeronautic meeting of the Society of Automotive Engineers, in Los Angeles.

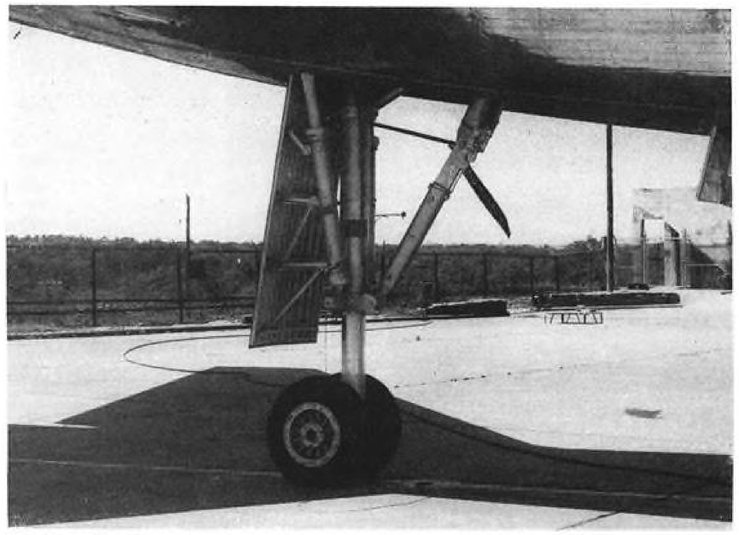
Eldred has had 17 years' experience with landing gear design. His analysis covers the broad aspects of gear configurations, main and nose gear details, materials and developments.

▶**Tail Type Fading**—Over the past 20 years, and especially in World War II, the tricycle landing gear has superseded the tail wheel gear almost completely. This switch has been justified for reasons of improved stability, braking, and steering.

On a current development design incorporating a high-angle landing attitude, a comparison of tail and tricycle types shows that the tricycle arrangement is substantially lighter, Eldred reveals. It appears that the tricycle arrangement is here to stay, except on specialized types such as vertical ascent aircraft, Eldred observes.

▶**Bicycle Compromise**—During recent years, because of the trend toward thinner wings and the large bomb volume requirement in the fuselage near the center of gravity, the bicycle-type landing gear has evolved as an "unfortunate" compromise on several aircraft. Eldred analyzes the bicycle gear in this way:

• **It limits the pilot** to a narrow range of touchdown speeds, which varies with gross weight. If landing is made above



YB-60 TAIL GEAR carries dual co-rotating tires, same size as nose gear.

Brake and Gear Developments

Wendell Eldred, Convair senior design engineer, touched briefly on a number of landing gear developments in his SAE presentation. Some of his points:

• **WHEELS AND BRAKES.** Developments in this field include greater energy absorption, improved linings, better disks and drums, automatic adjustments, forged wheels, and many other improvements.

• **TIRES.** These units have progressed from cotton to rayon to nylon. The tire engineer is now coping with the job of meeting even higher speeds and temperatures.

• **PARACHUTE BRAKES.** These apparently are here to stay on high-performance land-based military aircraft, because of weight economy. A good reverse-thrust method for jet engines may change this picture.

• **TRACK GEAR.** Extensive testing of prototype units on light, medium and heavy bombers has confirmed that weight, cost and maintenance are all higher than with wheeled gears designed for the same job. Under certain tactical situations, with pneumatic belts, the track gear might pay off.

• **CROSSWIND GEAR.** Considerable work has been done in this field with both free-castering and preset crosswind gears. There has been no rush to reap the advantages of this development, but crosswind gear may prove both worthwhile and economical on certain type aircraft.

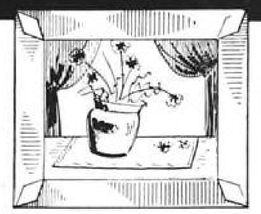
• **DROPPABLE GEAR.** These units appear to be good for getting fighters with high-pressure tires off an advanced base airstrip. In addition to this there will be other applications. The parachute appears to be the most feasible recovery method.

• **ZERO LAUNCHERS, INFLATED MAT LANDINGS.** The zero launcher is a takeoff means involving a portable platform with mechanical guidance, and with power supplied by droppable assist rockets on the aircraft or by a catapulting means on the launcher. An inflated mat landing is made on a platform of inflated rubber logs or containers covered with stretched canvas, where the stopping is by arresting equipment similar to that used on aircraft carriers. The British have used this both on carriers and on land. This combination looks good until the logistics and economic viewpoints are given consideration.

• **TAKEOFF CARTS, SKID LANDING GEAR.** The interceptor fighter seems the most likely application for these landing gear eliminators. However, the skid gets about as heavy as a landing gear if reasonable sinking speeds are met.

• **WATER SKI GEAR.** This appears to be one of the most promising developments in the landing gear field. The idea is not new, but only recently has an airplane (Convair's Sea Dart) been flown with retractable water skis as an integral part of the original design.

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this range of speed—sometimes advisable with turbulent or gusty ground conditions—the airplane usually porpoises off the ground, perhaps several times. If the pilot lands below this speed range, the nose gear hits too hard.

• **Lower crosswind stability** characterizes the bicycle gear, as compared with the tricycle gear.

• **Higher nose gear loads** require larger steering torques. This means larger steering units.

• **Control of braking** is complicated by addition of brakes to the nose gear, with a large variation in vertical load caused by the dynamic reaction of the center of gravity during braking. This condition may require brakes of different sizes for the front and rear gears, even though same size wheels are used. And, if the nose gear brakes override the main gear unit, a ground loop can develop rapidly.

• **Use of multiple wheels** that are laterally displaced relative to the fuselage can cause skidding of individual tires due to airplane rolling that is caused by crosswind or turns. Anti-skid devices, Eldred says, solve most of these brake problems, but at the price "of their necessity" and dependence on their reliability.

• **Use of outrigger gears,** even though relatively small and light, boosts the total number of landing units to a minimum of four instead of three. It also increases the number of free castering gears requiring shimmy-damping and centering, to three units instead of one.

This is not simplification, Eldred says. The greatest penalty of the bicycle gear is hidden—discovered during studies made to convert Convair's B-36 into the YB-60 sweptwing all-jet version, he points out. As a result of the large rearward shift of the aircraft CG—placing the tricycle main gears ahead of the CG at all high-gross-weight conditions—a bicycle gear was considered as a possible solution to the problem.

But studies of the increased fuselage bending involved to install a bicycle gear showed an increased structural weight of 4,000 lb.—about 1% of the gross weight or 22½% of total landing gear weight. This penalty could not be tolerated, Eldred says.

► **YB-60 Diamond Gear**—The solution to the YB-60 problem was to retain the same main gears in the same location, reducing the nose gear size because of the reduced loads, and adding a tail gear —a special unit fully retracted at the time of actual takeoff and landing.

This tail gear is primarily an air spring with an 18-in. stroke, a low compression ratio of 1.25 to 1, with dual co-rotating tires (36-11) the same size as on the nose gear.

Purpose of this special gear is to prevent the aircraft from falling over backwards as a result of the aft CG and





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jet-thrust moments. Another purpose is to throw enough vertical reaction on the nose gear to permit adequate steering under CG and runway grade variations.

In operation, the pilot retracts the tail gear at close to 90 mph.—when the airplane has ample elevator control under all conditions. The tail gear is not lowered again until after the airplane is landed—at any time suiting the pilot, because the combination of brake, engine thrust and forward CG shift makes use of the tail gear unnecessary until power steering is required, Eldred claims.

He doesn't expect this fore-and-aft rigger gear to be used to any great extent, but he sees the design arrangement as a solution for some aircraft.

▶ **Twins and Triplets**—Discussing detailed gear configurations, Eldred observes that the trend in main gears has been very clear on larger aircraft. From simple wheels, the progression has been to twin, tandem, twin tandem, and dual twin-tandem wheel patterns. He reveals that triple twin-tandem arrangements are under study.

Ability to use runways of moderate quality—both surface and subgrade—have made this progression a necessity.

Eldred observes that the aircraft engineer usually pays a price by giving in to the civil engineer, but maintains that in the case of multiple wheel gears he came out ahead. With multiple wheels:

• **Weight is saved.** In the conversion of the B-36 from single 110-in. tires to twin-tandem 56-in. (type VII) tires, 2,500 lb. of weight was saved—1,800 lb. in the running gear and 700 lb. in the structure.

In the conversion of the de Havilland Comet from one to four wheels on each main gear, 217 lb. was saved from an original of 3,815 lb. per plane. Eldred says 341 lb. of this weight was saved on running gear but 124 lb. was added in structure. He claims this structural loss should not be typical, because there seem to be some rather heavy features in this design, probably caused by the conversion, including a bolted flanged joint in the middle of the main column.

• **Safety is increased.** Eldred claims that a flat tire is of little or no consequence. He cites as an example the landing of a B-36 with all rear tires of both main bogie gears blown as a result of inadvertent brake application during the latter part of takeoff. Only reverse-pitch-thrust braking was used for landing, because a brake line had been damaged by a blown tire. Yet, the landing was entirely successful, with no further damage.

• **Maintenance effort is cut.** On a heavy bomber the trouble of handling huge single tire, tube, wheel and brake assemblies is reduced by switching to smaller, multiple units, Eldred says. The reverse may be true of small aircraft, and probably averages out in the medium weight, he says.

• **Taxiing problems are eased.** The tandem or twin-tandem gears also are superior in taxiing over obstacles—the fore and aft wheels climb over the obstacle at different times, thus raising the airplane only about half the total obstacle height.

Eldred reveals that a complete series of obstacle taxi-tests have been completed recently on the B-36 at high gross weight, over both short and long obstacles and over a large speed range, with complete instrumentation of the gear and the plane. The Air Force will receive the report soon and it should be very helpful in setting up obstacle design criteria.

▶ **Disadvantages**—Opposing these advantages of the multiple wheel is the greater number of parts involved, with cost increase. This, however, is typical of many components of modern, high-performance aircraft, coming as the price of progress.

Also, the multiple gear develops higher ground turning torques, particularly if the aircraft is pivoted about one main gear. A limit ground coefficient of 0.8 has proven satisfactory for design purposes, Eldred maintains;

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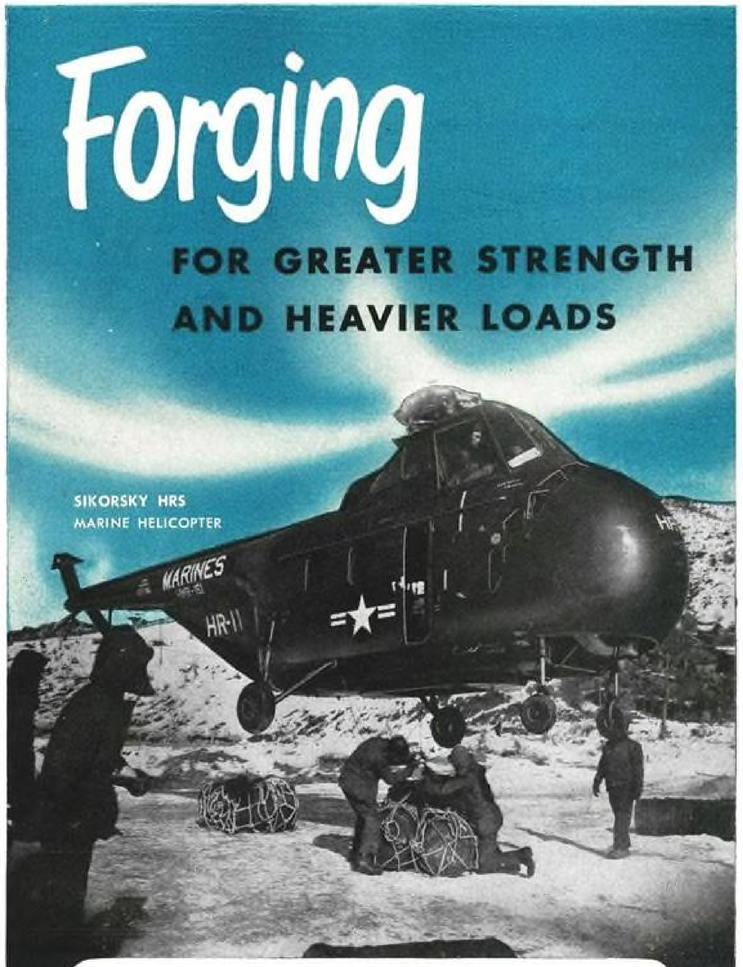
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tire wear has not been a problem where the pilot has observed reasonable turn radii.

▶**Co-Rotating Nose Gear**—In nose gears, the trend has been toward the dual-wheel gear, with a vertical spindle axis and power steering. The dual gear affords a 100% safety factor on tires, and usually permits the best stowage provision in the structure, Eldred points out.

Co-rotating nose gears are also permitted by dual-wheel design. The co-rotating gear is a dual-wheel unit in which the wheels and the axle rotate as a common unit on a pair of bearings placed between the axle and the axle housing, eliminating differential action between the wheels.

When properly designed, co-rotating nose wheels are a 100% guarantee against nose gear shimmy, Eldred claims. When used without power steering, weight is definitely saved by elimination of the shimmy damper and associated mechanisms, he says.

When power steering is used, a small weight penalty is involved, since the steering unit can serve as a shimmy damper and steering torques are higher. Eldred points out, however, that with co-rotation and power steering, scissor deflections and joint play due to adverse tolerances or wear do not lead to shimmy as has often been the case where non-co-rotating wheels are used.

He reveals that a USAF Directorate of Flight Safety Research report covering a 30-month survey of landing gear accidents through 1950-1952 shows the dual co-rotating nose gears had the best safety and maintenance record.

▶**Joint Elimination**—Examining various areas where improvements have been made, Eldred says that elimination of joints has been an effective method of saving weight. He cites as a typical example the combination of the oleo inner cylinder, wheel fork and axle into a single forging.

An alternate makeup is to flash- or pressure-weld two or three pieces together to make the same part. This method often combines forgings with tubing and reduces raw stock and boring costs.

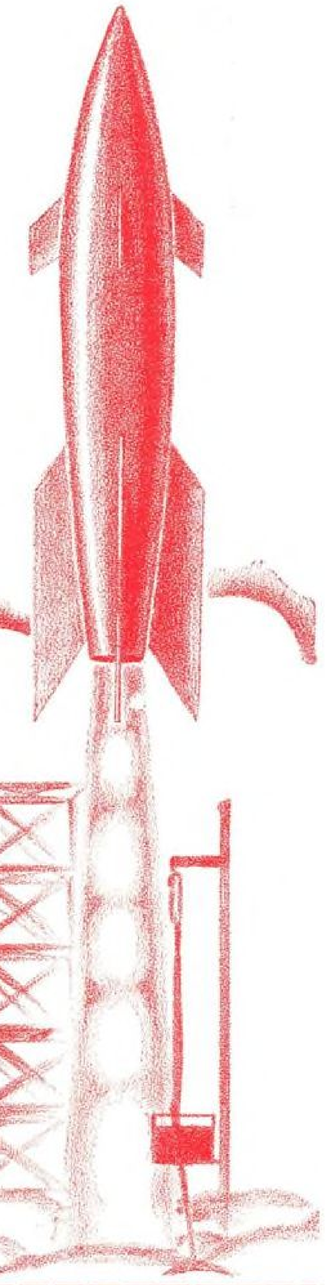
By either means, two socketed joints with their connections and stress concentrations are eliminated.

This approach applies equally well to outer cylinders and trunnions, drag links and many other parts, Eldred claims. Manual welding is apparently being abandoned for major joints because of lower fatigue life at the higher heat-treat being used, and for other reasons.

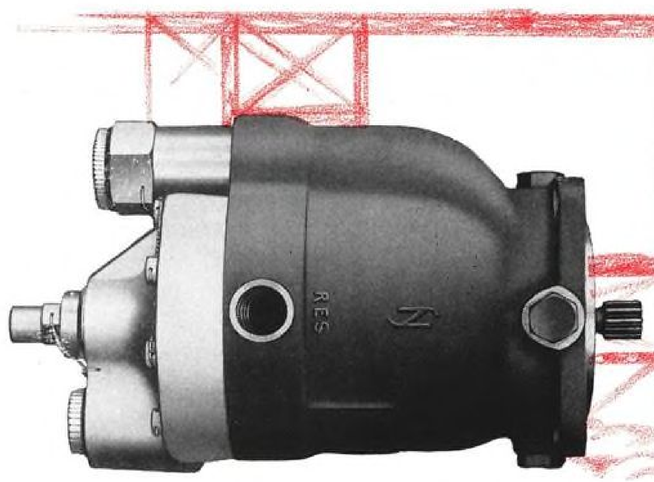
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machining costs, are all helping gear quality.

► **Aluminum Alloy Advantage**—Use of improved materials has been the biggest factor in reduction of gear weight. These materials include aluminum alloy and high-heat-treat steels. The 14ST and 75ST aluminum alloys have been used mostly.

Larger-diameter and thicker-wall oleo struts result from their use because of the lower modulus of elasticity and strength as compared to steel. But where space is available, the lower density may show a weight reduction of as much as 30% compared to steel at 200,000 psi., Eldred contends.

He reveals that Convair recently was required to design and build a semi-cantilevered shock strut from both 4340 steel and 75ST. The steel unit had an inner cylinder diameter of 7½ in., while the aluminum alloy gear proved most efficient at a 9-in. diameter. The 75ST outer cylinder was made from an extruded tube of 12-in. o.d. with 1.25-in. wall thickness, and the inner cylinder was made from an extruded tube of 9¼-in. o.d. by 1¼-in. wall thickness. The net weight differential was 171 lb., or 45% in favor of the aluminum alloy, Eldred points out.

He claims, however, that this saving was somewhat larger than typical because of some compromise on the steel design to meet interchangeability of mating parts.

Problems in aluminum alloy design include the inability to use flash- or pressure-welding at joints; the inability to use forging design that will give good grain flow and quality, particularly in the larger sizes; greater expenses of chrome-plating of cylinders; and distortion of the material during machining.

► **Steel Trends**—Steel alloys, the most common landing gear material for many years, have changed gradually from SAE 4130 to 4140 to 4340 and their equivalents, as larger sections and higher ultimate strengths have been required.

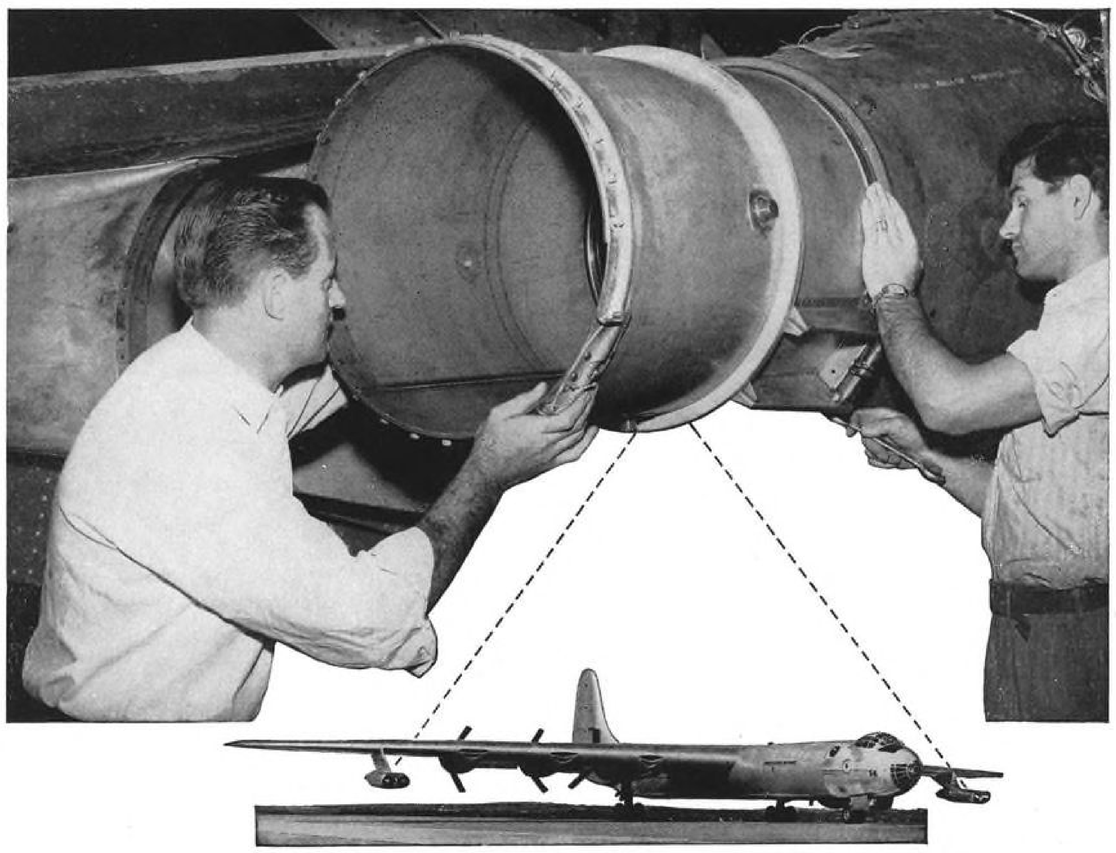
The old standard 150-180,000 psi. heat-treatment range has for some time been replaced by the 200-220,000 psi range. The 220-240,000 psi. range has been used with Hy-Tuf and similar alloys.

Experimental gears have been built and at least one production airplane committed to the 260-280,000 psi. range using SAE 4340 steel.

► **Steel Rules**—Eldred claims that there are a number of difficulties associated with the use of steel at this ultra-high-strength range. These difficulties can be avoided only by close cooperation between the metallurgist, designer and the manufacturing department.

He gives the following condensed rules representing his interpretation of current thinking on this problem:

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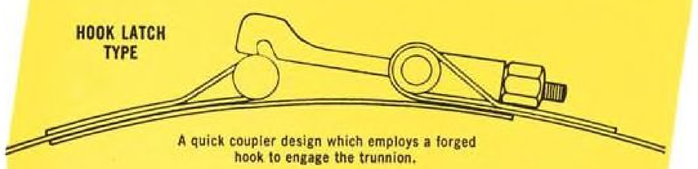
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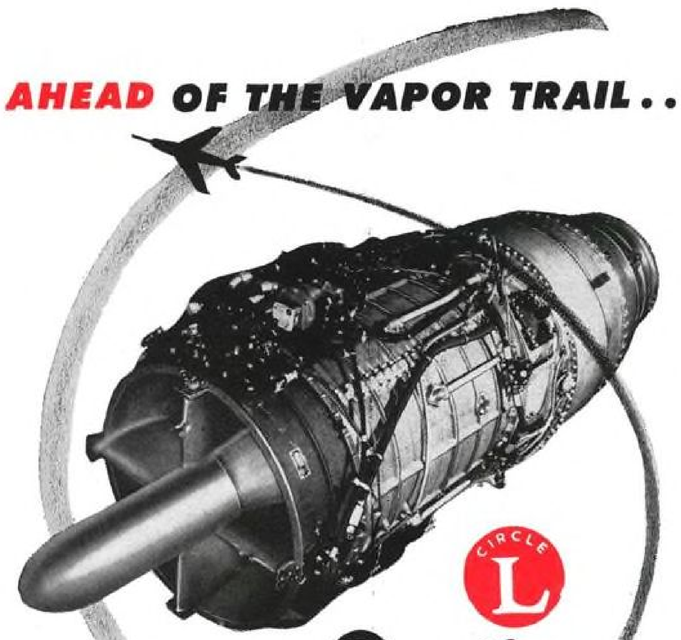
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to aircraft standards, of the lowest carbon content possible, which will result in the proper hardness when the metal is hardened and tempered at 400F. This, he says, probably will fall in the carbon range of 0.32 to 0.37% and will tend to improve ductility, impact value and notch sensitivity over higher carbon values. The 400F temperature in general will insure that third-stage tempering does not occur and cause toughness reduction.

• **Hardenability.** The material must have sufficient hardenability to insure development of more than 90% martensite in production parts. Slack quenching must be avoided to insure this degree of hardenability.

• **Notches.** Design to eliminate, to the greatest extent possible, notches, undercuts, insufficient fillets and any other high-stress concentration points. Because this can't be done entirely, these areas must be drawn back to lower heat-treat or arbitrarily reinforced to reduce the stress level. Use of shot peening will aid fatigue life materially where tensile stress concentrations are involved.

• **Residual stresses.** Stress-relieve all parts immediately after a grinding operation at the original tempering temperature of 400F. Improved grinding techniques that eliminate high-stress temperature will reduce residual stresses, but cannot be relied upon to eliminate baking at this time, Eldred warns.

• **Embrittlement.** Avoid any practice tending to produce hydrogen embrittlement. This includes acid pickling, electrolytic cleaning and conventional plating methods.

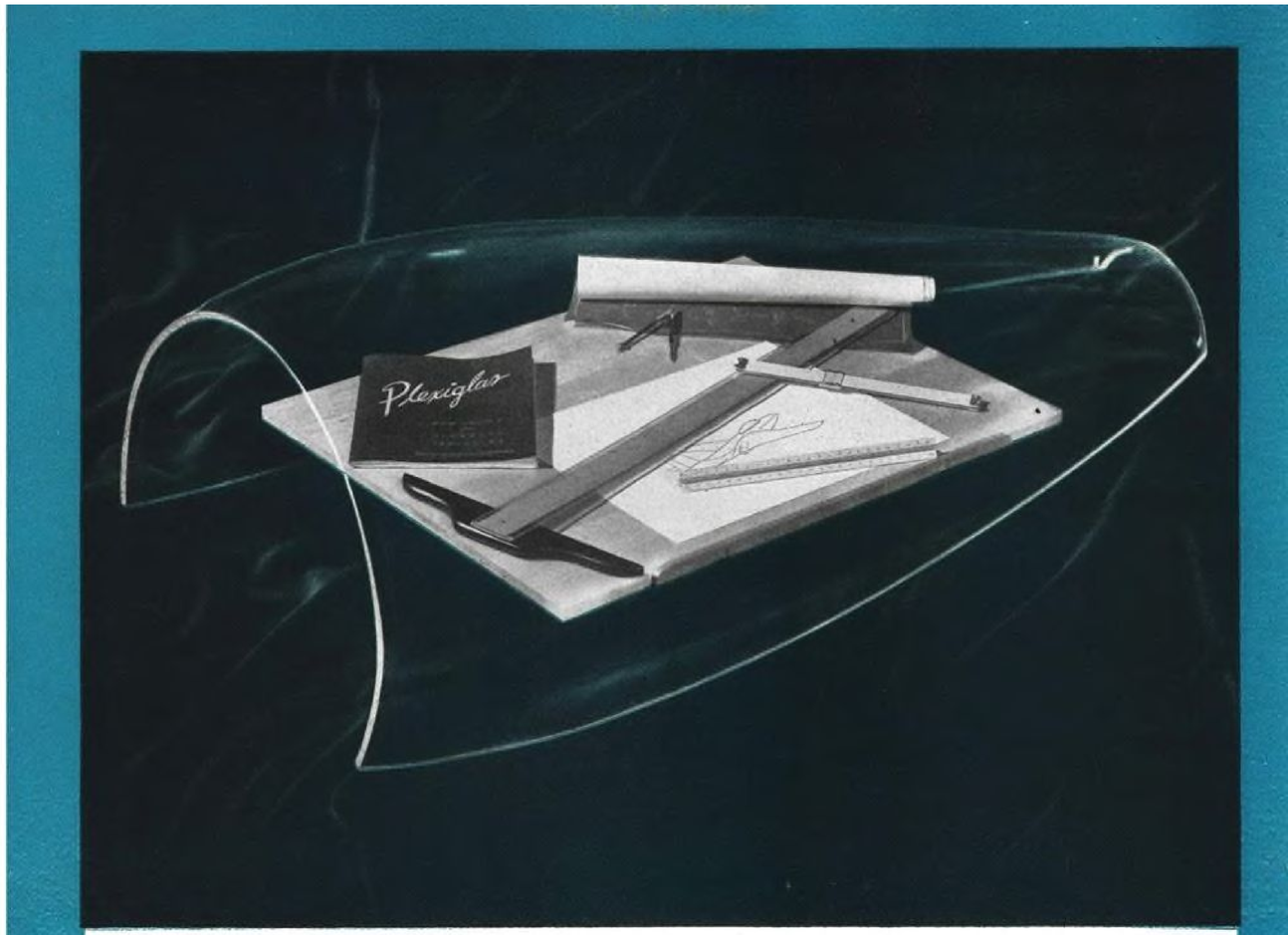
▶ **Titanium in Picture**—Under the impetus of forced development, titanium is definitely entering the landing gear picture, Eldred reveals. He says that its applications are not going to be too extensive until alloys of higher tensile strength and improved quality are available, but these may come along sooner than expected.

It is doubtful if any one material is going to prove best for overall use, according to Eldred. Designs using composite structural materials are appearing, and several efficient units have been built using aluminum alloy outer cylinders and steel inner cylinder and axle assemblies.

▶ **Development Methods**—Despite the improvements in shock strut and structural art, some landing gears have not given satisfactory service.

Failures have been of many varieties, but fall into the two general categories of low cycle fatigue failures and sustained load failures. These failures have been accelerated by high-heat-treat steels and lower design load factors.

The one common characteristic is a point of high-stress concentration. This may be caused, by form factor, secon-



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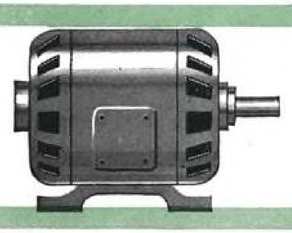
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dary deflection, hydrogen embrittlement, stress corrosion and other conditions. It is still imperative, says Eldred that each design go through a development program before flight. This program should emcompass the following:

• **All structural components** of the gear should be mounted in a jig duplicating the attaching structure of the plane as closely as possible with respect to strength and rigidity. Actual fuselage or wing fittings should be used if at all practicable.

By use of the brittle lacquer method, the location and direction of all high-stress points should be determined for the major design load, vertical, drag and side loads, and reasonable combinations of these. Stress gages then can be used in economical numbers to determine the magnitude of the peak stresses at ultimate load by plotting in successive increments up to 50% of the ultimate projecting to 100%, assuming no yield, Eldred contends.

This procedure alone, he says, may bring out several stress concentrations worthy of making immediate design modifications.

• **The gear should be fatigue-cycled** at a relatively high stress level (for example, the limit load). If failure of a given part is encountered, it should be modified and replaced. Most of these failures will probably originate at internal points where it is impractical to determine stress levels initially. Here, special tests may be required to measure the hidden stress points by inserting internal strain gages for this purpose, Eldred says.

Sometimes, the cause and cure is obvious from the failure analysis and can be checked by further fatigue testing.

• **Sustained load tests** should be run in certain cases, where a part is subjected to sustained loads of more than approximately 25% of ultimate load when sitting on the ground.

This procedure should give a reliable gear and one of minimum weight, Eldred says, since parts can be lightened as well as reinforced, based on fatigue life.

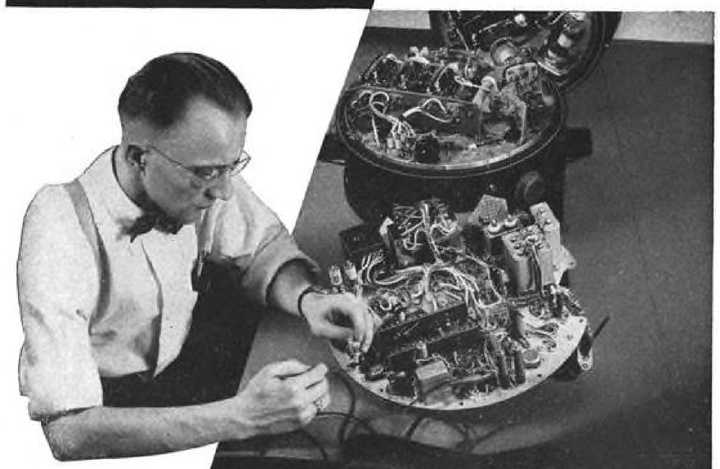
The final development step is to instrument the landing gear of an early flight test airplane to measure the actual loads encountered, to check the adequacy of the design loads.

All this may seem rather expensive, but if it can prevent the loss of even one airplane, it will be paid for many times over, Eldred observes.

► **Design Criteria**—Gradually, design specifications are becoming more objective, Eldred points out. The philosophy of telling the aircraft designer what he shall do rather than how he shall do it, is evident in many of the revised



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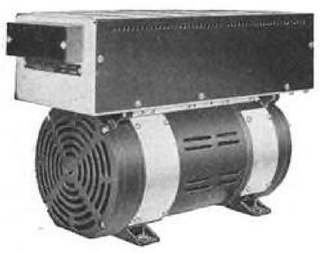
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INVERTERS—400 CYCLE OUTPUT

Type Number	INPUT		OUTPUT			Approx. Weight Lbs.	Max. Alt. Feet	Designed to Govt. Part No.
	Volts	Amps	Volts	Phase	VA Rating			
12128	27.5	1	26	1	6	5	35000	AN3496-1 AF
MG-54	27.5	22	115/200	1	250	18	65000	E-51A1A-9 Navy
				3	250			
12142	27.5	22	115	1	250	13	35000	N17158 Navy
				3	250			
12146	27.5	22	115	1	250	13	35000	53B6239 AF
MG-60	27.5	22	115	1	250	17	65000	53B6239 AF
MG-62	27.5	22	115	3	250	17	65000	AN3532-2
32E01	27.5	35	115	1	500	26	50000	AN3533-1
				3	500			
32E00	27.5	45-54	115	1	500	34	50000	AN3534-1
				3	750			
MG-44	27.5	55	115/200	1	750	35	50000	E-52804-2 Navy
				3	750			
MG-57	27.5	100	115/200	1	1250	42	50000	E1737-1 Navy
				3	1500			
MG-61	27.5	100	115	1	1500	51	65000	—
MG-64	27.5	100	115	3	1500	51	65000	—
1518 Mod. 1 & 2	27.5	130	115	1	1500	37.5	20000	—
				3	1800			
1518 Mod. 5	27.5	130	115	1	1500	37.5	35000	—
				3	1800			
32E06	27.5	180	115/200	1	2250	56	50000	E1725-1 Navy
				3	2500			
32E03	27.5	180	115	1	2500	56	50000	AN3516-1
32E09	27.5	180	115	1	2500	56	50000	—
				3	3000			

NOTE: D.C. Input voltage shown is a nominal value of 27.5 volts, but all units are designed to operate from 26 to 29 volts. Input Amperes shown are values at 27.5 volt input.

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specifications covering landing gear design. Much remains to be done along these lines, but progress is being made, Eldred believes.

This trend multiplies the work of the design team and calls for more careful analysis of all the possible loading conditions to meet the requirements of a particular airplane. When this has been done by responsible people, Eldred maintains, the end product is a more balanced and efficient design—no longer carrying the weight of arbitrary fear or ignorance factors or loads that were developed to cover unrequired types of service.—IS

Douglas Scholarship Fund Biggest Ever

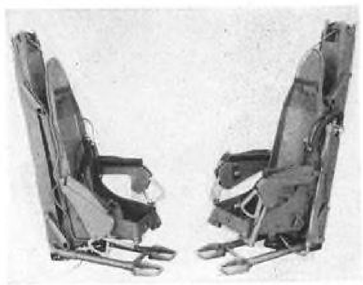
The scholarship fund of $75,000 set aside by Douglas Aircraft Co., Inc., for the 1953-54 school year is the largest yet allocated under the company program inaugurated in 1947.

This fund is being distributed to engineering colleges throughout the country for the benefit of Douglas employes and their children.

About 600 employes will take extension courses while working full time. A group of 38 employes will take full-time college work on scholarships valued at up to $1,500 each for the year.

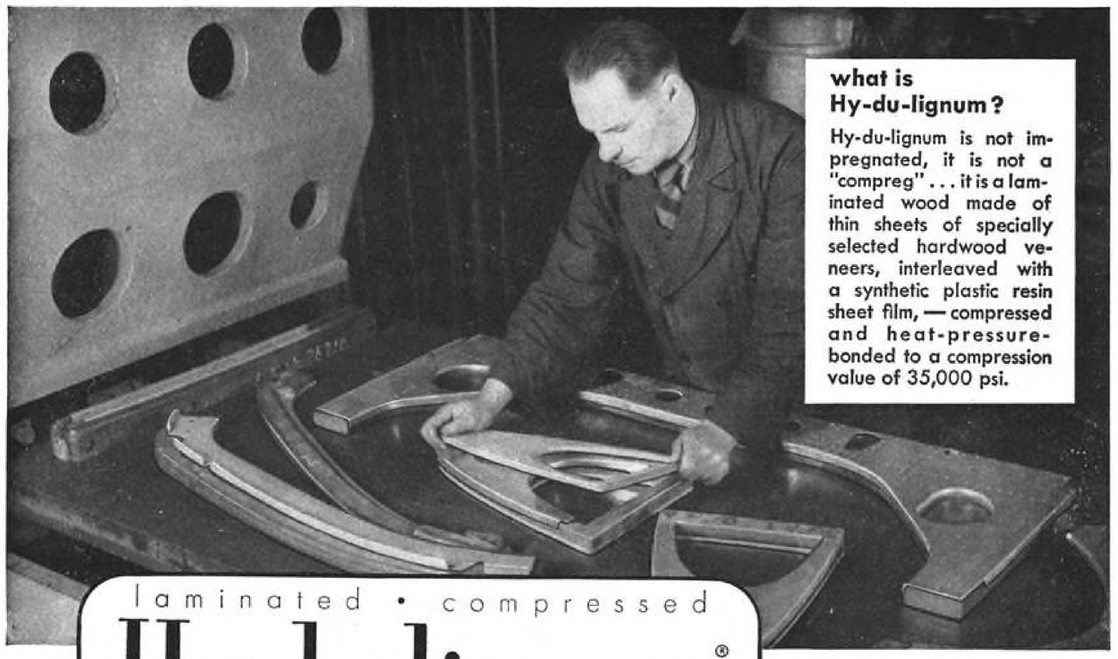
One-year scholarships of up to $300 have been awarded to 51 children of employes, who will attend major institutions.

California schools benefiting from the Douglas fund are UCLA, University of Southern California, University of California at Berkeley, Stanford University and the California Institute of Technology.



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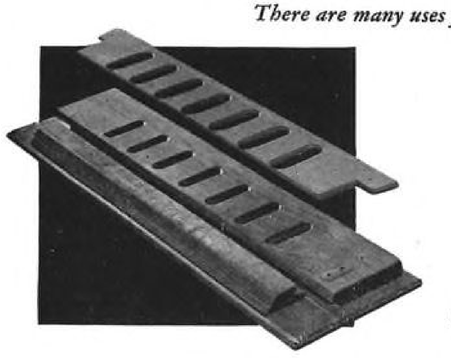
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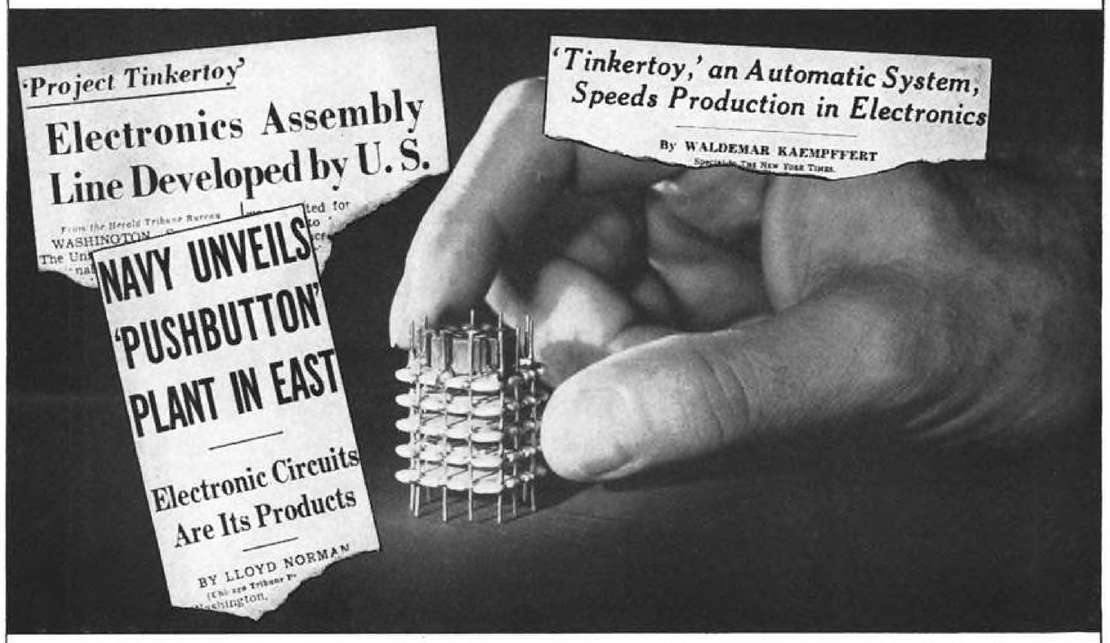
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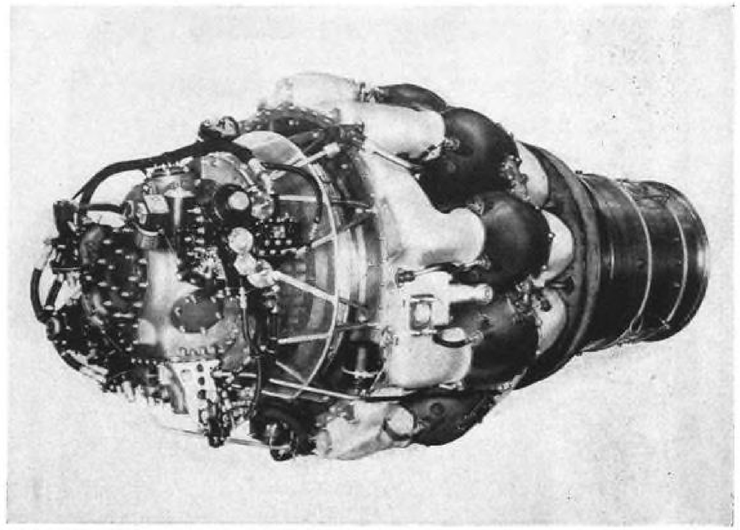
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Hisso Boosts Centrifugal Jet's Thrust

- **Verdon is higher-thrust Version of R-R Tay.**
- **Engine rating is 7,700 lb. without afterburner.**

By David A. Anderton



FORERUNNER of both the P&W J48 (above) and the Verdon was the Rolls-Royce Tay

Paris—The Hispano-Suiza Verdon turbojet has given a new lease on life to the centrifugal-flow gas turbine in France. At its current thrust rating of 7,700 lb. without afterburning, the engine compares with such large axial-flow engines as the Wright J65 Sapphire and the Avro Canada Orenda.

It joins one or possibly two other similar engines in the world: the Pratt & Whitney J48, officially rated at 7,200-plus lb., and a reported Russian centrifugal engine in the same thrust category.

These three engines—assuming the Russian engine exists—are developments of the basic Rolls-Royce Tay, designed in 1947 by the British firm, and dropped from its active production program when the Avon came in.

▶**Being Built**—First Verdon was completed by Hisso in March this year, and a pre-production batch is now sharing the twin lines at the factory in Bois-Colombes, a northwestern suburb of Paris. The firm expects to reach its full production rate by the end of the year, and will phase out production of Tay engines afterward.

A Dassault Mystere 4 has been modified by installation of the new engine replacing its Hispano-built Tay—with which the Verdon is identically interchangeable—and is currently on flight status for engine evaluation. This program is seen by some observers as a first solution to two of the criticisms of the Mystere as reported by American test-pilot teams: deficient in thrust and control regulation of the engine.

The Verdon represents about a 25% increase in thrust rating over the Tay, and it features thermometric control of the engine based on maximum permissible tailpipe temperature.

Flight tests of the Verdon have also been made in a Mystere 2, and during one typical month, 20 test flights were made, a high value for such experimental work here.

▶**Improvements**—In an exclusive interview with AVIATION WEEK, M. Jacques Blanc, technical director of Hispano-Suiza, explained the basic modifications which changed the Verdon from the earlier Tay.

"We learned much from our development work with the Rolls-Royce Nene, which we also build under license," Blanc said. "The airflow in that engine was increased 10% by modifications of the impeller, although we were able to keep the same diameter.

"In the Verdon, we have increased the air mass flow about 16% and have increased the diameter of the air inlet to handle that amount. Then we modified the diffuser angle to handle the increased airflow, and got a little better pressure ratio. This enabled us to decrease our specific fuel consumption for the same tailpipe temperature."

Blanc said that the next step was to increase the permissible tailpipe temperature, and that this was done by using Nimonic 90 turbine buckets, where Nimonic 80 had been used in the Nene development.

Blanc explained that the use of the higher-temperature material would theoretically permit an increase of about 90F in tailpipe temperature. But in actuality they designed for less because they wanted increased safety.

Blade roots are cooled by passing air through them; in addition to the obvious advantage in blade life, this also reduces the amount of heat flow from the blade into the rotor disk. Hispano uses a ferritic steel in the disk in place of austenitic steel as another measure against high-temperature stressing of the structure.

▶**Interchangeable**—The Verdon is interchangeable with the Tay from which it was developed. There is a length increase of about 3 inches, and the weight is about 70 lb. more, but trunnion locations and control positions are identical on both engines.

Blanc cited the example of preparing the Mystere 2 for flight tests. The airplane was withdrawn from service, and three days later was flying with the new engine, after complete replacement of the Tay and the necessary ground run-in of the installation.

For production, also, there is a large degree of interchangeability. Numerically speaking, 60% of the Verdon is made up of Tay parts. This includes major segments such as the compressor housing and flame tube exteriors, as well as little fasteners.

▶**History**—The basic Tay was received by Hispano about two years ago from Rolls-Royce. At that time, Blanc stated, the engine was delivering 6,300 lb. thrust and had been type-tested at that power.

Hispano management heard that Pratt & Whitney were starting production of the same basic engine, and asked for a technical agreement between the two firms. It was April 1953 before any drawings were received from P&W, according to Blanc, and the

Engine Comparison

	Hispano-Suiza Tay	Hispano-Suiza Verdon
Thrust, lb.	6,250	7,700
Specific fuel consumption, lb./lb./hr.	1.06	Reduced
Dry weight, lb.	1,971	2,015
Length, in.	98	101
Diameter, in.	49	49
Thrust/weight ratio	3.17	3.81

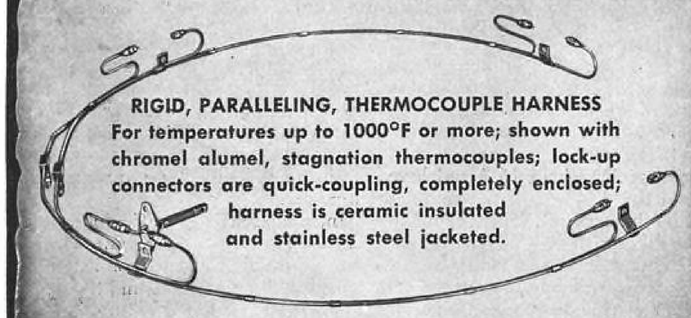
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prototype Verdon had already been built.

Actually Hispano ran two concurrent development programs on the Tay. The first was for an improved Tay—which was never to receive a separate name—from a production and endurance standpoint. The second was to increase the thrust of the engine, and this led ultimately to the Verdon.

Blanc said that in the Verdon development, there were two possible alternatives:

- **Redesign the engine completely,** only maintaining the diameter, and strive to get optimum component characteristics.
- **Improve the production engine** with a minimum of differences.

The French Air Ministry made the decision to choose the second alternative, and the program began. Currently Hispano-Suiza is discussing with the French Air Ministry the problem of where to phase in the Verdon production and phase out the Tay.

▶ **End of the Line**—Blanc felt that the Verdon was the ultimate development of the basic engine frame from the thrust viewpoint. If there was to be an increase, he said, it would have to come from afterburning, and Hispano has a development of the Tay afterburner which has been under test for some time.

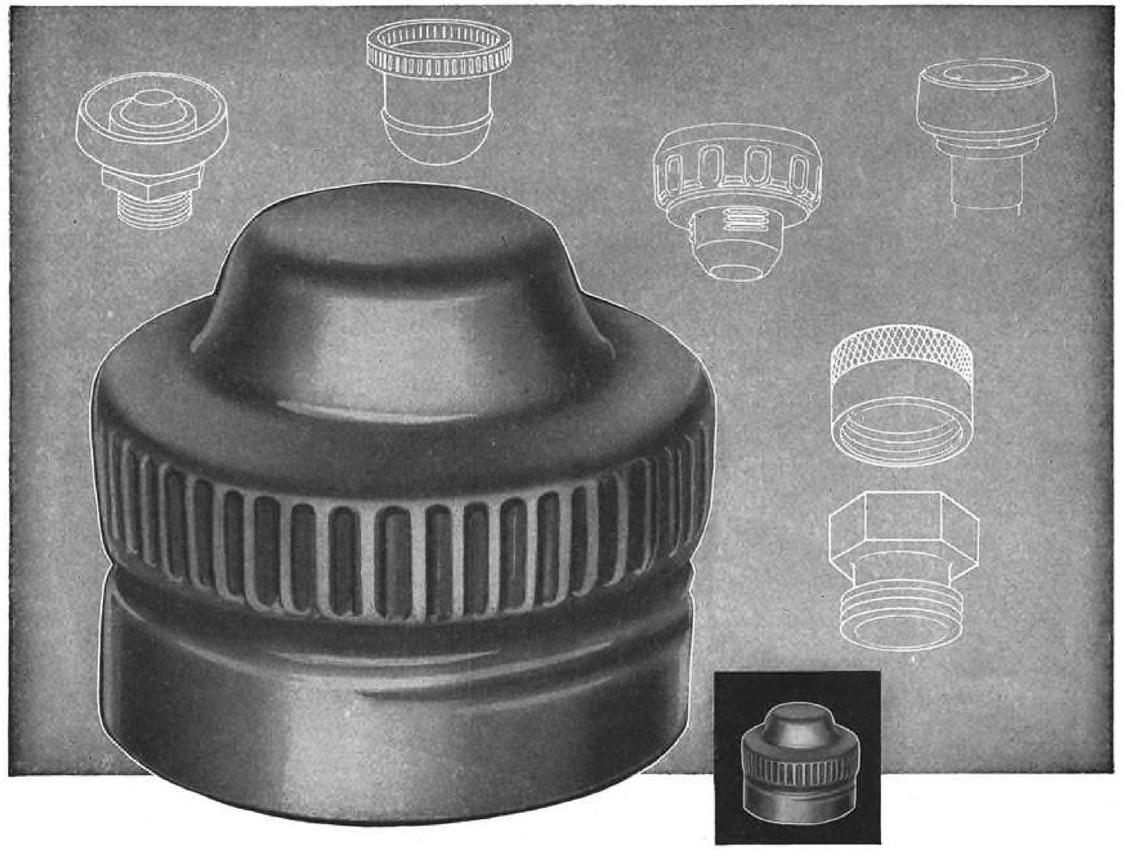
In the factory, Hispano has a pair of production lines for Nenes and Tays mixed, in a room about 100 ft. square. One of the lines is for assembly of the engine, and the other is for teardown after green runs.

There is a strange mixture of ancient and modern machinery in the plant. The shop is very crowded by American standards, and a forest of twisted belts reaches up to the ceiling to a common overhead power transmission system for many of the machines.

Large numbers of American machine tools owned by the Air Ministry and loaned to Hispano are in evidence, sharing floor space with special-purpose tools such as a multiple-spindle shaper developed by Hispano for cutting five impeller blades at once.

Hispano has always been known for the finish of individual parts in the firm's engine work, and sample pieces of the Tay and Nene examined at random confirmed that general impression. Quality control and inspection methods are completely modern, and the latest types of optical gaging and inspection devices are used.

Only a handful of engines were on the production line, but it is unfair to conclude that this indicates a low production rate. In fact, Hispano is producing engines on schedule for the French airplanes that require them. If airframe schedules increase, Hispano can easily step up its production rate.



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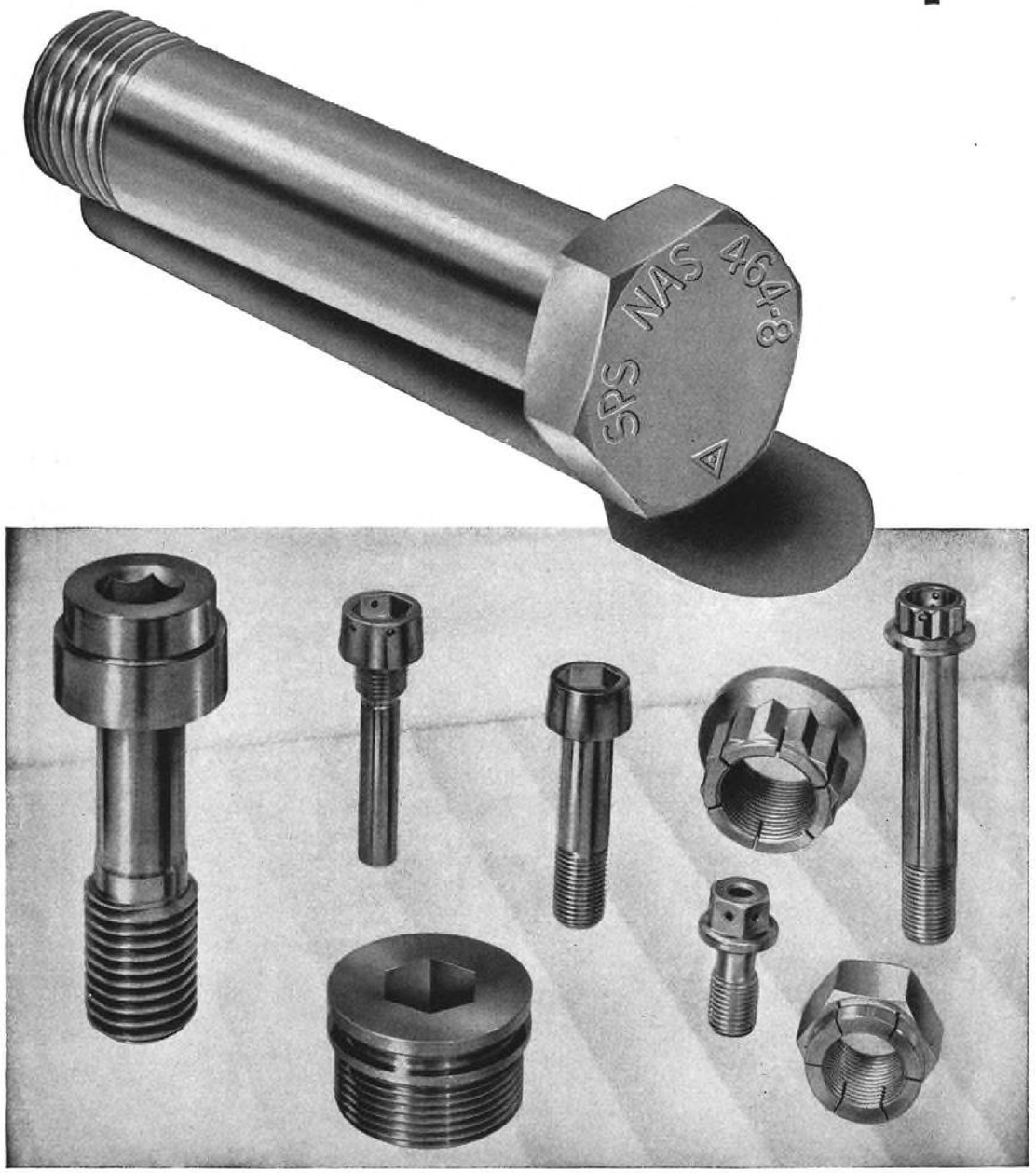
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1953 Market Action Of Aircraft Common Stocks

Company	1952 Year-end Close	Book Value 12/31/52	1953 Range High	1953 Range Low	9/30/53 Close	Decrease or (Increase) From 1952 Close Amount	Decrease or (Increase) From 1952 Close Percent
Beech	$14.50	$17.81[1]	$16.75	$9.00	$10.62	$3.87	26.7%
Bell	21.25	23.39	26.87	17.75	20.00	1.25	5.9
Boeing	40.25	41.60	48.50	36.50	42.75	(2.50)	(6.2)
Cessna	7.75	10.36	9.50	6.12	7.00	0.75	9.7
Convair	20.37	20.12[2]	22.75	15.12	17.25	3.12	15.3
Curtiss-Wright	8.37	15.19	9.62	6.62	7.12	1.25	14.9
Douglas	62.50	79.93[2]	72.25	60.00	68.75	(6.25)	(10.1)
Fairchild	7.37	9.20	10.25	6.75	7.75	(0.37)	(5.0)
Garrett	31.37	18.26	33.75	22.75	26.12	5.50	17.5
Grumman	25.75	16.50	28.12	19.37	20.75	5.00	19.4
General Dynamics	42.75	22.94	46.25	31.00	34.50	8.25	19.3
Lockheed	22.62	24.63	26.25	20.25	23.87	(1.25)	(5.5)
Martin	15.12	5.77	18.37	12.25	14.62	0.50	3.3
McDonnell	19.62	24.39[2]	24.50	16.75	17.50	2.12	10.8
Northrop	13.25	15.14	18.37	12.37	14.87	(1.62)	(12.2)
North American	16.25	16.72	20.50	15.37	17.62	(1.37)	(8.4)
Republic	19.87	17.22	27.00	19.50	23.00	(3.12)	(15.7)
Ryan	12.00	18.59[2]	16.50	12.00	14.75	(2.75)	(22.9)
Sperry	42.62	33.24	49.12	35.75	41.25	1.37	3.2
United Aircraft	38.00	36.80	40.25	31.87	40.25	(2.25)	(5.9)

NOTES: 1. As of June 30, 1953. 2. As of May 31, 1953. 3. As of July 31, 1953.

AVIATION WEEK Compilation.

Aircraft Investors Getting Choosy

Selected aircraft equities have been shown decided favor among investors as the general market sank to new lows in recent months. The exclusive AVIATION WEEK compilation printed here points this up.

The table, giving market action of all major aircraft stocks from the 1952 year-end to Sept. 30, 1953, reveals the sharp cross-currents of investor appraisals toward the individual companies in the industry.

► **Up and Down**—While the general market, as represented by the composite Barron's 50-stock averages, was off more than 11% from the 1952 year-end, the separate aircraft equities showed gains ranging up to almost 23%, as well as declines down to 26.7%. The pluses and minuses were about evenly divided among the 20 companies shown in the tabulation above, 11 issues being lower while nine chalked up gains.

The 1952 year-end, while representing a convenient measuring point, was also a relatively low level compared with subsequent price actions. For example, it can be seen that early this year much higher prices prevailed. The gains prevailing at Sept. 30, 1953, are therefore even more significant. In a number of cases, market prices at this recent point are not much higher than the lows established during the year.

► **The Leaders**—Of the individual issues, Ryan demonstrated the most impressive gain, up 22.9% from the 1952 year-end. Republic was next with a gain of 15.7% followed by Northrop's increment of 12.2%.

The erratic pattern of the aircraft issues taken separately can be seen in the 26.7% decline of the Beech stock and the 19.4% drop in the price of the Grumman equity.

In viewing the 1953 market action thus far, an interesting perspective can be obtained by viewing 1952 results as well. Last year stockholders of aircraft equities were treated quite well with price appreciations ranging from a low of 2.2% (Lockheed) to a high of 66.5% (Bell).

For example, while the common stock of General Dynamics at Sept. 30, 1953, was down 19.3% from the 1952 close, or at $34.50, it was still substantially higher than the $26.63 price established at the 1951 year-end. In other words, long-term investors in most aircraft equities have retained considerable price appreciation despite the decline in the general market averages. Of course, throughout this period, liberal dividend income has been received by most aircraft investors.

► **Market vs. Book**—Recent market fluctuations also reveal interesting contrasts

DILL LOK-SKRU
THE BLIND ANCHOR NUT OR/RIVET
ONE MAN INSTALLATION IN SECONDS



THE AVIATION STANDARD
for Screw Locking Anchor Nut Uses and Metal to Metal Fastening.

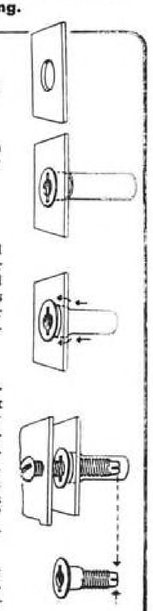
1 Drill one (1) hole.

2 Insert Lok-Skru with either Hand or Power Lok-Skru Tool.

3 With Lok-Skru Tool draw barrel over shoulder of Lok-Skru and flush with metal. This provides a Blind Anchor Nut for Secondary Attachments.

4 TO FASTEN ATTACHMENTS insert standard Machine Screw through hole in attachment and into Lok-Skru. As machine screw is tightened into Lok-Skru it is securely locked by means of the "Specially Crimped" locking-end of the Lok-Skru.

Crimped internal threads of Lok-Skru provide secure locking device for attachment screw.



Write for Folder
Handy information on the many uses and application of Lok-Skrus in airplane construction with complete data on types and sizes.

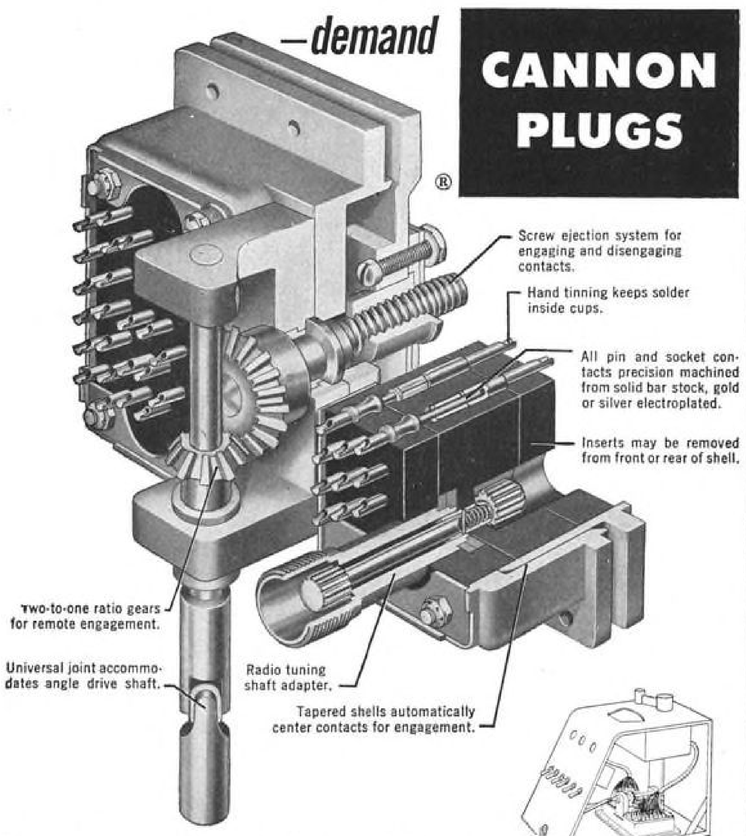


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Here's why those in the know

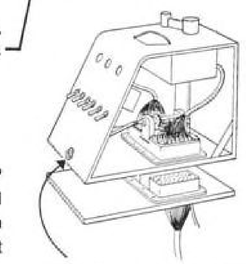
—demand **CANNON PLUGS** ®



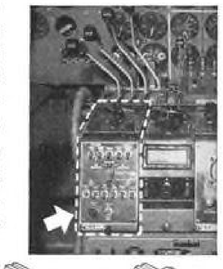
This highly specialized DPD2 Cannon Plug, a member of the DP Series, has its principal use in aircraft instrument panels and remote radio control equipment. But, like many other Cannon Plugs, it has found its way into other fields where the highest quality is needed and where the value of long, trouble-free performance is recognized.

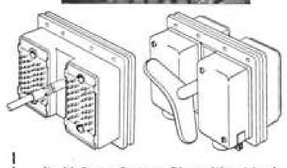
Originally this 2-gang connector was designed to assist in the standardization of radio and instrument assemblies so that such equipment might be interchanged between similar aircraft. It allows for compact design in close quarters with access from the front only. This type of application and variations of the fittings are shown at right. Any Cannon DPD insert may be placed within the shell, with or without tuning shaft, coax, twinax, large or small contacts, provided the separation forces of both halves are similar.

This plug typifies the close attention to important detail that distinguishes every Cannon Plug—the world's most extensive line. If you are looking for real value, regardless of the field you work in, your best bet is Cannon.



Connector is separated by turning slotted shaft here. Complete unit may then be removed from pedestal, shown below.





(Left) Same Cannon Plug without tuning shaft. Straight drive instead of 90° gear. (Right) Similar DPD2 with Dzus wing nut extraction method and junction shells. There are several other variations. Write for details.

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with reported book valuations of the aircraft equities. For many years, book valuations were generally considerably higher than market quotations. This trend no longer prevails for all companies. For instance, Boeing, Garrett, Grumman, General Dynamics, Martin, North American, Republic, Sperry, and United Aircraft all sell in the market place at higher levels over their last reported book valuations.

This is another manifestation of the capitalization of earnings or potential earnings as the more dominant factor.

Once again, the market actions of the separate aircraft equities are a reflection of the investment evaluation of the position, earnings and potentials of the individual companies involved. Despite the recognized favorable outlook of the industry as a group, it is highly significant that there is a complete lack of uniformity in the price variations of the individual companies represented. Selectivity, prevalent in the past, has become even more pronounced as an industry characteristic in recent times.

▶ **Selectivity Factors**—Despite the confused atmosphere and apprehension in some quarters as a result of reduced appropriations, cutbacks, cancelations, and stretchouts, the aircraft industry as a whole remains in a healthy state.

The fact remains that the Air Force alone went into its current fiscal year with more than $23 billion as available from unspent appropriations from previous years for aircraft procurement. This amount was reported by the House Appropriation Committee as adequate to carry the Air Force "for more than three years at the present rate."

This condition makes for a healthy investment attitude toward aircraft equities in general. But the mere element that cancelations and cutbacks have occurred and may develop in the future does introduce an important risk factor. For this reason, selectivity has become increasingly important.

This condition is reflected in the wide disparities of past market fluctuations of the individual aircraft equities. This is nothing more than tangible recognition that not all units in the industry participate evenly in the available business and earnings generated.

Technological progress in the aeronautical art, the flexible nature of military procurement policies and the managerial capabilities of the companies themselves remain more forceful than ever before as the major elements influencing the leadership trend within the industry.

The market, as a sensitive barometer constantly evaluating the relative positions of the aircraft companies, reflects its verdict in quotations revealing pronounced selectivity within the group.

—Selig Altschul

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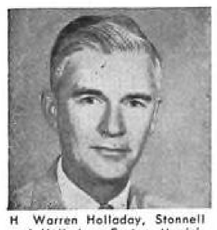
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Fred Smith, Sales Manager, AiResearch Aviation Service Co., 5907 W. Imperial Highway, Los Angeles 45, California.



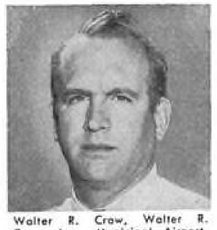
H Warren Halladay, Stonnell and Halladay, Easton Municipal Airport, Easton, Md



Don Pennington, Carolina Aero Company, Municipal Airport, Asheville, North Carolina.



George Harte, Harte Flying Service Municipal Airport, Wichita, Kansas.



Walter R. Crow, Walter R. Crow, Inc., Municipal Airport, Toledo, Ohio.



B. G. Vandre, Van's Air Service, Municipal Airport, St. Cloud, Minnesota.



C. W. "Wayne" Crussell, Southern Aero, Inc., Municipal Airport, Atlanta, Georgia.



Cheston M. "Chet" Newhall, The Babb Co. (Canada) Ltd., Montreal Airport, Dorval, P.Q.



Art Meurer, Arthur Meurer Co., Inc., LaGuardia Field, New York, N. Y.



I H Monty Montgomery National Aero Sales Corp., Midway Airport Chicago, Ill



Don Hood, Air Sales and Service Company, Wier Cook Municipal Airport, Indianapolis, Indiana.



Peter Graves, Southern Ohio Aviation Company, Inc., Dayton Municipal Airport, Vandalia, Ohio.



T. E. "Ted" Byron, Aero-Ways, Inc., Municipal Airport, Cleveland, Ohio.



J. K. "Johnny" Hamp, Aero Sales Division, Houston Transportation Co., Municipal Airport, Houston, Texas.



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Aircraft Industry Employment

	Employment June 1953	Percent of total work force	Increased percentage since June 1952	Increased percentage to December 1953 (forecast)
Aircraft assembly	458,319	58.0%	8.0%	3.4%
Engines and parts.....	187,219	23.7	28.2	7.2
Propellers and parts....	16,263	2.1	22.2	3.8
Parts and auxiliary equipment	128,365	16.2	31.9	5.9
Total	**790,166**	**100.0%**	**16.0%**	**4.8%**

Source: Bureau of Employment Security, U. S. Department of Labor

Aircraft Work Force Levels Off

By Richard Balentine

Cutbacks, contract terminations and rescheduled delivery dates have caused noticeable tapering in the sharp upward trend of employment within the aircraft industry in recent months.

Between mid-1950 and the beginning of 1953, aircraft employment had tripled, Department of Labor's Bureau of employment reports.

A survey of 208 aircraft firms found 790,166 workers employed in June, an increase of 16% over June 1952. Between April and June of 1953, the employment total increased only 1.2%.

▶**Gains Slowing**—In the past 12 months, aircraft assembly, which accounted for the bulk of the industry's expansion in total work force during the first year after the Korean outbreak, showed a gain of only 8% in employment.

Work force of propeller firms increased more than 22%; aircraft engines gained 28%, aircraft parts 32%.

Of 203 companies reporting past trends, 154 indicated employment increased during the past 12 months and 49 reported losses.

But in the two months before June, 128 of these manufacturers expanded their employment and 75 decreased.

A few firms said they reduced personnel because of reorganization or difficulty in obtaining necessary parts.

▶**Future Trend**—With the recent readjustments and cutbacks announced by both Air Force and Navy, it is possible the overall aircraft employment picture will do more tapering before it takes another swing upward.

But of the surveyed firms that estimated future employment levels, about five predicted increases during the next six months for every one that anticipated a decrease.

▶**Engineer Shortage**—Half of the aircraft companies surveyed are experiencing difficulty in filling highly technical and skilled jobs. A February survey showed the ratio to be about two out of three.

Engineers still are the number-one shortage in the labor market. However, only three firms reported that manpower shortage was retarding production.

The survey showed an average separation rate of 4.8 per 100 workers in May, and total employment gains of 4.3 per 100. Labor Department says the turnover rate is "not abnormal."

▶**Labor Supply**—Approximately 60% or

Aircraft Worker Earnings

	Average weekly earnings		Average weekly hours		Average hourly earnings	
	June 1953	June 1952	June 1953	June 1952	June 1953	June 1952
All U.S. manufacturing..	$77.42	$71.98	41.4	41.2	$1.87	$1.747
Total aircraft	81.77	80.36	41.3	42.7	1.98	1.882
Aircraft assembly	79.77	78.48	40.7	42.4	1.96	1.851
Engines and parts.....	84.02	85.32	41.8	43.2	2.01	1.975
Propellers and parts....	84.46	93.59	41.0	45.5	2.06	2.057
Parts and equipment....	84.74	80.21	42.8	43.1	1.98	1.861

Source: Bureau of Labor Statistics

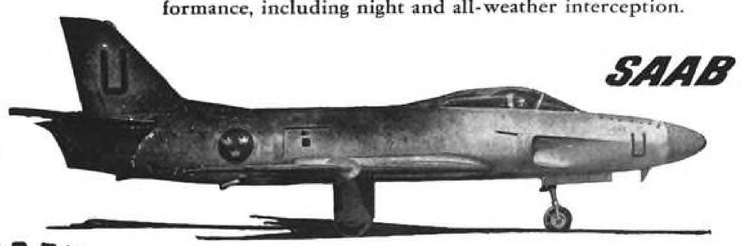


The essence of modern air defence

An Air Force whose combat planes are only day-fighters is, in effect, one armed. But strict economy, even in defence, is essential to all nations today, and so any country dependent for its safety on a powerful air defence force must choose not merely the most up-to-date and efficient aircraft, but also the most versatile and economical. Its fighter aircraft must be capable of more than one role.

The Royal Swedish Air Force has followed this principle in its procurement of combat aircraft. A striking example is the swept-wing Saab-29 jet fighter — now also available for export — which is being produced for three different military duties.

The next important step in the Swedish Air Force modernization programme is that centred around the 700 mph (over 1,100 km/h) Saab-32 Lansen all-weather jet, which has been chosen to become the standard all-weather attack aircraft. The Lansen is also most suitable for several other purposes requiring first class combat performance, including night and all-weather interception.



SAAB A 32 Lansen

a versatile and ultra-modern all-weather jet aircraft

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about three out of every five workers in the industry are located in 12 major labor market areas, each with aircraft employment of more than 20,000, the survey finds.

Of the 12 centers, Wichita and Hartford, Conn., have labor shortages. San Diego, Chicago, Cleveland, and Buffalo, N. Y. report a balanced labor supply. Los Angeles, New York, Seattle, Ft. Worth, Paterson, N. J., and Philadelphia have a moderate labor surplus.

Los Angeles has four times as much aircraft employment as the next most important center. In Chicago, 2.2% of all factory workers are employed in the aircraft industry. Philadelphia has 3.1%, New York reports 3.6%. Wichita aircraft employment is 70.5% of the total; San Diego, 67.3%; Ft. Worth, 47.5% and Seattle, 44.7%.

▶ **Changing Supply**—Ten of the 12 centers had an increase in aircraft employment during the 12 months preceding June. Chicago climbed 134%. Ft. Worth and San Diego had decreases of 12.4% and 3.3%, respectively. However, in the two months before June, the picture changed with six of the areas reporting increases and six decreases.

Aircraft firms in Ft. Worth, Chicago and Seattle forecast employment slumps in future months. Los Angeles and Wichita predict a 1% increase, New York an 18.8% boost and Hartford a 20.9% climb.

▶ **Wages Rise**—Average weekly wages within the industry rose from $80.36 in June 1952 to $81.77 during June of this year.

In comparison, the Bureau finds, other manufacturers "continued to lag considerably behind aircraft."

Among divisions of the industry, hourly earnings ranged from $1.96 in aircraft assembly to $2.06 in propellers and parts.

Lowest average weekly hours were 40.7 in aircraft assembly; highest were 42.8 in parts and equipment.





MACHINE clamps steel tube for cutting.

Abrasive-Wheel Tool Cuts Stainless Fast

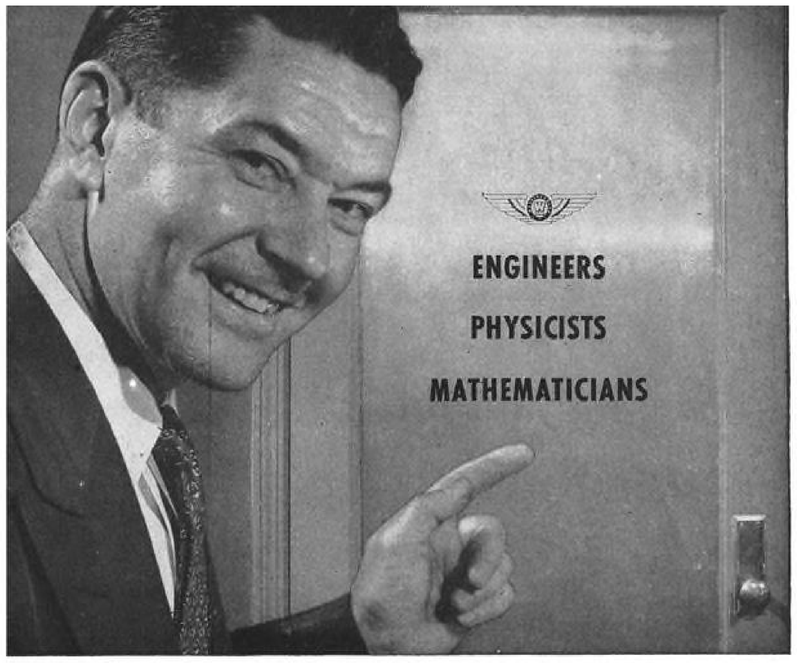
Substantial manhours are saved at Ryan Aeronautical Co. with a new abrasive-wheel machine used for cutting stainless steel tubing.

Ryan estimates that $32,000 is being pared on tube cutting costs yearly.

▶ **Fast Cutting**—The new tool, developed by Campbell Machine Co., Bridgeport, Conn., can produce 1,000 finished tubes in an 8-hr. shift, with only one operator plus a few minutes of time from another worker.

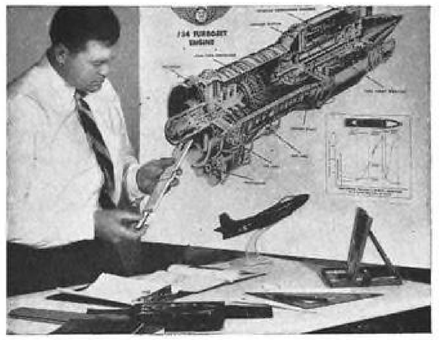
Formerly, Ryan did the job with tube-cutting lathes, with manual clamping, feeding, cutting and removal operations. Individual deburring followed the cutting job. This approach tied up four men and four machines to make 1,000 finished tubes in an 8-hr. shift.

▶ **Operator's Job**—The Campbell machine employs a 20-in.-diameter, ⅛-in.-thick highspeed abrasive wheel that burns its way through the stainless steel. Clamping and cutting action is done hydraulically. All the operator does is to



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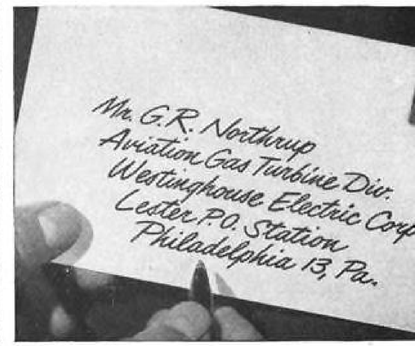
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6. Living conditions in Philadelphia and Kansas City suburbs are good with easy access to recreational activities. We will help you find housing.



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J-54023

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HIGHLIGHTS IN *Jet Engineering*

Smaller engine diameters permit twin-jet reliability

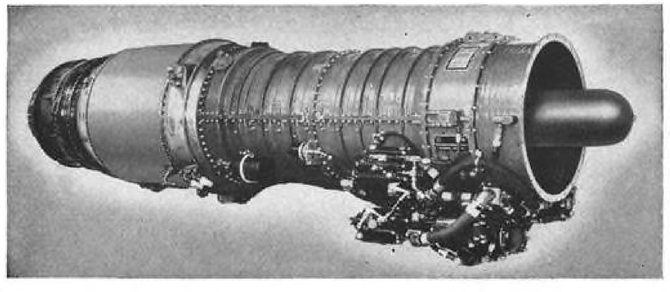


The Chance Vought F7U "Cutlass", a swept-wing, tailless U. S. Navy jet plane in current production, is Westinghouse powered. It is designed for operational speeds above 600 mph and used as a carrier-based fighter.

The "Cutlass" is an example of modern fighter trends, depending on twin lightweight turbojets to attain greater reliability with maximum thrust and minimum drag. Basic Westinghouse engine characteristics help airplane designers meet demands for such high-performance aircraft. Outstanding among these is the small engine diameter inherent in Westinghouse designs. Westinghouse developed this feature in the first American designed jet engine. This characteristic—when combined with improved component efficiencies—produced constantly improving thrust ratios in terms of engine size and weight.

Such Westinghouse engineering advancements make it possible for aircraft builders to use cleaner aerodynamic designs, obtain more effective power from engines, and add the safety of twin-jet reliability . . . examples of the continued pace-setting in aircraft propulsion which can be expected from the Aviation Gas Turbine Division, Westinghouse Electric Corporation, Lester Branch, P. O., Philadelphia 13, Penna.

J-54019



The small diameter with minimum frontal area is apparent in this side view of the Westinghouse J34 Turbojet. Such characteristics permit twin-engine use for maximum thrust and reliability with a low frontal area to minimize drag.

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feed the pipe into the machine and depress a lever for clamping and cutting. When he raises the lever, the wheel is freed from the tube before the clamps are released.

The burned, brittle burr is removed by tumbling. The tumblers hold several hundred parts, but the only employe time required is that taken to load and unload the tumbling machine by air hoist.

Deburring now, is estimated to cost two cents per tube against eight cents for the former method.

► **Stock Factors**—Ryan production engineers have built a special loading rack for attachment to the new cutting machine. It will hold six 20-ft. tubes ready for feeding. An automatic ejection mechanism guides each cut length into a box. Cut lengths, held to an accuracy within .002 in., run from 1 to 17 in. Bulk of the wide variety sections have 2⅜-in. diameters and .065-in. walls.

An oscillating system in the machine causes the wheel to move back and forth across the work during the cutting. Ryan finds this movement desirable in cutting stainless solid rod stock because it produces a smooth-finish cut. In tube cutting, however, Ryan reports that it has found wheel life is doubled when the oscillating action is not used, and other advantages such as speed are not affected.

Preheat Cabinet Improves Plastic, Rubber Molding

A dielectric heater, for heating plastic, rubber and vinyl compounds, has been placed in production by Resdel Engineering Corp.'s Industrial Division.

Known as Model 1000 Electronheat, unit has an output of 1 kw. and can raise temperature of 10 oz. of general-purpose phenolic material from 80F to 240F in one minute.

Manufacturer claims that by rapidly preheating the preforms or powder, the device shortens molding cycles, reduces number of rejects, and minimizes insert and pin breakage. It is also said to prolong life of press and mold.

Unit is housed in stainless steel cabinet 15 in. wide, 21½ in. deep and 25 in. high; has door opening into electrode area with space between electrodes adjustible from ⅝ in. to 3 in.

Resdel Engineering Corp., 2351 Riverside Drive, Los Angeles 39, Calif.

Scrap Metal Fight

Aluminum scrap dealers are challenging Air Force operation of installations to process scrap metal from discarded planes.

Clinton White, vice president of the National Association of Waste Material Dealers, told the Senate Small Busi-



Servicing UAT Comet at Le Bourget, France

Faster Service for the JET TRANSPORT ERA!

The Hydrant Refueling System, pioneered and developed by Esso, is the answer to the safe and speedy refueling demands of modern air carriers.

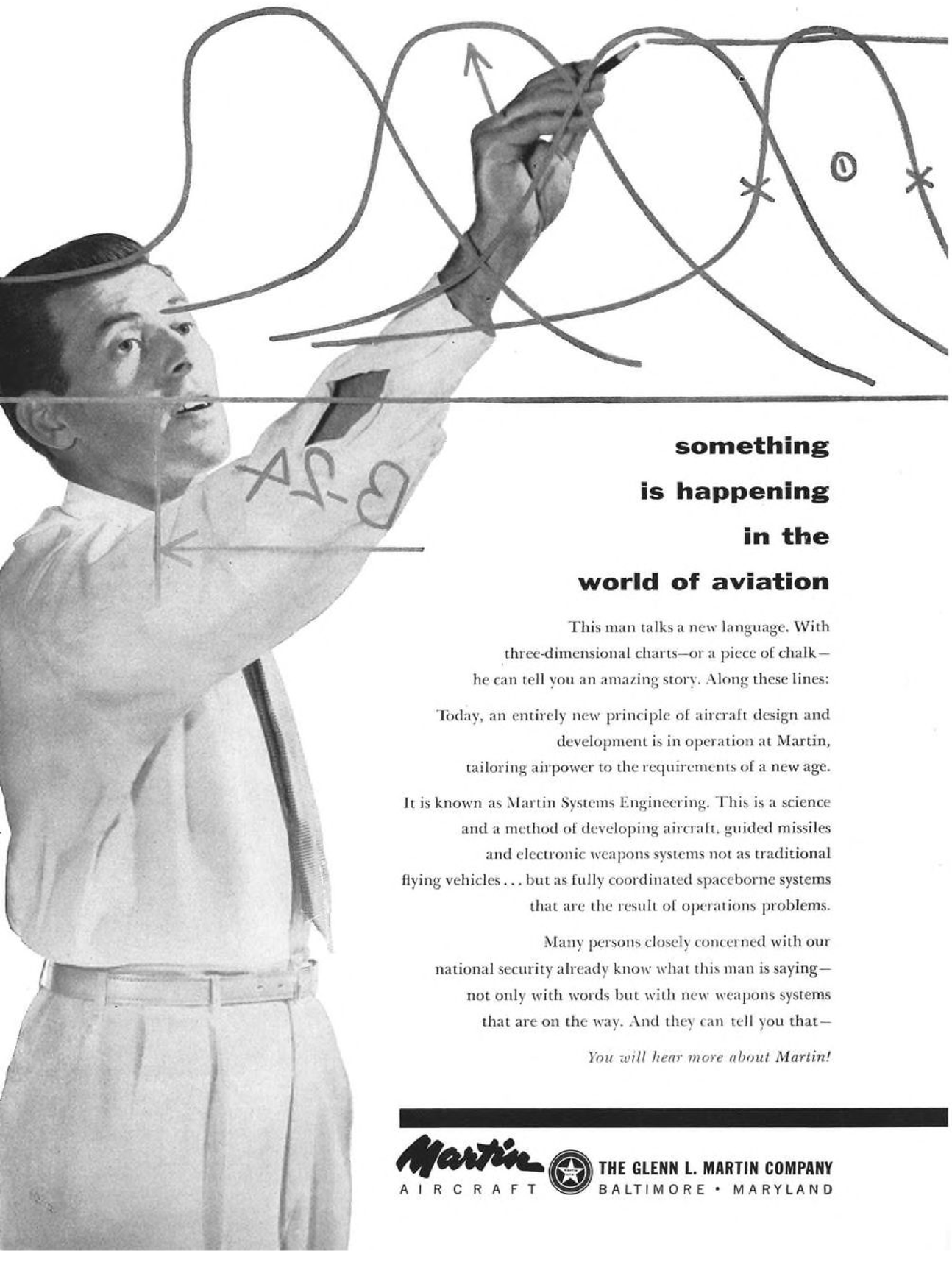
In the past, one refueling truck with a capacity of up to 4,000 U.S. gallons could service most aircraft completely. Today, due to the expansion of commercial aviation, and to the increased fuel capacities of large transoceanic planes — especially jet transports like the de Havilland Comet — refueling with conventional mobile units is gradually being replaced by Esso Hydrant Refueling Systems at many major international airports.

By eliminating the need for several trucks to complete a single refueling operation, the Hydrant Refueling System automatically lessens traffic congestion at airport terminals. Furthermore, it has the great advantage of combining speedy servicing with *maximum safety* thus insuring rapid turn-around at all times, to all aircraft.

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of *all* the World's International Airlines 8 out of 10 use

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It is known as Martin Systems Engineering. This is a science and a method of developing aircraft, guided missiles and electronic weapons systems not as traditional flying vehicles . . . but as fully coordinated spaceborne systems that are the result of operations problems.

Many persons closely concerned with our national security already know what this man is saying—not only with words but with new weapons systems that are on the way. And they can tell you that—

You will hear more about Martin!

Martin AIRCRAFT — THE GLENN L. MARTIN COMPANY BALTIMORE • MARYLAND

ness Committee that private firms could do the work cheaper.

But Assistant Defense Secretary Charles E. Thomas reported that the USAF processing is saving more than $300,000 a year for the government.

GE Builds Midget Motor For Bomber D.C. Jobs

General Electric has developed a miniature direct-current motor for bombers that ranks with the smallest motors ever built by GE. It is 1⅜ in. in diameter by 2⅜ in. long and weighs 8 oz.

Rated at 0.002 hp. at a speed of 6,500 rpm., the unit is so sensitive that it is controlled by the output of two small vacuum tubes, GE engineers say.

The motor is of the split-shunt, reversible-rotation type, drawing maximum armature current of 0.8 amp. from a 28-v. line. It is required to withstand a high potential of 1,500 v. above ground. It reportedly is capable of responding to field currents of 0.00075 amp.

GE engineers say the unit is designed for favorable operation at sea-level atmospheres or at altitudes up to 50,000 ft. They claim it will withstand temperatures as low as minus 65F.

General Electric Co., Specialty Motor Subdivision, Schenectady 5, N. Y.

BuAer Contracts

The following contract awards of $25,000 and more have been announced recently by the Bureau of Aeronautics, Department of the Navy, Washington 25, D. C.

BENDIX AVIATION CORP., Eclipse Pioneer div., Teterboro, N. J., design, develop, fabricate & furnish two air-powered gyro horizon indicators, type No. X1207397-1, $66,176; C-1 amplifiers, 759, $377,097; pressure transmitters, 5,339, pressure indicators, 3,099, $708,690.

E. W. BLISS CO., Canton, Ohio, services of 6 qualified engineers and 12 qualified technicians to perform services in connection with launching and arresting devices at any place(s) and at any time(s) within and without the continental limits of the U. S. as directed by the Commander, Naval Air Material Center, Philadelphia, Pa., $252,240.

CONTINENTAL AVIATION & ENGINEERING CORP., Detroit, Mich., material and services required to tear down R975-42 engines, modify, reassemble and test as R975-46 engines, 49, $97,027.

FIDELITY ELECTRIC CO., INC., Lancaster, Pa., motors, 400-cycle a. c. continuous duty, open aircraft, 3 hp., 5 hp., 7½ hp., 10 ea., $25,281.

GENERAL ELECTRIC CO., Schenectady, N. Y., control amplifiers, 903 master indicators, 903, remote compass transmitters, 909, $1,499,144.

GENERAL TEXTILE MILLS, INC., New York, N. Y., quick fit nylon parachute harnesses: (1) seat type, regular, 602819-20, 5,672; (2) seat type, oversize, 602825-5, 755; (3) back type, regular, 602821-20, 1,404; (4) back type, oversize, 602827-5, 395, $199,984.

GREMCO, INC., Fort Worth, Tex., design, fabricate & furnish 4-wheel electronic maint. vans with diesel-driven generator trailers, 2, $63,540.

ANDREX

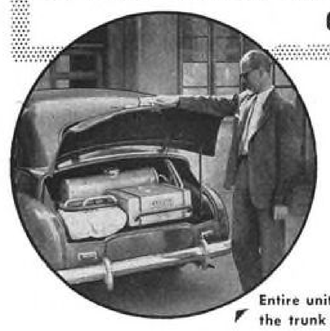
This Industrial X-Ray Unit is REALLY Portable...



NOW AVAILABLE in capacities of 175 kVp, 120 kVp and 250 kVp as shown.

AVAILABLE SOON... Light weight, portable 250 kVp X-ray unit with 360° tube. Capable of radiographing circumferential welding seams in 1 exposure.

NO HIGH TENSION CABLES, COOLING CONNECTIONS OR SEPARATE TRANSFORMERS!



Entire unit fits easily into the trunk of a car.

ANDREX is independent of all but a power supply (110v, 220v, 440v). This together with ***ANDREX's*** small size and light weight enable it to be carried by one man into working spaces which are either inaccessible with other machines, or entered with the greatest difficulty. That's what ***ANDREX*** means by *real* portability.

There's real economy in an ***ANDREX*** unit, too. By combining X-ray tube and other high tension parts in a single all-welded steel tank, maintenance and repair costs are greatly reduced. No wonder that in the space of just a year since ***ANDREX*** introduced this new concept of X-ray machines, users among major American industries have increased continuously.



Not many spaces are too small to get into with an ANDREX.

WRITE FOR DETAILED, ILLUSTRATED BROCHURE

The ANDREX Unit is backed by 25 years of experience in the manufacture of X-ray equipment.

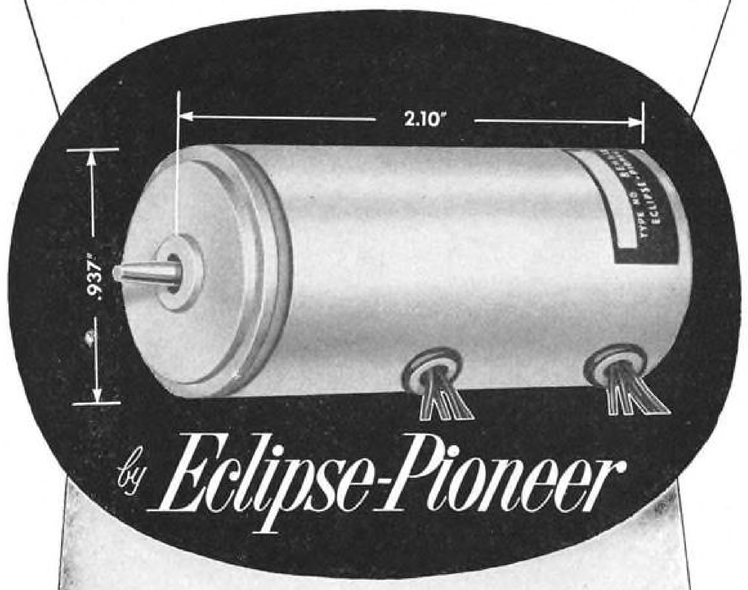
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GENERATOR DATA

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Output—300 mv/1000 rpm with 18 volt, 400 cycle excitation
Null—10 mv or less

MOTOR DATA

18 or 26 volt, 400 cycle, 2-phase low inertia motor

As one of the world's oldest and largest producers of synchro-type equipment, we are ideally qualified to provide you with the right answer to your motor generator needs. Why not take advantage of our long, practical experience? Call on us for recommendations based on handling your individual problem most efficiently.

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For full details, write Department H.
TETERBORO, N. J.
Export Sales: Bendix International Division, 205 East 42nd St., New York 17, N. Y.

INDUSTRIAL TELEVISION INC., Clifton, N. J., OS-4/AP oscilloscopes, including transit case, conversion kit, attenuator probe, crystal probe, low capacity probe, power cable, video cable, probe cable, 140, accessory case for OS-4/AP oscilloscope, 140, spare parts, $140,140.

JANKE & CO., INC., Hackensack, N. J., develop, test and furnish mobile air-transportable turbojet engine test stand which shall include (2) finished items constituting single test units, $30,479.

KAMAN AIRCRAFT CORP., Windsor Locks, Conn., construction of a flight test hangar at the Naval Industrial Reserve Aircraft Plant, Bloomfield, Conn., $490,674.

KOLLSMAN INSTRUMENT CORP., Elmhurst, N. Y., periscopic sextants with case, 2,100; sextant mounts, 1,369, $171,478.

LEAR, INC., Grand Rapids, Mich., redesign, fabricate and furnish (2) No. Gimbal Lock attitude gyro systems, each system to consist of (1) type B-1A indicator, and (1) type K-4 control assy., $39,236.

LEAR, INC., LearCal Div., Los Angeles, Calif., lightweight commercial radio compasses, Lear Model ADF-14B, each compass to consist of (1) tuner unit, Lear No. 97516; (1) amplifier assy. with mounting base Lear No. 97411 and (1) loop assy., Lear No. LFL-2, 141, $147,328.

ARTHUR D. LITTLE, INC., Cambridge, Mass., conduct a research and development program on vapor inhibitors, $48,760.

LORAL ELECTRONICS CORP., New York, N. Y., frequency meters, LM-14, 47; frequency meters, 21, $45,294.

MATHIESON CHEMICAL CORP., Baltimore, Md., materials and services to acquire and install capital equipment in contractors' plants and laboratories, $1,985,521.

MOTOROLA, INC., Phoenix Research Lab. Div., Phoenix, Ariz., power supply rectifiers, 235, $78,149.

PIASECKI HELICOPTER CORP., Morton, Pa., material and services necessary to acquire and install machine tools and other capital equipment required for the production of H-21 helicopter transmissions, $119,097.

SPECIALTIES, INC., Syosset, L. I., N. Y., design, construct and furnish a prototype angle of attack and angle of side slip compensator, $40,278.

UDYLITE CORP., Long Island City, N. Y., furnish and install (1) lot of plating and surface pretreatment shop equipment, including the relocation, rearrangement and reerection of existing plating shop equipment and the replacement of any damaged sections or parts that may be required as the result of this rearrangement, in the overhaul and repair Dept., Bldg. #8, Naval Air Station, Corpus Christi, Tex., $228,109.

USAF Contracts

Following is a list of recent USAF contracts announced by Air Materiel Command.

Beech Aircraft Corp., Wichita, Kan., miscellaneous assys. for aircraft, $318,815.

Boeing Airplane Co., Seattle, Wash., ejection seat development, $1,000,000.

Consolidated Vultee Aircraft Corp., Fort Worth, Tex., airplanes, 2 ea., $3,019,132.

DeVry Corp., 1111 Armitage Ave., Chicago, Ill., blower-projector sets, 64 ea.; motor, 50 ea., speaker, 156 ea., $28,423.

Bill Jack Scientific Instrument Co., Solana Beach, Calif., intervalometer, camera, 838 ea., $275,869.

Jack & Heintz, Inc., Cleveland, Ohio, generator, 368 ea., spares, 281 ea., $331,857.

Philadelphia Metal Warehouse Co., Philadelphia, war surplus items, $193,711.

Wright Aeronautical Div., Curtiss-Wright Corp., Wood-Ridge, N. J., aircraft engine spare parts, $2,141,790.

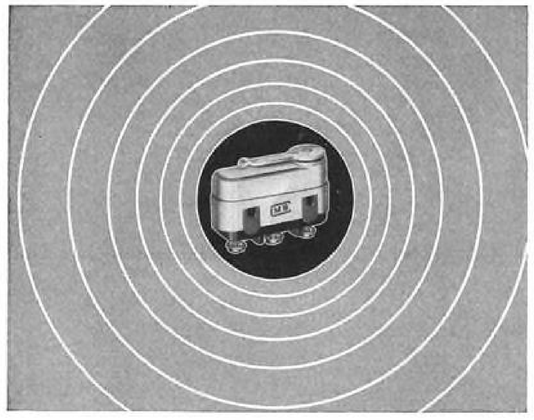
Vickers, Inc., 1400 Oakman Blvd., Detroit 32, spare parts, 16 ea., 1,185 ea., 319 ea., $78,526.

Westrex Corp., 118 Eighth Ave., New York, recorder, sound, 16 ea., $74,880.

Wilcox Electric Co. Inc., 14th and Chestnut St., Kansas City 1, Mo., receiver- transmitter, 697 ea., 325 ea., 9 ea., $96,478.

Better Products Thru Better Design

how short cuts to tomorrow's new products develop from cooperation of designers and MICRO Switch field engineers today



TOMORROW will belong to those manufacturers who are actively striving today to design new products for new jobs —or to redesign products to do their jobs better.

Success in such new designs often hinges on the skillful selection of even the smallest component parts—components that can be counted on to perform their function day after day, so accurately and efficiently that their presence is almost forgotten.

Prior to MICRO's pioneer efforts in the precision switch field, many of today's successful designs would have been difficult or impossible. MICRO switches, from the first, have been a short cut to better products. The small size, light weight, precise action and absolute dependability of MICRO switches swept away many old design conceptions.

Through the use of MICRO switches in his product, more than one manufacturer has become a leader in his field. By including MICRO switches, many designers have added greater reliability, more precise action and longer life to products that meet new demands or fill present needs more acceptably.

Design problems which "stumped the experts" have been solved through the cooperation of industrial designers and MICRO field engineers. This cooperation has resulted in the development of a vast reservoir of precision switch types. It may easily provide your short cut to better design.

Let us tell you about a few recent developments:

—A hermetically sealed switch which has proved itself in government atomic plants. These switches are called upon to operate accurately and over a long-life period in liquids that are "hot" in more ways than one. As the development of atomic power for commercial use becomes more and more of a factor in industry, MICRO, already able to supply switches to meet such requirements, will be fully prepared.

* * * *

—A fast-action switch to meet the demands of a manufacturer of "overload relays." These relays operate thermally to stop a motor in case of overload. A special type of MICRO switch enabled him to produce his equipment in lighter weight and smaller size than was hitherto possible. The switch operates magnetically in case of a short circuit or quick overload and must be reset manually before operation can be resumed.

* * * *

—A small low-torque switch which has saved many thousands of dollars worth of electrical equipment. In such devices, the concentration of power in smaller and smaller space frequently requires a flow of air to cool equipment and prevent tube burnout. Many a manufacturer of electronic device, depends on this type of MICRO switch to shut off the power instantly in case the air stream is not moving.

* * * *

Meeting such varied problems of industry has resulted in over 6000 different types of MICRO switches, each contributing to "better products through better design."

MICRO

MAKERS OF PRECISION SWITCHES

FREEPORT, ILLINOIS

HONEYWELL

A DIVISION OF
MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

THESE COMPARISONS PROVE

the superiority of VERSON-WHEELON rubber pad forming...



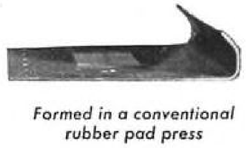
Formed in a Verson-Wheelon Press



Formed in a conventional rubber pad press



Formed in a Verson-Wheelon Press



Formed in a conventional rubber pad press



Formed in a Verson-Wheelon Press



Formed in a conventional rubber pad press



Formed in a Verson-Wheelon Press

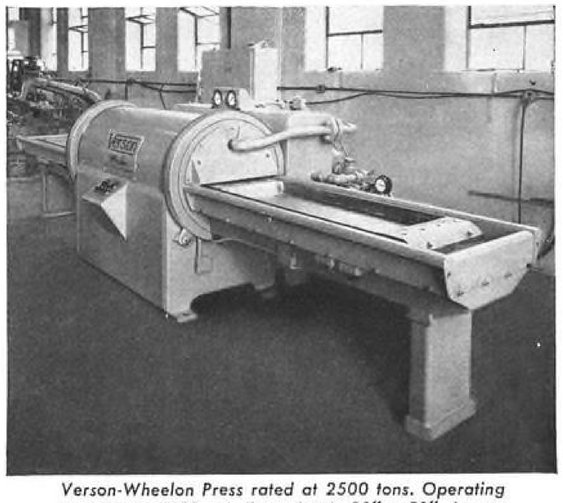


Formed in a conventional rubber pad press

The best way to judge the new Verson-Wheelon Direct Acting Hydraulic Press is to compare its work with that of a conventional rubber pad press. The typical examples illustrated above show the difference. Flanges of Verson-Wheelon formed parts are completely formed. Flanges formed in a conventional rubber pad press are often wrinkled and incomplete and require considerable hand finishing.

Add to this the substantially lower price of the Verson-Wheelon unit, its compactness and its elimination of the need for an expensive foundation and you'll see how economy has been combined with superior performance.

Bulletin VW-52 gives design and operating data. Write for a copy.



Verson-Wheelon Press rated at 2500 tons. Operating pressure is 5000 psi. Tray size is 20" x 50". Larger tray sizes and higher pressures are also available.

A Verson Press for every job from 60 tons up.

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

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MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES • TOOLING • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES

LETTERS

Chicago's Air Shuttle

In reading of New York Airways accomplishments of the past year, I find myself quite sympathetic with their passenger-handling problems ("Copter Airline Plans Reservations Setup," AVIATION WEEK Sept. 14, p. 115). However, when reading New York Airways' president Cummings' statement (". . . since nothing like this has ever been done before . . ."), I was left with the feeling that our public relations efforts have left something to be desired.

In fact, Midway Airlines has in its 26 months of operation suffered all of the growing pains which NYA is now going through. With our traffic continually increasing, we are still suffering those pains, but I believe them to be of a more advanced stage than those which NYA is now encountering.

As evidence of this, we carried more passengers in our last week of scheduled operation than did NYA during the months of July and August. These passengers were carried between Chicago's Midway Airport and two suburban fields which we served with frequent, 17-minute scheduled flights. We are presently doing the job with four passenger Cessna 195s, and have been operating, without subsidy, at a fare of 22 cents a seat mile.

Our traffic has been showing a healthy increase since we began operating in July 1951.

During those first months we were only operating eight round trips a day between Chicago and Northbrook, and our fleet consisted of two Cessna 195s. We now have four 195s and one Bonanza in the barn and still find ourselves needing more equipment.

The following will give you a fair idea of how Midway Airlines has grown in little more than two years:

- **In 1951** we carried 311 passengers in July; 345 in August; and 363 in September.
- **In 1952** we carried 1,136 passengers in July; 1,013 in August; and 1,385 in September.
- **In 1953** we carried 1,575 passengers in July; 1,682 in August; and an estimated 1,800 in September.

The preceding figures did not include passengers carried on charter flights.

During one peak day last week we carried 120 passengers in and out of Chicago, in spite of having our last two flights canceled due to local thunderstorms.

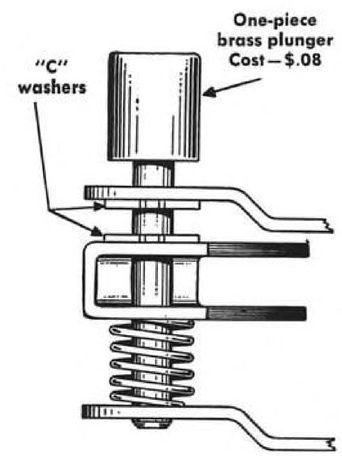
We wish New York Airways all of the success which we have been experiencing, but also wish to dispel any illusions that may be had concerning the identity of that carrier which has pioneered this newest phase of our air transportation picture.

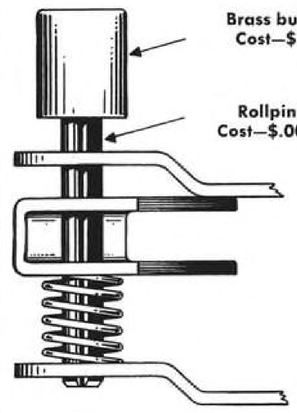
GEORGE E. BECK,
Manager of Stations
Midway Airlines, Inc.
Dundee Road west of Waukegan Road
Northbrook, Ill.

FASTENER PROBLEM

Fastener costs cut from $.08 to $.026 per assembly

Until recently, REVERE CAMERA COMPANY, Chicago, used a brass plunger to hold this assembly, used in a tape-recording unit. The plunger, a screw machine part, cost $.08. The "U" stamping was loose on the shaft—and an objectionable rattle or binding was possible. The plunger was free to rotate. Assembly was difficult and relatively costly.





Now, Revere uses a brass button (a screw machine part costing $.02) and Rollpin, the slotted tubular steel pin with chamfered ends. It is a simple arbor-press assembly. Rollpin compresses as driven, locking itself firmly into the various parts through the constant pressure it exerts on the hole walls. No washers are needed. The "U" stamping is rigid . . . the possibility of binding and rattling is prevented. And—the Rollpin costs only $.006, making possible a reduction in overall fastener cost of $.054 per unit.

If you use taper pins, set screws, rivets, hinge pins or any other pin type fastener, Rollpin can probably give you a cheaper, faster assembly.

ROLLPIN TRADE MARK

MAIL COUPON FOR DESIGN INFORMATION

Elastic Stop Nut Corporation of America
Dept. R22-1025, 2330 Vauxhall Road, Union, New Jersey

Please send me the following free fastening information:

☐ Rollpin bulletin
☐ ELASTIC STOP® nut bulletin
☐ Here is a drawing of our product. What fastener would you suggest?

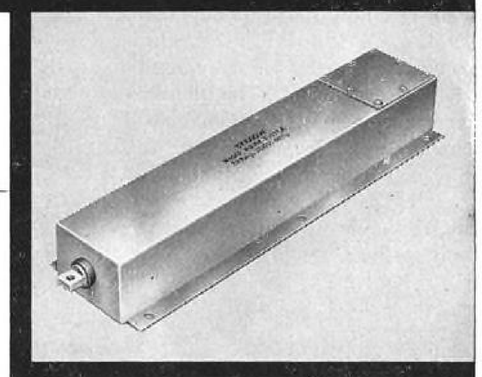
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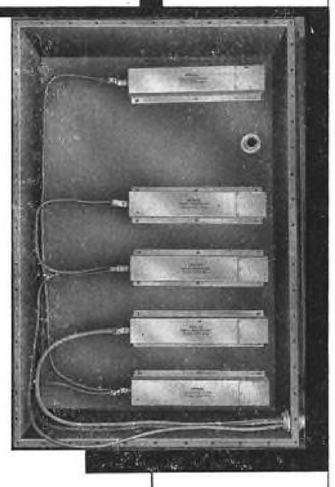
Firm_____

Street_____

City_____ Zone____ State_____

Screen Room Filters





BETTER BY FAR BY SPRAGUE

The power lines entering your screen room must be r-f free or else the efficiency of your shielded enclosure is greatly reduced.

Sprague engineers, long experienced in the manufacture of radio noise filters for all applications, have developed numerous types specifically for shielded enclosures. A typical installation is shown at right. Note that each filter is provided with a shielded end cap adaptable to most screen room power panels.

Perhaps we can help you improve the performance of your screen room. Write Sprague Electric Co., 327 Marshall Street, North Adams, Massachusetts for further information on modern, high-attenuation filters for screen rooms.

Sprague, on request, will provide you with complete application engineering service for optimum results in the use of radio noise filters.

YOU CAN DEPEND ON

SPRAGUE

Praise

We are very interested in the article published in AVIATION WEEK by Philip Klass, entitled "Gen. Putt Challenges Avionics Industry."

We would like to make reprints of this article available to members of management in IBM's Defense Engineering.

D. D. WILLARD
Defense Engineering Publications
International Business Machines Corp.
Endicott, N. Y.

We feel that you have done a fine job in discussing our products in AVIATION WEEK.

F. J. WEIHMILLER, SALES MANAGER
Thompson Products, Inc.
Electronics Div.
2196 Clarkwood Road
Cleveland 3, Ohio

More Tributes To Alex McSurely

Additional tributes to Alex McSurely, associate editor of AVIATION WEEK who died last month, are being received at AVIATION WEEK offices. Some of them are published herewith.

I have only just returned from a visit to England to hear of Alex McSurely's death.

I am deeply shocked at the news. During my time in Washington, when I first got to know him, there was nobody who was more helpful, or kinder, or more reliable than Alex, whether it was something to do with his profession or simply a personal matter. There will not be anybody who knew him who won't feel they have lost a real friend.

Please accept my very since sympathy.

CHRISTOPHER CLAREKSON,
342 Madison Ave.,
New York 17, N. Y.

We were saddened and depressed by the death of Alex McSurely. The loss to the industry is great. Alex was not only a fine personal friend, but it is our conviction that he was also a very great friend of the aviation industry.

He will be sorely missed. We share your loss.

CLARENCE N. SAYEN, President
Air Line Pilots Assn.
Chicago 38, Ill.

We who are connected with the flight safety program in the Air Force were indeed sorry to learn of the untimely death of Mr. Alexander McSurely.

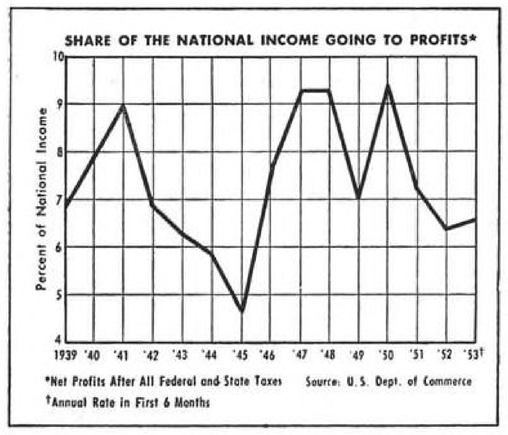
Our acquaintance with Mr. McSurely began when he visited the Directorate of Flight Safety Research a few months ago gathering information for an article. He impressed us as a serious student of aviation safety and it was a real pleasure to talk and work with him. You have lost a valuable editor and we have lost a valued friend.

We sincerely hope that your publication will continue the efforts of Mr. McSurely to make flying safer.

VICTOR E. BERTRANDIAS
Major General, U. S. Air Force
Deputy Inspector General
Washington 25, D. C.

The first of two articles on profits

PROFITS... How High Are They?



How high are profits? What is being done with them? This is the first of two articles designed solely to throw some factual light on these key economic questions.

One of the important economic developments of 1953 has been a substantial increase in the dollar volume of corporation profits from the level of 1952. But to answer the question "How high are profits?" we must also measure them: 1) by comparison with the record of previous years, and 2) as a share of the total national income. The term "profits," as used here, refers to profits *after taxes*. These are the only profits that can be paid to stockholders or retained for use in the business.

In the first six months of 1953, corporate profits *after taxes* were at an annual rate of $20.4 billion. This was higher than in the first half of 1952, but lower than in the full years 1948 or 1950, or in the first half of 1951. If allowance is made for the declining value of the dollar, this year's net profits for all corporations represent less purchasing power than those made five or six years ago.

Here is the record of profits over the years:

	Net Profits After Taxes of All U. S. Corporations	
	Billions of Dollars	
	Actual	In 1953 Prices
1929	8.4	14.6
1939	5.0	9.8
1947	18.5	22.1
1948	20.7	22.7
1949	16.3	18.3
1950	22.7	24.6
1951	20.1	19.7
1952	18.6	18.7
1953*	20.4	20.4

*Annual rate, first six months

The record shows that real profits have a little more than doubled since 1939. This increase, however, does not mean that corporations are doing exceptionally well. The entire national income has doubled since 1939. And our industrial plant is more than twice as large as it was in 1939. Therefore, profits have just about kept pace with industrial growth.

Return on Investment

How high are profits compared with sales, or compared with the stockholders' investment?

What is the rate of return to the people who have invested their savings in corporate business?

The table below shows that for the past three years the rate of return on both sales and investment has been substantially below the return achieved in earlier postwar years. The rate of return on stockholders' investment is higher now than it was in 1939. But this is primarily because today's profits are reported in terms of today's prices, whereas much of the investment in plant facilities is still carried on the books at prewar prices, which are substantially below the cost of replacement. The current rate of return, measured as a percentage of total corporate sales, is below prewar levels.

	Corporate Profits After Taxes	
	Per Cent of Total Sales	Per Cent of Stockholders' Equity *
1929	6.1	NA
1939	4.1	4.0
1947	5.3	14.8 average
1948	5.3	
1949	4.4	
1950	5.3	
1951	4.1	11.8
1952	3.6	10.3
1953#	3.7	10.8

* Manufacturing corporations only
NA Not available
\# Annual rate, first six months

In considering these figures, it should be remembered that they are averages for all corporations. Some companies make more than the average, and many make no profit at all. In every year since 1915 at least 25% of all corporations have operated at a loss. In 1939, 58% of all corporations were losing money. This year the figure will probably be at least 30%. The improvement since 1939 shows a much healthier economy. But it does not indicate that profits are easy to make.

How Big a Share of the Pie?

The most important single fact about profits is that they now represent a *smaller* share of national income than they have in past years of normal prosperity. For the past three years, profits have taken a smaller share of the pie than in 1939, and considerably smaller than in the early postwar years. Here, as the chart at the beginning shows, is the record:

	Corporate Profits After Taxes as a Percentage of National Income
1929	9.6
1939	6.9
1947	9.3
1948	9.3
1949	7.5
1950	9.4
1951	7.2
1952	6.4
1953*	6.6

*Annual rate, first six months

The main reason for the declining corporate share of national income is, of course, the increasing share taken by the federal government in the form of taxes. The wage earners' share is also higher than in 1939. But the really startling increase is in federal taxes. Taxes on profits now equal almost 8% of the national income, compared to only 2% in 1939.

Why This Is Important

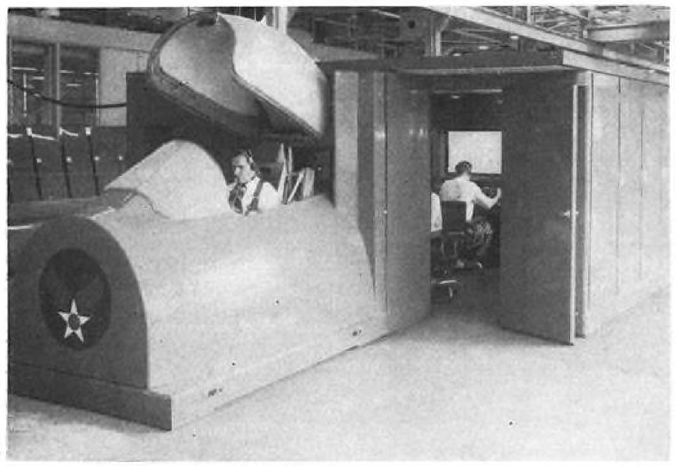
It is important that these facts about profits and taxes be widely understood. At its next session, Congress must consider what to do about the emergency taxes on profits enacted after the outbreak of the Korean War. The so-called excess profits tax is scheduled to die on January 1, 1954. In the absence of new legislation, the rate of the corporate income tax will drop from 52% to 47% on April 1. Many factors, including the revenue needs of the government, must enter into the decision whether or not to reduce taxes. But one fact stands out clearly: By comparison either with past years or with the total national income, corporate profits today are relatively low.

* * *

The second article in this series will discuss what corporations do with their profits.

McGraw-Hill Publishing Company, Inc.

AVIONICS



SIMULATOR built for AF gives F-86D trainee realistic training in flight and interception problems.



FLIGHT instructor reproduces flight and emergency conditions in cockpit.



RADAR instructor sets up navigational, interception problems for . . .



PILOT who sits in cockpit that is exact duplicate of the one in North American's all-weather interceptor.

AF Gets Assembly-Line F-86D 'Trainer'

Air Force has taken delivery of the first F-86D Sabre flight simulator to come off the assembly line at Westinghouse Air Brake's Union Switch and Signal Division, Pittsburgh, under a multi-million-dollar contract.

Another supplier of the F-86D simulator is Engineering and Research Corp., Riverdale, Md. (AVIATION WEEK May 25, p. 77).

The Model S-2B "trainer" is an exact reproduction of the cockpit of the all-weather interceptor version of North American's Sabre. It will serve a double purpose: trainer for new pilots, and refresher for experienced pilots.

Training will be in four phases:

- **Transition.** Schooling in highspeed jet operation after previous training in slower jets.
- **Emergency.** Devoted to handling flameouts, icing, generator failures, landing gear failures, etc.
- **Navigation.** Learning to make use of avionics navigational aids.
- **Interception.** Simulating tracking and shooting down enemy aircraft by means of radar.

Each simulator contains over 25 miles of wire, about 1,300 tubes, and 300 chassis assemblies, Union Switch and Signal says.

A USAF spokesman said the contract award to Westinghouse was based on its ability to offer the combination of its US&S division's engineering manpower and manufacturing space with the electronic knowhow of Melpar, a company subsidiary.

New Components Cut Size of Equipment

Several new miniature and subminiature components, designed to enable engineers to cut the size and weight of avionic equipment, recently have been announced. The new devices and their manufacturers:

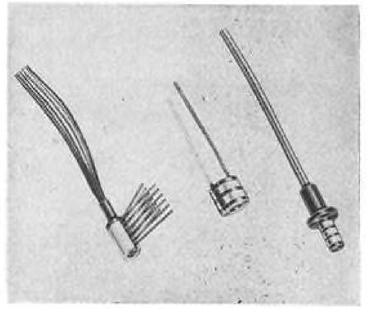
• **Wire-Wound Resistor,** Type 1119, rated at ¼ watt and available in resistances up to one megohm, is available with standard resistance tolerance of 1.0% but can be supplied to accuracies of 0.05%. Manufactured by The Daven Co., the Type 1119 is non-inductively wound and designed for operation at temperatures of −55C to 100C. Dimensions are: 3/32 in. dia. by 3/32 in. long. Company address is: Dept. SMR, 191 Central Ave., Newark, N. J .

• **Non-Linear Pot,** deposited film type with resistance taper to customer's requirements, is available in resistance range of 1,000 ohms to 2 megohms, with a tolerance of 2% and linearity of 1% from Ohmitron Mfg. Co. The Model 20 pots are one inch in diameter and one-quarter inch deep, weigh 0.6 oz., and are available in ganged sections.

Omitron also can supply individual resistance elements or cards.

• **Sub-Min Resistors,** Type 16 rated at 0.1 watt and Type 18 rated at 0.25 watt, are non-inductively wound and available in standard tolerances of 1% from Shallcross Manuf. Co. Type 16, available in resistances up to 150,000 ohms, measures 1/16 in. long by 1/16 in. dia. and has radial leads. Type 18, available in resistances up to 400,000 ohms, measures ¾ in. long by 3/32 in. dia. and has axial leads. Both are available with Shallcross BX impregnation to withstand prolonged exposure to high humidity environment. Company address: Collingdale, Pa.

• **Sub-Min Slip Rings,** called the first sub-miniature one-piece injection molded slip rings by its manufacturer, are available for use in gyros, synchros, motors, and potentiometers from Slip Ring Co. of America, Santa Monica, Calif. The slip rings, available in diameters of 0.062 to 4 in., will operate at temperatures up to 225F without heat distortion, company says. (The Slip Ring Co. of America is represented in California. Arizona, Nevada and New Mexico by Joe Davidson & Assoc., P. O. Box 108, South Gate, Calif. Representative for the balance of the U. S. and Canada is Travco Engineering Co., P. O. Box 188, Lynwood, Calif.) Company address is 480 Johnson Ave., Brooklyn 37, N. Y.



NEWS Edo NOTES

EXTERNAL STORE HOUSINGS BY EDO

It is not unusual that a number of electronic manufacturers and airframe builders have turned to Edo for the design and manufacture of housings for electronic equipment to be mounted externally below aircraft wings.

That's because building seaplane floats for over a quarter of a century, and pioneering in the precision fabrication of aluminum components has given us both the design and manufacturing experience which makes us extremely well qualified to handle the entire problem of building external store housings.

For several years we have built in large quantities, the streamlined housing for the APS-19 radar. Recently a major builder of airborne electronic equipment turned over to us the complete problem of designing a pressurized external store housing to fly at speeds approaching Mach 1.

From initial design conception through wind tunnel testing to finished tooling and production, we have handled the complete project, thus relieving both the electronic manufacturer and the air frame builder of the peculiar problems involved in such an intricate design.

Our qualifications are further enhanced by our wide knowledge and experience in the field of electronic design and manufacture. If you are faced with the problem of designing an external store housing, why not let us discuss it with you?

Edo CORPORATION
Since 1925 COLLEGE POINT, NEW YORK

IBM Adds New Computer to Line

International Business Machines Corp. has announced a new electronic decimal computer designed to fill the gap between huge digital computers such as IBM's Type 701 (announced this spring), and its smaller and older Card Programmed Calculator. The new machine has a magnetic memory with 20,000 memory positions, IBM says, and is called the Type 650 Magnetic Drum Calculator. New computer can add two 10-digit numbers at the rate of 200/sec. and can multiply two 10-digit numbers at the rate of 100/sec. Calculator's program can be controlled from its magnetic memory, external punched cards, or operator's console.



Chief Pilot Rokes with one of the two DC-3's operated by The Procter & Gamble Company, leading makers of soaps, special detergents and shortenings.

Ask the men with the most experience...

ask

NELSON U. ROKES

Manager of Aviation and Chief Pilot
The Procter & Gamble Company
Cincinnati, Ohio

"In 20,500 hours and 24 years of flying, I've seen plenty of changes in airplanes," says Mr. Rokes. "And I've also noticed how consistently Gulf *gasolines and oils* have matched the most advanced developments in aviation *equipment*.

"We at Procter & Gamble have learned from experience that we can count on Gulf to provide the finest possible quality—and to make their products steadily finer with every passing year."

Gulf Aircraft Engine Oil, Series-R

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Gulfpride Aviation Oil, Series-D

For horizontally opposed and Ranger in-line engines. Minimizes ring and valve sticking, oil consumption, oil-screen clogging and plug fouling. Users of this great detergent oil have actually increased periods between engine overhauls by as much as 100%.



Gulf Aviation Gasoline

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AVIATION PRODUCTS

Data on New Relays

Four manufacturers have recently announced new relays suitable for use in avionic equipment. The manufacturers and their new products are:

• **Barber-Coleman Co.:** Polarized (null-seeking) d.c. relays suitable for use in balanced bridge detecting circuits are available with sensitivities of 50 to 100 microwatts. Relays are available in hermeticaly sealed cases with either octal plug or solder terminals. (Rockford, Ill.)

• **Stevens-Arnold, Inc.:** Fast acting hermetically sealed plug-in relays which close in less than one millisecond are available with either gold or platinum-rhodium contacts. Devices can be operated in any position at temperatures of −65C to 85C, manufacturer says. Catalog No. 337 describes the new "Millisec" relays. (22 Elkins St., South Boston 27, Mass.)

• **Advance Electric & Relay Co.:** High-voltage relay with contacts rated for 8,000 v., 0.25 amp. d.c. are available in DPST, SPST, and SPDT styles. Identified as Series 2800, the relays have operating coils rated at 27.5 v. d.c. (2435 North Naomi St., Burbank, Calif.)

• **Signal Engineering & Mfg. Co.:** Miniature (1x1x1¾-in.) hermetically sealed relays with silver contacts rated at 2 amp., 28 v. d.c., require 40 milliwatts or less for operation. The new Series 100, 105, and 106 are available with operating coil resistances of 50 to 8,000 ohms and are designed for 10G vibration immunity in accordance with MIL-R-5757B, manufacturer says. (154 West 14th St., New York 11, N. Y.)

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B-X W S B-8 B R Z BACo 43

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► **Collins Sells TVOR**—Purchase of a Collins Radio TVOR (low-power omnirange) has been authorized by the City of Santa Monica, Calif., for installation at Clover field, site of a large Douglas Aircraft plant, Lear's new corporate headquarters, and other aviation outfits.

► **Eyes on New Avionics Firm**—Newly formed Ramo-Wooldridge Corp. of Los Angeles (AVIATION WEEK Sept. 28, p. 15), headed by two former Hughes Aircraft Co. vice presidents, Dr. Simon Ramo and Dr. Dean Wooldridge, plans to operate in the same field as HAC. This includes guided missiles, radar, computers, electronic controls, and automatic intelligence devices. Observers are watching to see whether Ramo and Wooldridge are able to attract former HAC associates. New company was organized and financed by Thompson Products, Inc., of Cleveland.

► **Transistor Licensees**—Evidence of the mushrooming transistor industry is the disclosure that Western Electric has now licensed 40 companies to manufacture transistors and more than 500 firms to produce equipment incorporating transistor circuits developed by Bell Laboratories.

► **Microscopic Memory**—A tiny memory cell, only one-half inch square, capable of storing 256 binary bits of information for an indefinite period has been developed by Bell Labs. Cell consists of barium titanate crystal which has been criss-crossed with input-output electrodes.

► **Emergency A/C Power Studied**—Armour Research Institute is studying means of generating emergency electrical power for essential aircraft instruments and devices on single-engine jet fighters in the event of engine failure.

► **New Bulletins**—Recently announced bulletins which describe components or devices of interest in the avionics field include:

• Selenium rectifiers, their electrical characteristics, life expectancy, and dimensions are described in GEA-5935, prepared by General Electric Co., Schenectady, N. Y.

• Ferromagnetic cores, including engineering data and dimensions on Ceramag cores

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Now Available at Major Airports from Coast to Coast



Executive and personal plane operators can now get the same thorough, efficient and quick ignition service as the commercial air lines enjoy. At major airports across the nation, progressive aircraft service organizations are using the Bendix Ignition Analyzer. They will provide this service for you at 100-hour check periods, major overhauls, or at any other time that a rapid check of your complete ignition system may be desired.

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Municipal Airport

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Chicago, Illinois
Air Associates, Inc.
Midway Airport

Dallas, Texas
Southwest Airmotive Co.
Love Field

Jamaica, New York
Lockheed Aircraft Service Int'l, Inc.
N. Y. International Airport

Kansas City, Kansas
Pacific Airmotive Corp.
Fairfax Airport

Linden, New Jersey
Pacific Airmotive Corp.
Linden Airport

Miami, Florida
Airwork Corp.
International Airport

Milwaukee, Wisconsin
Anderson Air Activities
General Mitchell Field

Oakland, California
Pacific Airmotive Corp.
Oakland Municipal Airport

Seattle, Washington
Pacific Airmotive Corp.
Boeing Field

Teterboro, New Jersey
Mallard Air Service, Inc.
Teterboro Airport

Bendix

SCINTILLA MAGNETO DIVISION OF SIDNEY, NEW YORK

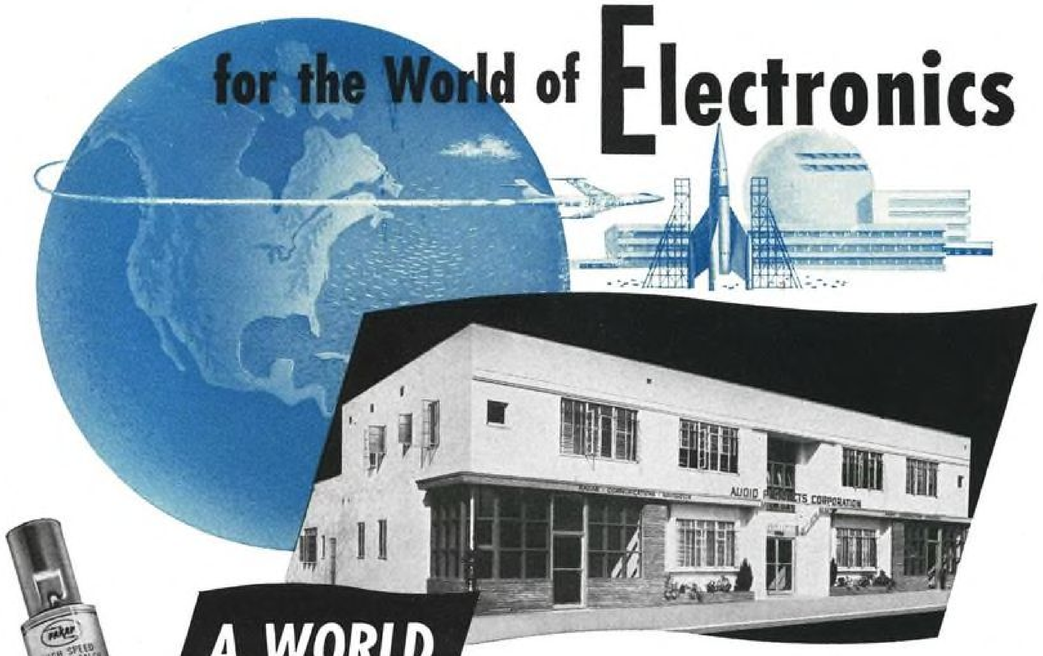
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Export Sales: Bendix International Division, 205 East 42nd Street, New York 17, N. Y.

FACTORY BRANCH OFFICES: 117 E. Providencia Avenue, Burbank, California • Stephenson Building, 6560 Cass Avenue, Detroit 2, Michigan
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for use in transformers and similar applications are described in RC-9A published by Stackpole Carbon Co., Electronic Components Div., St. Marys, Pa.

• **Selenium rectifiers,** particularly suited for use in magnetic amplifier circuits, are described and their engineering characteristics are listed in booklet TD-52-650 by Westinghouse Electric Corp., Box 2099, Pittsburgh 30.

• **Varistors** (non linear resistors), are listed and their typical applications are shown in bulletin SR-3 by International Resistance Co., Special Products Div., 401 N. Broad St., Philadelphia 8.

• **Taper terminals,** new self-locking device used primarily to interconnect individual wires, are described in a brochure published by Aircraft-Marine Products, Inc., 2100 Paxton St., Harrisburg, Pa.

• **Electronic timers,** suitable for use in timing or sequencing industrial operations, are listed in Bulletin 315-10 prepared by Sciaky Bros., Inc., 4915 W. 67th St., Chicago.

• **Electronic controls** for weighing, counting, measuring, timing, and cycling are described in new edition of "Cutting Production Costs With Electronic Controls," published by Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass.

• **SSB filters**—a new series of single-sideband filters are described, and frequency response curves shown, in a bulletin prepared by Burnell & Co., Dept. SB, 45 Warburton Ave., Yonkers, N. Y.

• **Microsyn indicator,** a small synchro-type device of high sensitivity and requiring low operating torque, is described in bulletin M, available from Doelcam Corp., 1400 Soldiers Field Road, Boston 35, Mass.

• **Instruments for Modern Measurements,** a 34-page brochure listing instruments suitable for a variety of different measurements in the electronic and electro-acoustical fields is available from Brush Electronics Co., 3405 Perkins Ave., Cleveland 14.—PK



ALTITUDE CONTROL

Dual-bellows construction of this new Lear Model 2203 altitude control for automatic pilots makes it more sensitive to changes in altitude and less sensitive to vibration and shock, Lear says. Altitude control is contained in hermetically sealed case 4 in. in diameter and 3 in. long; it weighs less than 2 lb. It is available for operation from both 12 and 24 v. d.c. and from 400 and 1,150 cps. a.c. Made by Lear-Cal division, Lear, Inc., 11916 West Pico Blvd., Los Angeles, Calif.



How to keep informed on the "with what" part of your business

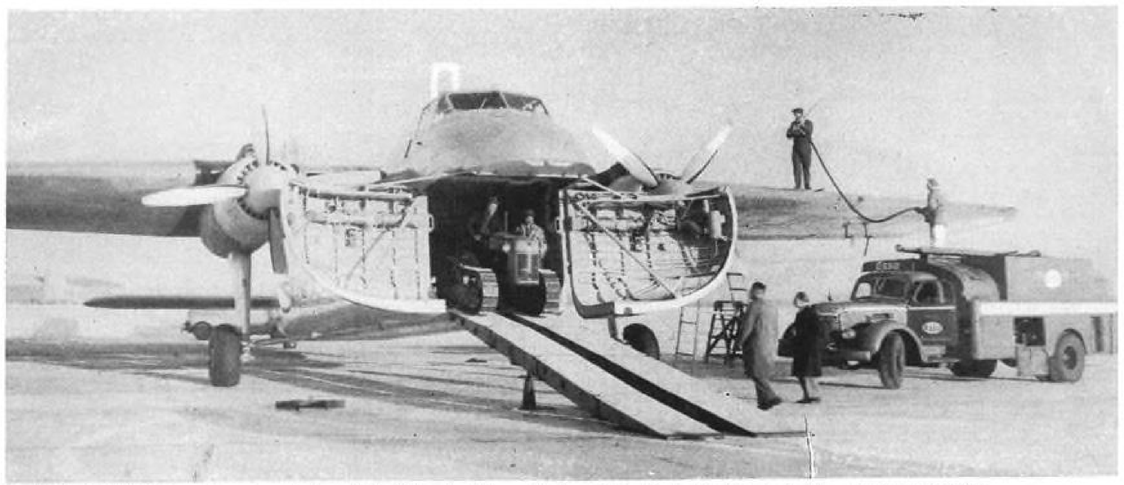
AT YOUR FINGER TIPS, issue after issue, is one of your richest veins of job information — advertising. You might call it the "with what" type — which dovetails the "how" of the editorial pages. Easy to read, talking your language, geared specifically to the betterment of your business, this is the kind of practical data which may well help you do a job quicker, better — save your company money.

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McGRAW-HILL PUBLICATIONS



LOADING RAMP is often stowed aboard Freighter to help unload vehicles if destination lacks the necessary facilities.

Bristol Freighter Paces Bush Operation

Here's how Associated operates its 24-plane fleet in the primitive stretches of Canada's Northwest.

By George L. Christian

Edmonton, Alberta, Canada—Hundreds of miles north of here, in the barren, cold Northwest Territories, the Salmita Gold Mines' sole means of supply for one year was a single Bristol Freighter.

The operation was the brainchild of Tommy Fox, old-time Canadian bush pilot and now president and general manager of Associated Airways, Ltd., based here in Edmonton. The Freighter is but one of an assortment of 24 planes AA operates. The others: four Beavers; three Barkley-Grows; three Norsemen; three Stinson Voyagers; three Bell 47-D1 helicopters; two Bellanca Skyrockets; one Anson Mark V; one Cessna T-50; one Beechcraft Bonanza; one Piper Super Cruiser and one Cornell trainer.

▶ **Tractors & Cement**—Fox told AVIATION WEEK that 100% of the supplies for Salmita Mines, some 500 tons, were hauled in by his Bristol Freighter from Yellowknife, on Great Slave Lake, 150 miles west of the mine site. Salmita's strip is 2,460 ft. long.

The cargo included tractors, 3-ton dump trucks, cement, air compressors, joists, timbers, mine cars, ball mills to pulverize ore, and a year's supply of diesel fuel.

All this was done with the plane landing on a hastily thrown-together unfinished rock strip at the mine. The landing surface was full of pot holes and resembled corduroy, according to Fox. Maximum loads carried on this run were up to 14,000 lb.

Fox was enthusiastic about the Freighter. Operating in temperatures as low as minus 50F, the plane flew 300 hr. in 49 days, all away from base with little maintenance and no hangar facilities.

During this time, it hauled loads up to 12,000 lb. from unprepared strips and frozen lakes. Fox thinks this is probably some sort of unofficial record.

▶ **Takes Bruising**—Fox listed these features of the Freighter which make it an excellent aircraft for the bulk cargo he has to haul over desolate, primitive country.

• **Rugged.** The Bristol's airframe is rugged and capable of taking the bruising and battering of having heavy, cumbersome machinery loaded into its fuselage. Usual method of loading is attach a steel cable to the cargo, pass the cable over a pulley (called a tail block) anchored to the bottom rear fuselage, then back to a tractor or winch. The cargo is gradually "bulled" into place in the spacious fuselage. Cable is disengaged and operation repeated. Plane is ideal for operating off short, rough fields.

• **Convenient.** Large nose-loading doors, truckbed-height loading sill, and a portable loading ramp make the Freighter well-suited for loading self-propelled vehicles such as Snowmobiles, tractors, trucks and cars. Fox says: "You just drive them aboard, lash them down and you're off."

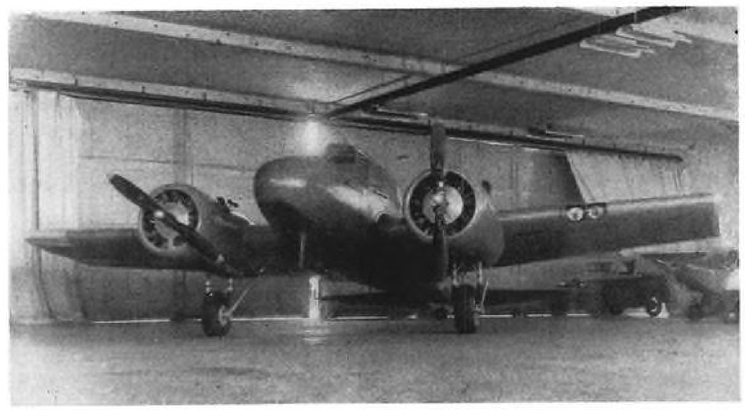
The 600-lb. loading ramp may be stowed aboard to unload vehicles at destination if no other facilities exist, as is often the case in the North Country.

• **Simple.** Severe simplicity of the Freighter pays off in the hinterland where spare parts are hard to come by and frigid winters make open-air maintenance a frost-biting task.

The fixed landing gear avoids the complication of a retraction mechanism. Its strength enables it to cope with the rough terrain the plane takes off and lands on. Its wide tread gives the plane good stability and ground handling characteristics.

Floors, stressed to take 200 psi., are covered with plywood and have replaceable plywood protection strips. The plane has no hydraulic system. All services are operated by pneumatics or, in the case of flaps and windshield wipers, electricity. Fox says hydraulic systems pose a leakage problem in extremely cold weather because of seal shrinkage. He has found the pneumatic system particularly trouble-free. Possibility of condensation and subsequent freezing is minimized by the dryness of Canadian winter weather.

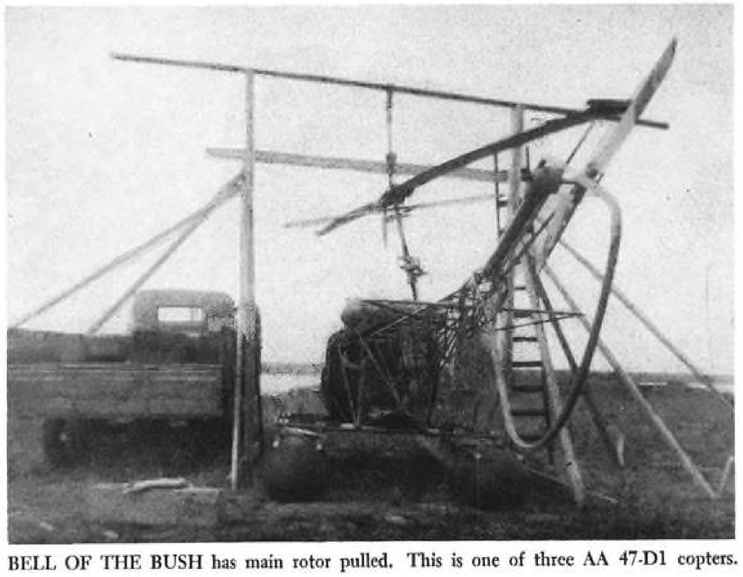
• **Porous anti-icer.** The anti-icing system on the Freighter will also de-ice within reasonable limits. The system



STUB WINGS on this Anson V are result of accident in Northern Alberta that lopped 9½ ft. off right wing. Tommy Fox sliced left wing same amount and flew home.



TAIL BLOCK in Freighter is hooked to tractor on ground to "bull" cargo in.

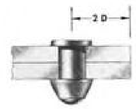


BELL OF THE BUSH has main rotor pulled. This is one of three AA 47-D1 copters.

STRUCTURE REWORK SIMPLIFIED WITH OVERSIZE *hi-shear* RIVETS

Structure rework nearly always requires replacement of fasteners. Because the pin diameter is slightly increased while retaining original head and collar end size, oversize HI-SHEARS avoid clearance problems that occur when the next larger size fasteners are used.

Diagrams show oversize HI-SHEARS in critical areas.



MINIMUM EDGE DISTANCE
minimum decrease in edge distance since the oversize shank is enlarged only 1/64 or 1/32.



ADJACENT STRUCTURE
same size HI-SHEAR head still clears nearby structure.

SPECIAL FITTINGS
no spotfacing or respotfacing required on radius to seat head.





FLUSH SURFACES
no enlarging of countersunk or dimpled holes when using oversize HI-SHEARS.



Approved for replacement, oversize HI-SHEARS weigh less than the next size fasteners or bolt-nut-washer combinations.

The HS39P-40P and HS41P-42P rivets are 160,000 psi heat treated, use standard size HS15 (24st) collars and are driven with same standard HI-SHEAR tool sets. This series serves as replacement to all standard HI-SHEARS.

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4408 MASTER CYLINDER

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WINDSHIELD CLEANER

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A8B

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Portable high pressure constant flow oxygen assembly.

5600

Portable high pressure constant flow and demand flow oxygen assembly.



8550

Oxygen Regulator for Scott 8500 Fixed Oxygen Systems.



6380

Demand Flow Regulators for fixed installations.

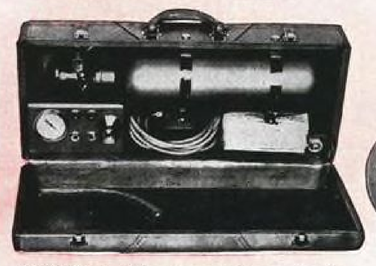


A-21

Portable, Low Pressure, Pressure-Demand Oxygen Assembly.



8540 Oxygen Flow Indicator.



AVIOX Portable Oxygen System for four persons, complete in a luggage case.

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A15

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Automatic, Steerable, and Full-Swivel Tail Wheel Assembly with 6 inch solid tire.



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Export: Southern Oxygen Co., 157 Chambers Street, New York, N.Y.

operates by pumping anti-icing fluid through porous strips of metal along the leading edges of the flying surfaces.

A big advantage in snowy Canada is the ability to anti-ice the flying surfaces while on final approach. The fluid effectively protects the leading edge and upper surfaces (where fluid runs back while plane is still airborne) against snow and frost during the night. This allows immediate operation the next morning, without time-consuming wing snow removal. The job of snow removal can become almost impossible with the snow falls and temperatures experienced in Northwest Territories. But even if snow does remain on the Freighter's wing, its adherence is so low that it may easily be swept off with a broom, Fox says.

• **Easy, cold starts.** Fox expresses pleasant surprise at the ease of starting the Bristol Hercules, sleeve-valve engine under extreme cold conditions (Hercules is a 14-cyl., twin-row, radial engine developing 2,000 hp. at takeoff).

"Even with temperatures down to minus 50 and 55 deg., all you have to do is pull the engines through a couple of times and hit the starter. Engines take hold easily. As soon as firing starts in a few cylinders, ignition picks up steadily until all cylinders are firing," Fox says. "I believe that a sleeve valve engine can be started in about half the time required for a conventionally valved engine under arctic conditions. . . . In spite of the very low temperatures we have to contend with for long winter months, we have had no cold weather problems with the Hercules. And the planes are never hangared."

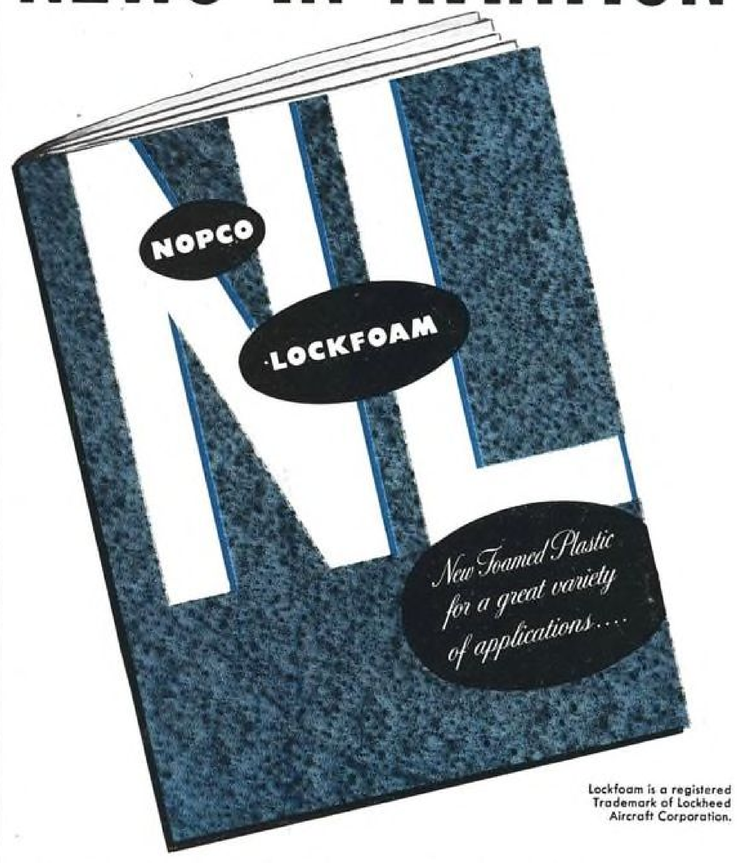
Current engine overhaul period is 700 hr. Only trouble experienced with the Hercules has been an occasional broken high tension ignition lead.

▶ **Oil Dilution**—Fox has the oil diluted in the engines of all his aircraft. Smaller engines are diluted starting in the fall. With these powerplants, oil screens are pulled daily starting with the first dilution until the screens are completely free of any sign of accumulated sludge. On the Freighter, oil is diluted the year round—about 1 min. in the summer, 6-10 min. in the winter.

A problem of operating in the extreme cold of northern Canada is to warm oil sufficiently to evaporate off the diluting fuel before takeoff. Usual procedure is to turn the tail of the aircraft to the wind and run up the engine. Sometimes up to half an hour is required to get rid of the gasoline—a must to provide adequate lubrication and prevent oil foaming and spewing at takeoff powers.

Fox originally operated two Freighters. The one he still has was bought in 1952 and has accumulated over 1,100 hours. The second, bought in early 1953, he sold to Maritime Central Air-

NEWS IN AVIATION



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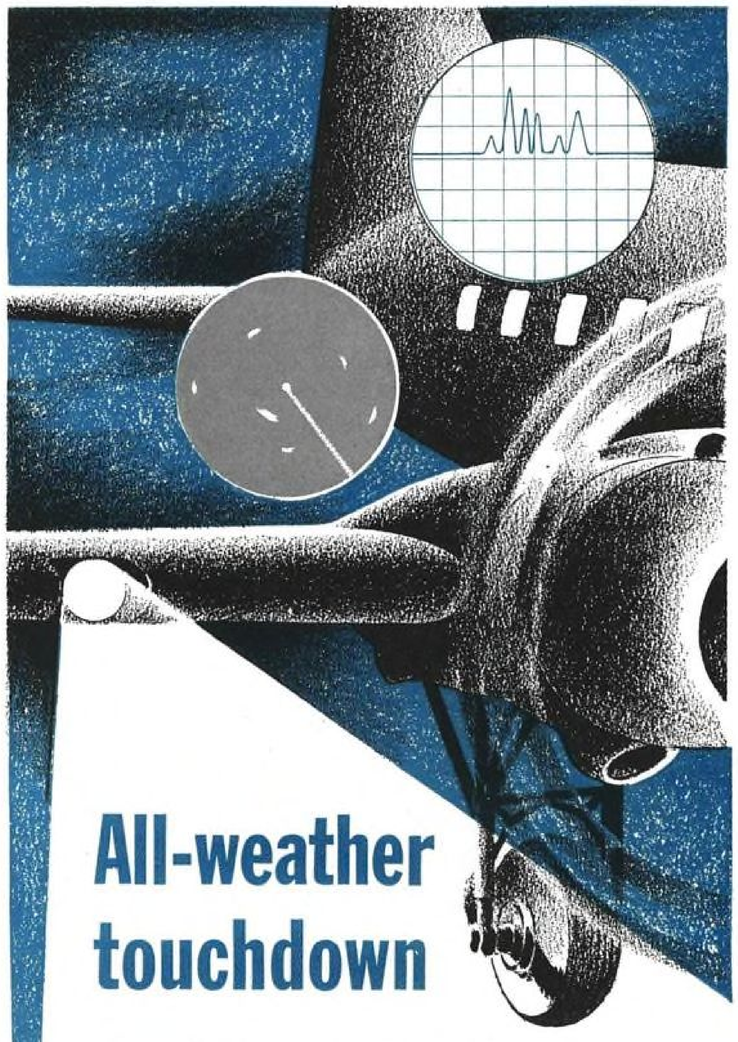
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ways, Ltd., Charlottetown, Prince Edward Island.

One thing Fox discovered about the Freighter operating with the loads he usually hauls in it. "The aircraft is empty when it is loaded," as he expressed it. "With the average density loads I carry, the Freighter has considerably more space than payload."

► **Old, but Good**—Associated Airways has a small fleet of three Barkley Grows, twin-engine, twin-tail, ten-passenger planes, with more than a passing resemblance to the Lockheed 12.

Fox finds the planes good for short-field work. The B-Gs are triphibious, using wheels, skis or floats, depending on weather and terrain in which they fly. Craft are powered with Wasp Jr. engines. Fox has a large stock of spares and intends to hold on to these planes for some time.

► **Bells in the Bush**—His helicopters give very little trouble, Fox says.

The three Bells are used primarily for oil surveys and topographical work for the Canadian Government. Flying in such out-of-the-way places as Beri Island and Fort Laird, in the far reaches of Alberta Province and the Yukon Territory, the Bells turn in an average utilization of 100 hr. a month during the flying season with nothing more than a tool box and a few spares to keep them going.

Last year, Fox's men got as high as 136 hr. a month out of a Bell in the bush. In common with their fixed-wing sisters, the egg-beaters never see the inside of a hangar.

Like other helicopter operators, Fox finds Shell Oil's TCP additive (tricresyl phosphate) a must for engine operation. "You can't keep plugs in the 200-hp. engine without TCP," Fox says.

► **In the Beginning**—Fox started his aviation career by building what he claims was the first successful, home-made airplane ever to be built on the West Coast of Canada. His effort consisted of putting together a Pietenpol high-wing two-seater monoplane from a design in Modern Mechanics magazine It was powered by a second-hand Cirrus Mark II engine.

Taught to fly by an instructor who himself had only a total of 50 hr. flying time, Fox flew his Pietenpol for a couple of years before disposing of it.

After wartime service with the Royal Canadian Air Force Transport Command, Fox started his company in mid-1945. Original equipment was a de Havilland Dragonfly and Tiger Moth. As business expanded, so did Fox's fleet of aircraft.

Among other craft, he acquired the Anson Mark V. The plane's right wing was "pranged" at Chipwyan Lake, in Northern Alberta Province, lopping off 9½ ft. of flying surface. So Fox had 9½ ft. sliced off the left wing, reducing the plane's original span of 54 ft. to a stubby 35 ft. Then he flew the abbreviated Anson 400 miles south to Edmonton. Rough air made the flight tough.

"The bumpy air made me work like mad to keep the plane level. The short wings made lateral control worse than marginal." To add to his trouble, a frozen cross feed caused Fox to make a forced landing, but he brought his ship in safely.

Associated Airways was growing. By 1950, the company did an annual business of $280,000; in 1951 income climbed to $540,000, and in 1952 Fox topped the $1-million mark.

► **Self-Sufficient**—Fox believes in self sufficiency. AA performs all the maintenance and overhaul work on its aircraft except for engines on the Bristol and helicopters. The former are sent to Bristol Aeroplane Engines, Ltd., in Vancouver, the latter to Standard Aero Engine, Winnipeg. Both companies do good work and provide excellent service, according to Fox.

Further to promote self-sufficiency, Fox recently acquired 50% of Aero Engineering, Ltd., an airframe, engine and engine accessory overhaul company whose shops are at the airport in Edmonton.

Currently, the company can overhaul engines up to 400 hp. Capacity will be increased to handle R985s and R1340s soon.



TAPPET-GUIDE CHECKER

A new method for checking engine tappet guides has saved Northwest Orient Airlines $2,500 during the first trial year, the carrier reports. During the year preceding use of the new method, Northwest had three unscheduled engine removals caused by loose tappet guides. Since the new system was instituted in August 1952, no premature removals have been caused by loose tappet guides. Lyle Canady, NWA inspector who devised the method, is shown checking engine tappet guides with torque wrench and adapter. This is said to give exact readings in inch-pounds. Old method used impact wrench to check the guides. Canady's system is used on R1830 and R2000 engines.



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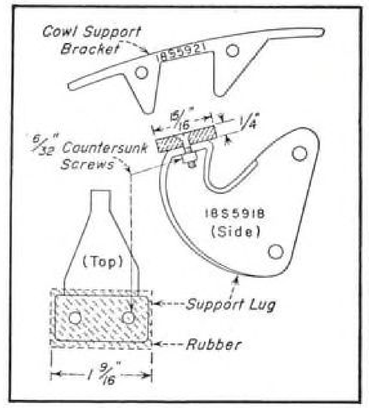
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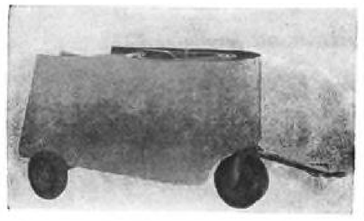
Mechanic Devises D-18S Cowling Fix

An effective fix on the Beechcraft D-18S engine cowling reduces considerably the replacement of micarta strips, cowl support brackets and attachment rivets due to micarta strip wear and popped rivets. The fix, devised by R. D. McKiernan, a mechanic for the R. L. Manning Co., Denver, reduces cowling vibration and eases removal and reinstallation. In some cases, no cowl work has been required after over 200 hours of operation.

This is McKiernan's modification, according to Louis A. Labe, pilot of The California Co., Stapleton Field, Denver: Remove the micarta strips from sides and bottom of cowl support bracket (Beechcraft P/N 18S5921). Replace with piece of rubber ¼ in. thick cut from large size fuel hose, rubber belting, or other strong, corded rubber material. Mount rubber pad on support lug (Beechcraft P/N 18S5918) by drilling two holes to take #6 countersunk screw attached with stop nuts. With this installation, rubber pad absorbs much vibration and most wear. Replacement of pad is easy, requiring only screwdriver and wrench.

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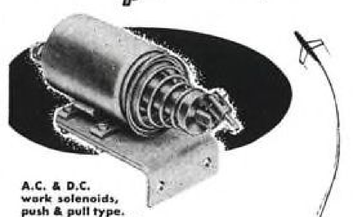
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Although the unit is designed primarily for use by aircraft companies, Harman notes that it also has application at small airports for fueling at any part of the field and at large airports, where it could help eliminate congestion and delay in fueling and defueling.

Among advantages claimed for Fuel-A-Plane are dual front wheels and a streamlined tank. An open compartment in the rear provides access to any type of dispensing unit, while pumping is handled by a demountable, self-contained unit consisting of gasoline engine or electric motor-driven pump or hand-operated pump.

Recessed, checker-work platform on top provides a safe access area for operator and storage space for the fuel delivery hose.

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Fuel-A-Plane is available with 125-, 220- or 300-gal. tanks. Only storage facilities required are barrels; no pits are needed.

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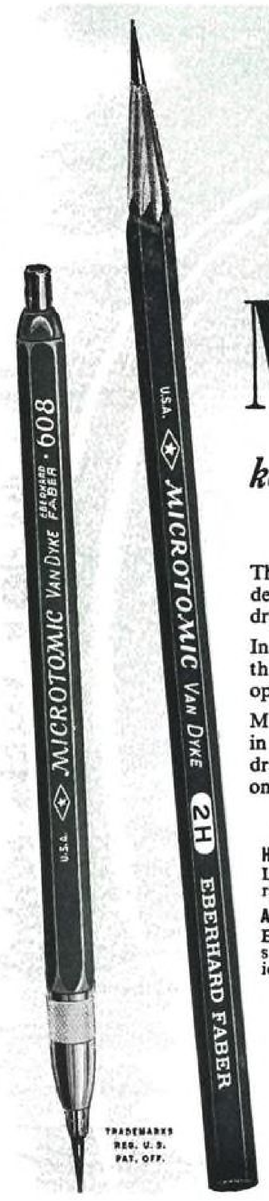
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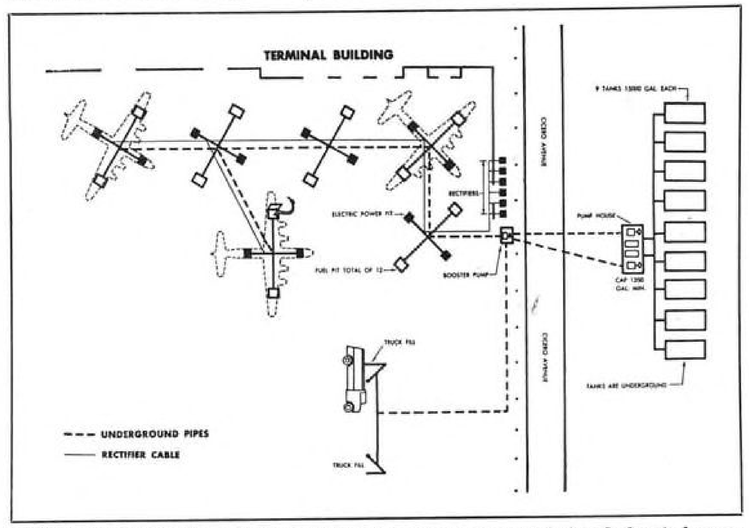
OFF THE LINE

Prime contract to provide progressive maintenance for Navy R7V-1s has been received by Temco Aircraft Corp. First of the Navy's Super Constellations will arrive at Temco's Dallas plant in February.

Electronics division of Curtiss-Wright recently delivered a Model 501 electronic flight duplicator to Air France. Unit is equipped with the AP2 radio aid.

Triple-glazed cabin windows being installed in some positions of the Douglas DC-7 are being used for acoustic purposes, not for added strength as reported here Sept. 21. The triple-paned windows will be installed in the first two cabin windows and in the aft passenger lounge windows, these apparently being the most critical from a noise point of view. The third, anacoustic panel is made of Plexiglas II and is installed as the inner pane of a standard double-paned window. The double-glazed panel is made up of a Plexiglas II inner pane and an outer pane of Plexiglas 55 where the latter's higher craze-resistance may be used to advantage, according to Rohm and Haas.

Resort Airlines has installed new Flite-Troines Visual-Aural 3-light marker beacon receivers in its aircraft to comply with CAR Amendment 42-8 requiring carriers to be equipped with certificated navigational radio gear by Dec. 31.



MIDWAY AIRPORT experience has sold UAL on underground fuel and electrical setup.

UAL Boosts Underground Facilities

United Air Lines plans to install underground fuel and electrical power facilities at New York, Newark, Cleveland, San Francisco and other cities as a result of successful operation of such a setup at Chicago's Midway Airport.

Use of fixed power outlets instead of mobile generators at Chicago is saving UAL some $3,000 yearly in maintenance and electricity costs alone, the carrier estimates.

The Midway Airport installation includes two fuel and two power pits for each of the six plane-loading positions. Fuel pits contain two 50-ft. lengths of 2½-in.-dia. collapsible hose which deliver fuel at 180 gpm. each. Plans are to raise delivery rate to 275 gpm.

This installation has completely eliminated the use of four gas trucks, says UAL. Also gone are the delays caused by trucks running out of fuel and the congestion and hazard of having the large vehicles maneuvering around the ramp. Fuel is pumped from nine 15,000-gal. underground storage tanks at 30-35 psi.

Power pits receive current from a battery of six rectifiers adjacent to the ramp. Rectifiers convert 480-v. three-phase current into 28.5-v. d.c. for planes' electrical requirements. One power pit is located to make its cable accessible to the underwing receptacle of the Convairs; the other is used to plug into the nose of Douglas DC-3, -4, -6 and -6B aircraft.

United also reports that it has established underground electric facilities at its Denver base and will make a similar installation at South Bend in the near future

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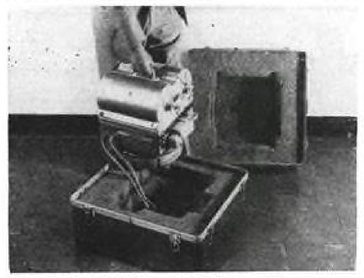
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Padded Fiber Glass Case Guards Delicate Devices

A line of fiber glass carrying and shipping cases for aircraft and electronic instruments has been developed by a San Francisco luggage maker. Formerly manufactured strictly for government use, the cases are now being made available to civilian firms by the maker, Koch of California.

Said to meet USAF's MIL-C-4150 specifications, the cases are specifically designed for the needs of individual pieces of equipment. Each case is lined with hair padding to fit the contours of the equipment being handled.

Upon closing the case, the hair padding—curled pig bristles bonded with latex—is compressed slightly thereby holding the equipment firmly in place. The company boasts a 100% performance record—no damage to cases or equipment—on some 30,000 cases being used by various government agencies.

Koch reports that parachute drop tests have been made with cases carrying a 175-lb. load from a plane flying 250 mph. at 600 ft. with no damage to case or its contents.

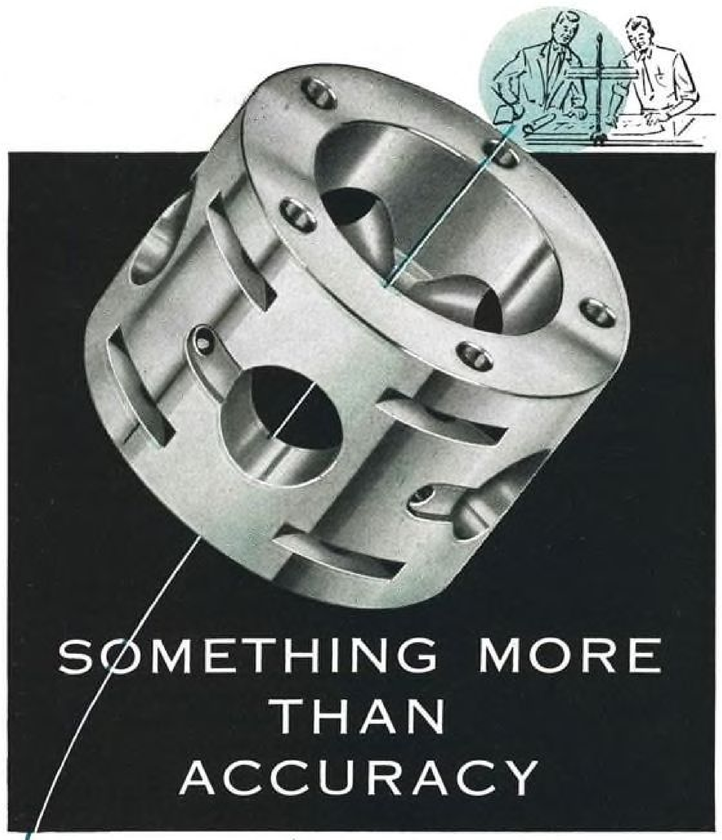
The Koch case is made of reinforced fiber glass impregnated with a polyester resin, having a tensile strength of 22,000 psi. Manufacturer reports that they are waterproof, have zero vapor and moisture transmission and remain unaffected by temperatures ranging from minus 65F to plus 160F.

Koch of California, 73 Beale St., San Francisco, Calif.

Standard Aircraft VHF Modified for Ground Use

Lear, Inc., announces a modification in its standard aircraft VHF radio package which transforms the unit into a versatile ground vehicle-to-tower, vehicle-to-plane or vehicle-to-vehicle communication system.

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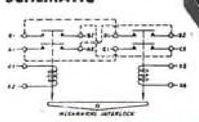
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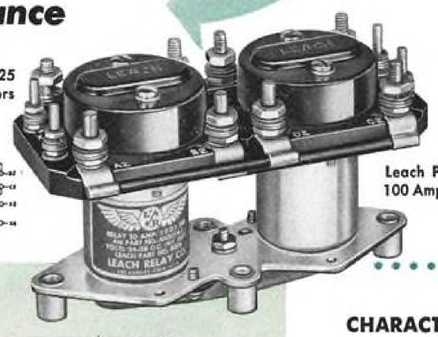
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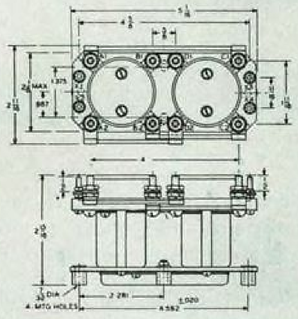
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Drop-out—3 v + 0, —2.5.
WEIGHT:
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(Supersedes AAF type C-2).
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COIL:
10 ohms, 24 v d-c intermittent duty (each coil).
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Drop-out—3 v + 0, —2.5.
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channel, crystal-controlled VHF transmitter.

A single 22-in. whip antenna is all that is required for both transmitting and receiving. Either speaker or earphones may be used.

According to Lear, a number of the systems are presently in use by aircraft manufacturers for plane-to-ground communication during flight tests, and by airport control in maintenance and crash vehicles for two-way communication with tower.

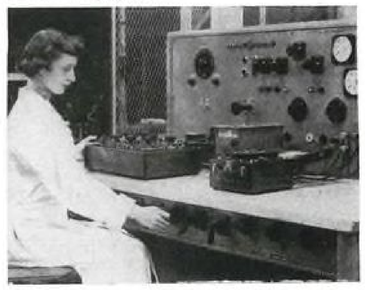
Big advantage claimed for the unit is its size. The complete package, less power supply, is said to be small enough to fit into an average automobile glove compartment.

Lear, Inc., LearCal division, 11916 W. Pico Blvd., Los Angeles 64, Calif.

New Console Calibrates Electrical Instruments

General Electric Co.'s special products section has developed an instrument standardization console for use in the development, design, and standardization or service calibration of electrical instruments.

GE engineers state that the unit supplies low-distortion regulated power in the audio-frequency range of 50-3000 cps., pointing out that this gives it definite application in the aircraft industry which requires 400 and 800-cycle instrument standardization. A.c. and d.c. voltage and current supplies are provided on conventional bus facilities up to 150 amp., 750 v.



Basic design principle of the equipment is the use of what GE calls "transfer standards" for the standardization of alternating current instruments.

These GE "transfer standards" are devices such as heater-type thermocouples and electro-dynamometer-type instruments, that respond identically to d.c. and the root mean square (rms.) value of a.c.

Thus, through the use of "transfer standards," a.c. values are transferred to more easily measured d.c. values. In this manner, says GE, the high accuracy and stability of d.c. potentiometer standardization equipment is extended

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Standard Relays

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The extensive line of Potter & Brumfield Standard Relays will meet the circuit requirements of a wide variety of applications. Wherever a P & B standard or slightly modified version can be used to solve your problem you gain these important advantages.

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3. **Fast Delivery**—Orders for standard relays can be filled from stock or with a minimum delay.
4. **Sold through Distributors**—Popular types available through P & B franchised Electronic Parts Distributors located in all principal cities.

A FEW OF THE MORE THAN 110 P&B STANDARD RELAY STRUCTURES



POWER RELAYS Two series—heavy and medium duty. For across the line power circuits, high current or high voltage switching. From SPST to 3PDT.



PLATE CIRCUIT RELAYS Actuate on a few milliwatts. Easy to adjust. Small—rugged—low in cost. From SPST to DPDT.



SUPER SENSITIVE RELAYS Operate on less than 10 MW. Dual coils, 10G vibration resistance. Wide versatility. One from C-SPDT.



GENERAL PURPOSE RELAYS For applications where space and weight are important. Withstand high shock and vibration. From SPST to 3PDT.



IMPULSE RELAYS Automatic stop prevents backlash or overtravel. Precise switching regardless of operating speed.



400 CYCLE AC RELAYS 15 gram or higher contact pressure. Withstand better than 10G shock. Heavy cast mounting foot. One form A to 2 form C.



MULTIPLE CONTACT RELAYS Longer coil gives power to actuate additional contacts and maintain 15 grams pressure. From SPST to 3PDT.



TELEPHONE RELAYS Four series meet practically all telephone type relay requirements. Short armature movement, long armature arm. Many contact combinations.



SUPER MIDGET RELAYS Tiny and rugged—plug in—one form C. High degree of resistance to vibration and shock.



MULTIPLE LEAF RELAYS For multiple circuit switching of power loads. Contact springs heavy tin-coated phosphor bronze. From SPST to 4PDT.



MOTOR STARTING RELAYS Voltage controlled to insure throwout of starting winding when motor reaches rated speed. Fast acting double break.



SUBMINIATURE SENSITIVE RELAYS Standard 7 pin plug-in. Ruggedized for vibration and shock. Operating power 25MW. Contact load 2 amps.



LATCHING RELAYS Compact—high contact capacity. Coils for either AC or DC current or voltage operations. From SPST to 4PDT.



HEAVY-DUTY SHOCK-PROOF RELAYS Can be mounted in any position. Particularly resistant to vibration and shock. From SPST to DPDT.



MINIATURE DC POWER CONTACTOR High current contact capacity and rugged construction. Contact pressure approx. 250 grams.

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HOW DID THE *screw* GET ITS NAME?



The word "screw" is supposed to come from the Latin "scrofa" which has been defined as "a digger," from the habit of swine, who are fond of rooting up the earth with their noses. However, at least one man disagrees with the explanation. He figures that the etymologists have picked the wrong end of the pig. To him, the curly tail looks more like a screw than the nose does. Heads or tails, tradition has made the word part of the language.

Today, Allmetal—maker of stainless steel screws, bolts, nuts, and many other stainless fasteners—owes its good name to a tradition of high quality and fast service. If you need anything from our line, just give us the word.

Our 96-page catalog contains engineering data and weights as well as sizes and dimensions of stock items. If you want a copy, send us a note on your letterhead. Ask for catalog 53S.

STAINLESS FASTENERS

ALLMETAL
SCREW PRODUCTS COMPANY, INC.
821 STEWART AVE., GARDEN CITY, L. I., N. Y.

into the audio-frequency range of calibration.

Two sections go to make up the GE console. The back or cabinet section contains most of the sub-assemblies, while the front or non-magnetic table section acts primarily as a work area.

The console is also provided with a regulator to give a stable voltage source to all components affecting calibration. Regulation provides sufficient stability for normal power supply variations. It is obtained over an input voltage range of 95-130 v. single phase, 50-60 cycles.

A rectifier unit and a filter unit make up the d.c. potential supply. A conventional full-wave rectifier circuit uses a three-stage filter to reduce 120-c. ripple to low value. A dry-type 6-v. battery can be used as a power source for low-voltage operation.

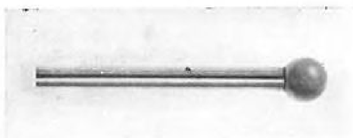
Power requirements for the console are 115 v., 60 c., 30 amp. The unit measures 6 ft. long by 5 ft. high, 4 ft. wide. Weight is 1,300 lb.

General Electric Co., Special Products Section, Schenectady 5, N. Y.

Precision Tooling Ball Speeds Jig Buildup

A new tooling ball that has hit the market consists of a straight shank with a high-precision ball welded onto the end of it. The shank portion is inserted in a hole drilled at intersection of station lines during construction of machine jigs and fixtures.

Direct measurement reportedly can be made on a line perpendicular to the ball tangent to any part of the jig or fixture, facilitating setup and layout.



Called a "tool maker's ball," this new unit is heralded as an improved development over former models which had been discarded over recent years because no method had been developed to produce them with sufficient precision to meet modern requirements.

Douglas Aircraft engineers in the methods development group at the El Segundo division devised a method to produce the balls to the necessary precision; Flabob, Inc., has been licensed to produce and market them.

The unit consists of a finely machined steel ball bearing flash-butt welded onto a cold rolled steel shank and finely machined. Ball diameters are within plus-or-minus 0.0002 in. Shank concentricities reportedly meet the same figure.

Flabob, Inc., 1301 W. 1st St., Los Angeles, Calif.

SPECIALIZED POWER from FAIRCHILD

JET POWER for a guided missile . . . take-off boost for a commercial or military transport . . . main power source for a piloted plane . . . these are potential uses for the Fairchild turbojet engines.

The J-44, now in production, was the first choice for the new high-speed, high-altitude Ryan Firebee target drone. This engine design, proving its worth *today*, has unlimited possibilities for *tomorrow*.

* * *

FAIRCHILD'S monocoque construction is another important development by an organization with over 25 years of power plant experience. Working for all three branches of the services, this development and production team is looking ahead to meet the challenge of *specialized power* on land, in the sea, and in the air.

J-44 SPECIFICATIONS

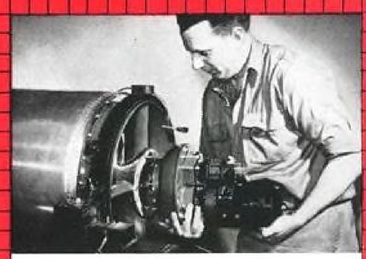
Announced thrust	*1000 lbs*
Weight	*300 lbs*
Length	*72 inches*
Diameter	*22 inches*



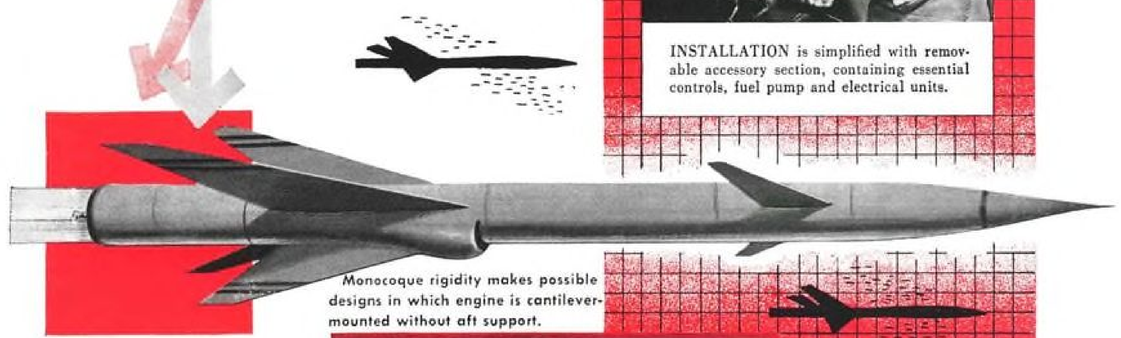
PRODUCTION, with unique monocoque construction, minimizes heavy castings and machined parts, speeds up manufacturing.



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INSTALLATION is simplified with removable accessory section, containing essential controls, fuel pump and electrical units.



Monocoque rigidity makes possible designs in which engine is cantilever-mounted without aft support.

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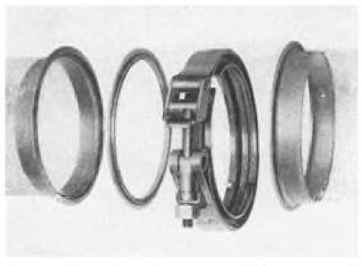


ALSO ON THE MARKET

Magnetic fluid clutch movement is offered to the commercial market after successful operation as a pen-recording meter movement in airborne military gear, according to manufacturer. Output shaft mechanism is said to deflect up to 120 deg. with maximum rated output torque of 5.25 oz.-in. at 4 milliamperes. Accuracy is claimed to be within 5%. Estimated life is over 3,000 hr.—Texas Instruments, Inc., 6000 Lemmon Ave., Dallas 9, Tex.

Safety wire twister, called Ziptwist, is said to produce either right or left symmetrical twists. Jaw of the twister is constructed to prevent marring, fracturing or denting of wire. Main advantage claimed for this tool is its ability to twist safety wires in small, hard-to-work-in areas without sacrificing uniformity. Ziptwist is made of hard-chrome finish.—Herco Products, 1311 W. Magnolia Blvd., Burbank, Calif.

Lightweight joint system for high pressures and temperatures in aircraft consists of two steel flanges welded to ducting, a V-band coupling for rapid assembly, and a self-aligning metal gasket for a positive seal. Unit is said to be



quite versatile since self-aligning seal can be readily replaced by specially designed valves or filters when necessary. —Marman Products Co., Inc., Los Angeles, Calif.

Pressure transducer for measurement of gage or differential pressures in the 0-0.05-psi. range can be used with a wide variety of recording, indicating and control instruments. Stainless steel diaphragm permits operation with corrosive fluids. Useful in investigation of static and dynamic pressures, the element is claimed to be the lowest mechanical-energy system of strain-gage type yet devised. Pressure applied to diaphragm is translated into exact electrical equivalent by full-bridge transducer, employing unbonded strain wire principle. Output is 3.5 millivolts/volt full-scale open circuit.—Statham Laboratories, Inc., 12401 Olympic Blvd., Los Angeles 64.

LEAR VGI SYSTEM ...SIXTH SENSE FOR THE BOEING B-47

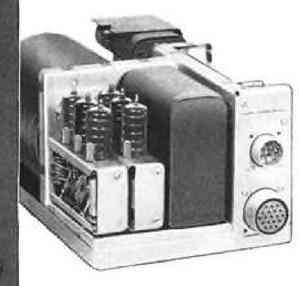
IN HIGH-SPEED maneuvering hazardous errors are introduced by conventional attitude indicating instruments. For greater safety, the jet plane needs something *special* in the way of an attitude indicator. For the Boeing B-47 and other jet bombers and fighters, this critical function is performed by the Lear Vertical Gyro Indicator System.

Operating as the plane's "sixth sense," the Lear VGI system is designed to measure and display deviation from horizontal flight with near-perfect accuracy and speed. All necessary gyros, amplifiers, and power supplies are contained in one compact unit which is remotely installed, transmitting pitch and roll intelligence electrically to the flight attitude indicator. The Lear VGI may also be used as a master vertical reference for an autopilot, radar, or other equipment.

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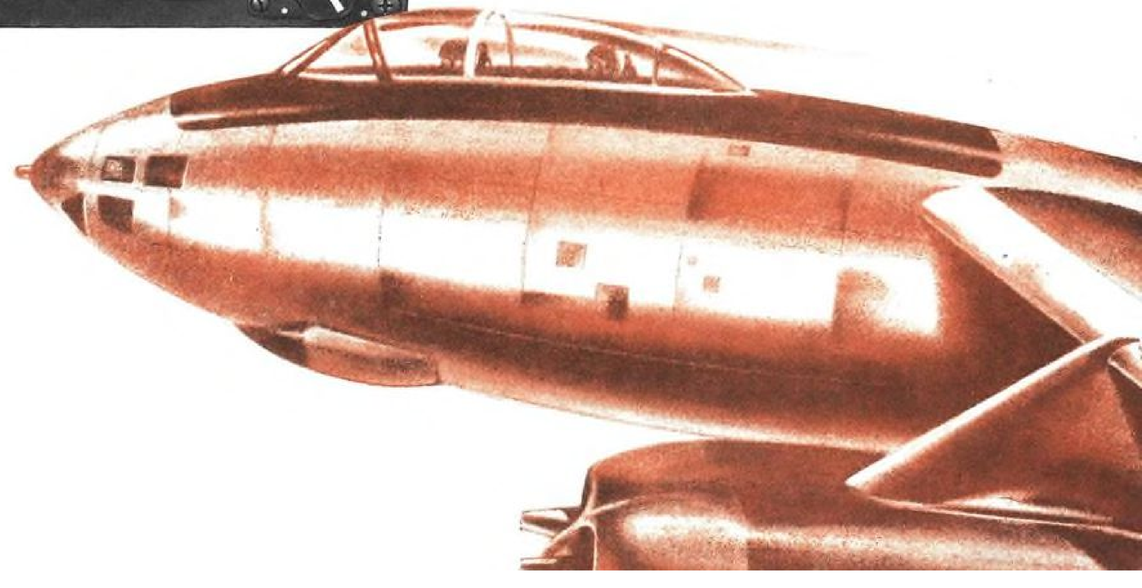
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LEAR VGI SYSTEM Non-tumbling horizon gyro (in roll), provides greatly improved accuracy, reduced turn errors. The system includes 24,000 rpm gyro motor and a highly sensitive Lear electrolytic erection switch.

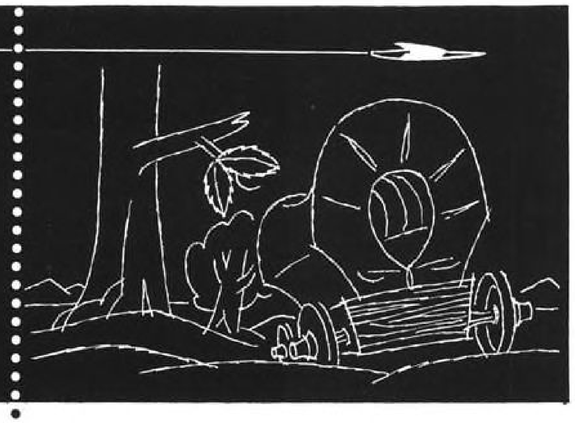
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(b) Determination of armament systems configurations and equipment characteristics.
(c) Analytical development of autopilot, radar, fire control and turret systems.
REQUIREMENTS: BS or MS in EE or ME or physics. Experience in the same field or allied field.

ONE OPENING

POSITION: Systems Analysis Specialist.
LOCATION: Analytical Section of Development Engineering.
DUTIES: Specialist in operations research. Analysis of aircraft tactical attack problems. Evaluation of detection, acquisition and destruction probabilities of aircraft armament systems.
REQUIREMENTS: Capable of applying probability theory and statistics. With or without Ph.D. No previous experience necessary if Ph.D.

ONE OPENING

POSITION: Hydraulics Engineer
LOCATION: Special Systems Section of Development Engineering.
DUTIES: Analysis and design of hydraulic valves, pistons, actuators and servomechanisms.
REQUIREMENTS: Six or more years experience in allied fields. Engineering degree -- BS or MS in Engineering.

ONE OPENING

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DUTIES: Supervise field installation and flight testing activities of auto pilot development field work. Also, customer liaison with design engineering staff.
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AIR ARM DIVISION

BALTIMORE, MARYLAND

IATA Sets Stage for New Inter-Line Rates

- **Round-the-world coach fares asked by delegates.**
- **Honolulu meeting to act on major airline issues.**

By Lee Moore

Montreal—Chief executives and delegates representing 67 of the world's airlines paved the way to solution of controversial inter-line rate and operations decisions during International Air Transport Assn.'s seven-day ninth annual general meeting here.

They set the stage for settlement of most major debates on rates, rules and agency relations at the IATA traffic conference in Honolulu next month.

▶ **$1-Million Budget**—Delegates approved the new IATA administrative budget of nearly $1 million, including a substantial increase for the enforcement office—apparently unable to police member activities sufficiently to date.

The meeting also approved replacement of the Traffic Committee with a standing Traffic Advisory Committee headed by a full-time director.

Delegates scheduled the next annual general meeting for Paris next September.

▶ **Future Projects**—Among the proposed actions discussed by the world's top airline executives:

- **Round-the-world** aircoach rates.
- **Seasonal load** factor correction.
- **Airfreight** rate cuts.
- **Freight** consolidator contracts.
- **Double-standard** aircraft economics, half coach and half first-class in the same plane.
- **How to handle** "no-show" passenger ticket rebates.
- **New safety** performance regulations being prepared by International Civil Aviation Organization.
- **How to combat** increased fees and taxes.

Briefs of the IATA committee reports to the general meeting, and some airline attitudes thereon:

Traffic Committee

The traffic committee is being replaced by a Traffic Advisory Committee that will concentrate on preparing the way for agreement on economic resolutions to be adopted at Honolulu.

F. von Balluseck, of KLM Royal Dutch Airlines, reported:

- **Airfreight forwarders.** Freight forwarders will become a big factor in international airfreight when IATA cuts its rates on bulk shipments, expected this winter. This is because there will be an incentive to consolidate shipments. The airlines are divided sharply on how to make sure the savings from their own rate cuts are passed on to shippers rather than largely absorbed as profit by the consolidators.

Some carriers insist that association members must regulate this by making rate contracts with the forwarders. Others say the best way would be to eliminate the proposed sharp "break point" on rates for large bulk shipments, in effect tapering tariffs much as they are now. But the aggressive group says this would eliminate the competitive volume and cost advantages of the proposed cuts.

A majority of the committee believes a cargo agent should be able to charge less than IATA rates when he is acting as a consolidator. But there were dissenters.

- **Absorbing passenger expenses.** Airlines from different areas could not agree on whether it was proper to continue permitting carriers to absorb hotel and other expenses when a passenger must lay over to make connections.

Some say this cuts overall rates, in effect, and that the airlines should concentrate on selling transportation only. They also argued the IATA aim of mass transportation changes the emphasis from such services previously offered to preferred air travelers.

Proponents of layover cost absorption say there are times when this is necessary to compete with other carriers offering through service without stopover. These members contend that IATA should concentrate on avoiding airline abuse of this practice, rather than eliminating it.

- **Carrying hazardous cargo.** Members agreed on standardized regulations for accepting and packing "restricted articles," patterned on U. S. practice.
- **Reservations for "no-shows."** Association members have not entirely standardized treatment of passengers who make reservations, then fail to show up for departure. Importance of this problem was highlighted by a re-

IATA Committee Memberships Appointed At Annual General Meeting

Executive Committee: John C. Leslie, vice president, Pan American; Rene Briend, commercial director, Air France; Croil Hunter, chairman Northwest Orient Airlines; Per A. Norlin, president, Scandinavian Airways System; Gregorio Obregon, president, Avianca; Prince Marcantonio Pacelli, Linee Aeree Italiane; Dr. Walter Berchtold, president Swissair.

IATA Executive Committee: Reappointed—Lord Douglas of Kirtleside, W. Hudson Fysh, Sir Leonard M. Isitt, J. Ronald McCrindle, Gilbert Perier, Warren Lee Pierson, Dr. Albert Plesman, Mohammed Roushdy, Paulo Sampaio, J. R. D. Tata, Gen. C. J. Venter.

Financial Committee: To serve until 1954 AGM—L. S. Holstad (NWA); K. A. Lawder (Panagra); V. J. Long (AA); M. Van Pelt (KLM); M. J. Plodinec (TWA); J. S. Woodbridge (PAA). To serve until 1955 AGM—H. Bernstrom (SAS); P. Brabant (Sabena); R. P. Hartley (CAA); R. Montarnal (AF); B. Smallpeice (BOAC); R. L. Weir (BEA).

Legal Committee: To serve until 1954 AGM—Miss G. N. Cowasjee (AII); H. J. Friendly (PAA); R. Golstein (Sabena); M. Lemoine (AF); H. E. Marking (BEA); George A. Spater (TWA); Sune Wetter (SAS); D. J. Zepos (TAE); A. Schweickhardt (Swissair). To serve until 1955 AGM—P. J. Brennan (ALT); Samuel E. Gates (AA); K. H. Staple (BOAC); W. A. Steenstra-Toussaint (KLM); James Clark (CPA); Juan Viniegra (Iberia).

Technical Committee: To serve until 1954 AGM—J. Adam (SAA); J. J. Van Balkom (KLM); A. C. Campbell-Orde (BOAC); J. R. Cunningham (UAL); J. T. Dyment (TCA); A. C. Gazdar (AII); K. Hagerup-Svendsen (SAS); J. W. G. James (BEA); A. A. Priester (PAA). To serve until 1955 AGM—J. C. Kelly-Rogers (ALT); P. Goldsborough (TWA); R. Dupre (AF); I. C. McOran-Campbell (CAA); A. Vernieuwe (Sabena); M. E. Cahill (NWA); W. T. Arthur (Delta); J. Kinkade (PAL); P. M. Reddy (Deccan); P. Venturini (LAI); F. Zimmerman (Swissair).

Traffic Advisory Committee: To serve until the end of the Composite Traffic Conference in 1954—F. von Balluseck (KLM); E. O. Cocke (TWA); M. De Villeneuve (AF). To serve until the end of the Composite Traffic Conference in 1955—S. K. Kooka (AII); P. C. F. Lawton (BEA); W. G. Lipscomb (PAA).

Medical Committee: To serve until 1954 AGM—Dr. A. Allard (Sabena); Dr. M. Baeza (LAN); Dr. K. E. Dowd (TCA); Dr. C. P. Fenwick (CPA); Dr. A. Robert (AF); Dr. F. H. Shillito (PAA); Dr. K. L. Slotboom (KLM); Dr. J. Tillisch (NWA); A/M Sir Harold Whittingham (BOAC). To serve until 1955 AGM—Dr. T. Bernardo (PAL); Dr. A. Buchanan-Barbour (BEA); Dr. H. B. Dye (TWA); Dr. A. Hassenein (Misrair); Dr. A. Jordi (Swissair); Dr. G. Kidera (UAL); Dr. N. Sundgren (SAS); Brigadeiro E. Tostes (PAB); Dr. J. F. C. du Toit (SAA).

port that U. S. and Canadian airlines lose $25 million in revenue each year on no-shows.

The committee decided customer psychology and other problems are so complex that a fact-finding survey group made up of reservations personnel should be set up to study it.

• **Consolidated tariffs.** Committee agreed all IATA world tariffs might be published by the organization, but financing problems deferred any firm program.

• **Air waybills.** Committee recommended a standard waybill for all airline traffic on the standard used by IATA for inter-line traffic. Traffic conferences adopted the recommendation.

• **"Facilitation" of customs, etc.** Traffic committee reported that members show increasing efforts to press governments into cutting their border red tape along lines set down in Annex No. 9 of ICAO.

Traffic Conference

Dovetailing into the traffic committee report were recommendations from the Cannes, France, traffic conference that set most of the current rates and resolutions. Chairman Dennis Handover, of Scandinavian Airlines System, wrote its report.

• **Next conference.** Handover said the coming Honolulu meeting should run much shorter and smoother than the 38-day Cannes conference. Main reasons cited for the Cannes delays were the controversial new aircoach and agency rate-cut proposals on the agenda and lack of full preparation of the issues by the fares, rates, charges and schedules subcommittees. Commitment of the carriers to a full year's effectiveness also made some companies skittish, he added.

• **Double-standard planes.** Honolulu conference must make a definite decision whether to permit airlines to seat both coach and luxury passengers in the same plane, the committee reported. This debate set off the liveliest exchange at the Montreal assembly.

One faction, notably Pan American World Airways and Trans World Airlines, argued that this, in effect, upgrades the coach service and therefore is unfair competition.

But some airlines say they had to run "mixed equipment" to avoid the burden of buying much more equipment to maintain schedules for both classes. They also contend that requiring more schedules would run them into trouble on bilateral agreements with some governments limiting service volume.

• **"B" class fares.** Airlines argue whether some carriers with inferior equipment on local routes should be allowed to charge lower rates, now that aircoach service is established. This coach vs. "B" class will be discussed at Honolulu.

• **Europe fares.** Over the years, fare upon fare has built a chaotic rate structure in Europe. It is time to work out a reasonably standard rate per mile there, Handover said.

• **Cargo rates.** A giant inter-airline war may result at Honolulu between lines backing all-cargo service and carriers that consider airfreight as a "fillup" for passenger planes, the traffic chairman indicated.

• **Nonstop routings.** New planes and airway aids making possible shorter, Great-Circle routes may upset the present rate structure, Handover said.

• **Cabotage.** The committee urged governments to exercise restraint in taking advantage of their right to set rates within the country when this causes large fare differentials for competing carriers.

Executive Committee

J. Ronald McCrindle of London delivered the report of the executive committee.

He noted that the new standing traffic advisory committee wants the three rate chairmen and six experts to focus problems on the agenda before the whole conference meets each year. Previously, he said, it took the main conference at least three days to sort the problems and more time was lost while delegates checked back with their companies for policy on the issues.

The executive committee set up the new traffic advisory committee on recommendation of the "Briend Report," prepared for it by a special committee headed by Rene Briend.

Other action:

• **Mail rates.** The committee plans to keep after the postal administrations of individual governments in the hope of persuading the next Universal Postal Union conference to adopt uniform rates.

Some governments cut rates paid to carriers but do not pass the lower tariff on to the public—so rate cuts do not bring the necessary volume increase, it was explained. Differing rates also work competitive disadvantages on some carriers in the Europe-Near East area, because of the particular route.

• **Enforcement.** Executive group recommended and got a larger enforcement staff for 1954 to increase speed and thoroughness of action.

Technical Committee

Chairman J. C. Kelly-Rogers, deputy general manager of Aer Lingus Teroanta, said the most important problem facing the airlines is development of a new performance code of safety regulations by ICAO's Standing Committee on Performance (SCP).

• **New performance regulations.** Kelly-Rogers urged operators to keep abreast of the work, although ICAO cannot make initial findings for another eight months. Problems include gathering adequate meteorological data from some governments, applying the standards to turbine aircraft and the question of retroactive application to present types.

• **Non-conventional runways.** The committee noted that largely due to IATA efforts, ICAO now allows properly cleared unpaved runway extensions to count as length for takeoff and landing.

• **Temperature-humidity.** Present ICAO correction factors are inadequate, Kelly-Rogers reports, and ICAO recently decided to adopt runway length requirements almost identical with those proposed by IATA.

• **Visibility measurement.** Nations are being urged to adopt the newly developed runway slant visibility criteria to decide if an airport is clear. This should greatly increase efficiency and avoid needless diversions to alternate airports.

• **Coach seating density.** Safe and economic aircoach seating capacities vary so much between plane types that no overall formula can be developed, the committee decided.

• **Turbine fuel.** IATA has formed a special technical group to search for an ideal standard turbine fuel to be available at airports throughout the world—preferably as a presently marketed product to ensure reliable, economic operation.

Financial Committee

Chairman J. S. Woodbridge, Pan American comptroller, said inter-airline accounting must be simplified. Accuracy is "costing more than it is worth."

Woodbridge also reported:

• **Distance instead of dollars.** IATA clearing house at London has experimented, in cooperation with five airlines, with accounting for interline transactions in units of distance traveled instead of currencies owed. They found this would be possible on trans-Atlantic traffic, but fare and route variations in Europe made extension of the system impossible at this time.

• **Currency controls.** Committee negotiated with the organization for European economic cooperation in freeing airlines from some postwar currency controls.

Legal Committee

Chairman Henry J. Friendly, PAA vice president and general counsel, reported "substantial gains" in cutting away the legal underbrush in the path of simple and easy interline bookings of passengers and cargo. This welds the routes of individual airlines "into a single worldwide public utility network," he said.

A LONG LOOK AHEAD Second of a Series of Six Articles on Air Transport Markets in the Next Ten Years:

Growing Population, Shifting West, to Bring Travel Changes

BY THE MCGRAW-HILL DEPARTMENT OF ECONOMICS

Changes in population played a big part in the postwar prosperity. Some of the basic population trends have slowed down a little. But they will continue to be major economic factors in the future—and some of these trends have great significance for the transportation industries.

1) **THE POPULATION IS GROWING FAST.** The number of people in the United States grew twice as fast in the '40s as in the depressed '30s, and it is growing even faster today. Barring a severe depression, the population is expected to go on expanding rapidly for the next two decades. By 1965, there may be between 180 million and 190 million people in the United States, compared to 152 million in 1950. And if economic conditions—which affect birth rates—stay especially good, more than 200 million people probably will be living in the U. S. before 1970.

More people means more passengers—that is obvious. But population growth will not contribute as much to growth in travel in the near future as the figures above might indicate. That is because most of the current population growth is in the very young age groups, which travel at lower fares, or by car, or not at all. Most of the older groups—20 years and up—are expanding, but not so fast as in the last few years. The big growth in these classes will not come until the '60s.

Still, population is growing. And some of the other population trends are just as important for the airlines as total growth.

2) **THE POPULATION IS SHIFTING** across the country, to the West and Southwest. Between 1940 and 1950, the West Coast picked up population about five times as fast as the northeastern states, and four times as fast as the South. And they still are gaining on the rest of the country.

The long-range implications of this movement for the transportation industries are tremendous. A big population on the West Coast means more and more cross-country travel—longhaul travel ideally suited to the airlines. Unless something happens to reverse the westward movement in population—and there is no sign of it—cross-country travel will be a growing force behind air traffic for a long time.

The cross-country movement means that people are more spread out than they used to be, in one sense. But actually they are increasingly bunched up together, in much larger clusters than in the past.

3) **TODAY,** people are moving rapidly to large cities and their suburbs. In 1950, about 56% of all Americans lived in what the Bureau of the Census calls the 168 "standard metropolitan areas"—"central" cities of 50,000 or more, plus the territory immediately around them. Population of these areas grew by 22% in the '40s. That is a terrific rate, compared to the 14.5% growth for the country as a whole.

This concentration is a big booster for the air travel market, since most air travel originates in large cities. And it broadens the air travel market in another way, too. Except on vacations, most people travel in order to see other people. With more and more persons living in or near large cities, travel will be increasingly intercity, rather than between the country and city. And high-density intercity travel is ideally suited to the airlines.

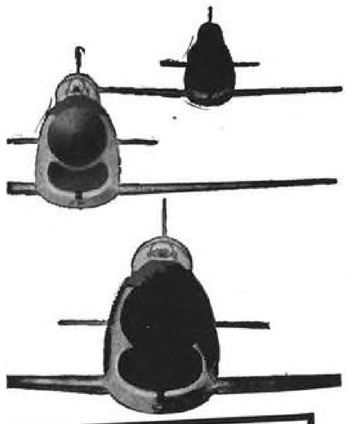
4) **THE SUBURBS** show the most striking population growth of all. Areas around the 168 central cities grew by more than 35% between 1940 and 1950—almost two and one-half times as fast as the country as a whole.

Suburban growth offers both a problem and an opportunity for the transportation industries. More people than ever before live in the suburbs and work or shop in the cities. They have to be carried back and forth somehow. So far, railroads and highways do most of the transporting. But railroads find it difficult to carry commuters at a profit, because the nature of the traffic—high in early morning and late evening, almost non-existent the rest of the day—leaves expensive equipment idle most of the time. The highways and city parking facilities are so inadequate that they can be improved only at tremendous cost. And the airlines, of course, are entirely out of the picture.

But what about the helicopter? On the surface, at least, it seems ideally suited to this big and growing market for transportation. It does not involve the tremendous public expenditures that adequate highway and parking facilities would—a single mile of superhighway often costs several million dollars. And the helicopter has two big advantages over railroads for carrying commuter traffic. It does not require as much expensive urban real estate. And it can be shifted easily from commuter service to short intercity service at the slack commuting periods.

The problem here is one of cost and technological development, and whether helicopters can be used profitably on a large scale remains to be seen. But the market is certainly there, and it's growing.

These are the basic trends in population that affect the transportation industries—it is growing fast, moving West, concentrating in and around the larger cities in the United States. All three developments were accelerated in the past few years, by war and super-prosperity. The chances are that they will operate more slowly in the near future, at least for a while. But they are all long-term trends that will continue, barring a major change in the economy or the world situation. And they will continually change the market pattern for the transportation industries in favor of air transportation.



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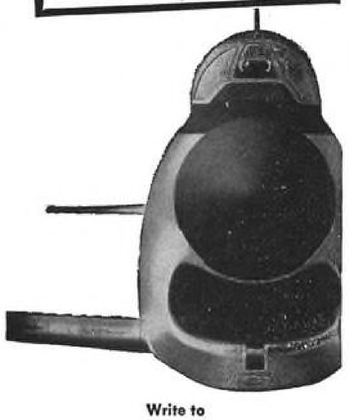
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FORWARD-FACING seat (arrow) in torn cabin remained intact, was protected by galley.

CIR Calls for Stronger Cabins

By Frank Shea, Jr.

Had aft-facing seats been installed in the National Airlines DC-6 that crashed at Elizabeth, N. J., Feb. 11, 1952, the toll still would have been approximately 27 killed and 23 injured.

This conclusion is reached in a complete analytical report on the crash soon to be released by Crash Injury Research, Cornell University Medical College.

▶ **Direction of Forces**—It was not a question of the direction in which seats were facing, the report says, but more a question of the direction of forces imposed on the aircraft. In this case the forces were lateral.

The plane struck the ground at approximately 140 mph., nose down at an attitude of 10 to 15 deg. Upon impact, forward half of fuselage disintegrated. Rear half remained semi-intact, was torn from center wing section and hurtled through air until it jackknifed around a large tree.

▶ **Excessive Side Load**—In the rear cabin, lateral forces were caused by flexion of the walls. Seats pulled out because of the excessive side load. All seats are designed to withstand a minimum load of 6G, from front or rear but only can handle side loads of approximately 1½G.

"One thing learned from this crash," says A. Howard Hasbrook, CIR's chief accident investigator, "is that present side-load factors are not sufficient, they must be increased.

▶ **Built for 35G**—"With regard to aft- or forward-facing seats however, . . . we have no data from this or from previous crashes to indicate that aft-facing seats of present-known design will provide appreciable realistic increase in safety for the kind of accidents and type of survivable accidents being sustained by present aircraft structures."

A strong point in favor of forward-facing seats under present conditions, he says, is that they have twice the retention strength of aft-facing seats.

Hasbrook indicates that rearward-facing seats might be conceivable if 35G loads ever should be reached.

CIR feels, he says, that no fair evaluation can be made for one seat against the other until data is recorded from accidents in which both types of seats are used. To accumulate sufficient data, he adds, would require the cooperation of accident investigation groups from many countries.

▶ **Prime Disintegration Area**—Pointing up the lack of sufficient data for comparison, Hasbrook refers back to the National crash: "This aircraft contained four aft-facing seats. Four of five passengers (mother was holding baby) occupying these seats were fatalities. You can't use this as a basis, however, since all of these seats were in the forward cabin—a prime disintegration area."

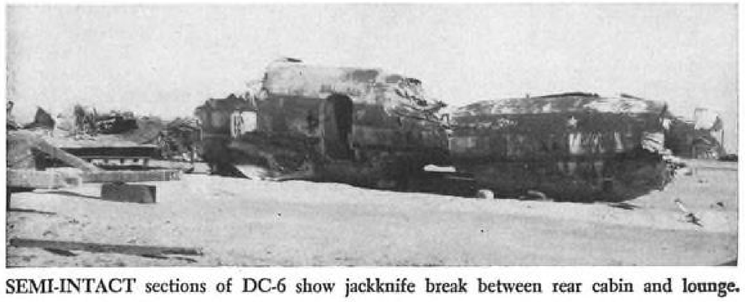
One fact ascertained from data compiled in recent accidents, Hasbrook adds, is that regardless of which direction seats face, seat strength should be integrated with basic transport design in order that full use may be made of the aircraft structure for "passenger tie-down."

▶ **Recommendations**—In addition to calling for an increase in side load factors, CIR's report on the Elizabeth crash includes these recommendations:

- **"Delethalization"** of cabin components along the lines of the safety features built into seats of Convair 240s for protection of passengers that might be thrown forward.
- **Strengthening of buffet units** in cabins to afford maximum support upon impact.
- **Adequate tie-down** of tear-free items in the cabin, such as fire extinguishers.

CIR believes shoulder harnesses would provide additional protection but points out that this would meet with strong passenger resistance on commercial carriers.

"It could work with the military, however," Hasbrook says, "since passengers on military aircraft are obliged to obey regulations."



SEMI-INTACT sections of DC-6 show jackknife break between rear cabin and lounge.

Australian Lines Agree To 'Fair' Competition

Differences between privately owned Australian National Airways and the government-owned Trans-Australia Airlines have been resolved after three months of talks that placed the carriers on a "fair competitive footing."

Each operator is reviewing existing services to avoid over-scheduling and to reduce wasteful operation.

Duplication of services will be eliminated on two feeder routes, now flown by both operators at a loss.

In addition, TAA will relinquish service to the Riverina area of New South Wales and ANA will relinquish flights between Townsville and Mt. Isa, Queensland.

Both airlines will continue to operate on a competitive basis over Australian trunk air routes.

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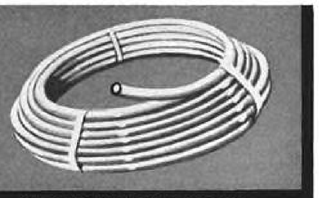
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VHF Snag

- **FCC rejects UAL radio network arrangement.**
- **Action jeopardizes other AT&T-airline proposals.**

Plans for a United Air Lines route-wide network of 70 VHF radio stations to be owned and maintained by American Telephone & Telegraph Co. (AVIATION WEEK Feb. 2, p. 11), received a serious setback when the Federal Communications Commission recently rejected the basic arrangement on which the program was predicated.

Aeronautical Radio, Inc., presently operating all radio facilities for the airlines as a single FCC licensee, proposed to lease AT&T VHF facilities along UAL's routes. Existing airline communications stations are either owned by Arinc or leased to it by individual airlines. Arinc then prorates cost of its services among the airlines.

▶ **The Reason**—The FCC rejected the new plan because "it cannot be determined that Arinc would have sufficient interest in the stations to assure the exercise of that responsibility for (their) operation (which is) expected of the licensee."

AT&T had proposed to provide a completely integrated system, including interconnecting phone lines. Because UAL's routes parallel the telephone company's continental microwave network in many areas, most of the VHF stations could be erected on the microwave sites and be maintained by telephone personnel.

Under those circumstances, FCC concluded that Arinc would not have the direct control exercised over its existing communications facilities.

▶ **High Stakes**—The FCC action raises a serious obstacle to the entry of AT&T into the field of airline radio communication services at a time when several other airlines have shown sufficient interest in the plan to entertain proposals. The list reportedly includes Trans World Airlines, Eastern, Western, and Capital Airlines. AT&T is said to have set aside $8 million to cover capital outlays and system development costs.

▶ **Alternative**—One way around present FCC objections would be for AT&T to bypass Arinc and apply directly for a license, but this would raise other problems:

The FCC may be equally reluctant to license a commercial communications operator in the safety and special services field, previously reserved for non-profit use, an FCC spokesman indicated to AVIATION WEEK. This alternative would raise the questions of government control of rate structure and also would put AT&T into competition with Arinc for assignment of aviation frequencies.

An Arinc spokesman told AVIATION WEEK that he doubted AT&T would make direct application to FCC for license in the airline communications field.

▶ **Heads Together**—Meanwhile, Arinc and telephone officials have their heads together trying to devise a new lease arrangement which will meet with FCC approval. FCC views on the original proposal were made known to Arinc by letter giving the commission's views to allow Arinc to amend its petition before it comes up for consideration at a formal hearing.

Arinc could press for a hearing on the original proposal, but such action seems doubtful in face of the present expression of FCC opposition. Arinc intends to investigate other means of providing interconnected VHF network services for interested airlines in the event that an arrangement with AT&T proves impossible, a spokesman told AVIATION WEEK.



NWA READIES DC-6B SERVICE

A new Douglas DC-6B in Northwest Orient Airlines markings, the first of which is scheduled to go into Hawaii tourist service Nov. 16 on a three-times-weekly basis from the carrier's Seattle-Tacoma-Portland gateway. NWA is getting two more DC-6Bs this year and another in 1954. They probably will be fitted to take 74 tourists on transcontinental flights, officials of the carrier say.

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CAB ORDERS

(Oct. 5-11)

GRANTED:

Consolidation of route extension applications of 10 airlines in the "additional North-South service to Tulsa case." Complex case involves most routes from Northeastern U. S. to the Southwest and to the West Coast.

North Central Airlines permission to overfly Eau Claire, Wisc., on some Winona-Minneapolis flights, provided Eau Claire gets one roundtrip a day.

Pioneer Air Lines same renewal date, Sept. 30, 1954, for certificates on various route segments instead of expirations at separate times.

Air Carrier Mechanics Assn. intervention in States-Alaska route case.

Bonanza Air Lines mail subsidy increase proposed in showcause order of Sept. 16.

APPROVED:

Braniff Airways amended certificate dated Sept. 25. Effectiveness was delayed pending court review appeal by Continental Air Lines, now withdrawn.

Southwest Airways request to withhold from public disclosure a contract filed at CAB Aug. 3.

American Air Export & Import Co. request to withhold from public disclosure a contract filed with CAB Sept. 21.

Airborne Flower and Freight Traffic (freight forwarder) acquisition of control of Airgo International Corp., a cargo agent for members of International Air Transport Assn.

Routine inter-airline contracts of 23 groups of parties.

Air Traffic Conference of American changes in airline rules on free-baggage allowances.

Universal Air Travel Plan changes made by domestic and foreign airlines. Revised UATP manual is filed with CAB.

Alaska Airlines request to suspend service at Stebbins, Alaska, until adequate landing facilities are constructed.

STARTED INVESTIGATING:

Non-certificated airlines' applications to carry first-class preferential mail as airfreight. Questions CAB will investigate: Can the Board grant exemption for mail carriage by carriers without a mail certificate? Who would fix rates for such carriage? Would permission imply subsidy guarantees in case of need?

DISMISSED:

Investigation of liability restrictions on tariffs of Caribbean-Atlantic Airlines.

Braniff Airways application to serve Bartlesville, Okla., between Kansas City and Tulsa. Braniff withdrew the request.

Aerovias Sud Americana and North American Food Carriers requests for exemption. They withdrew their application.

DENIED:

Pan American World Airways complaint against reduced fares of Transocean Air Lines between California and Hawaiian Islands.

Southwest Airways pilot application to intervene in Bonanza Air Lines' route renewal case.

Little Rock, Ark., petition to intervene in Ozark Air Lines route renewal case.

Canadian Lines Fight For Aircoach Traffic

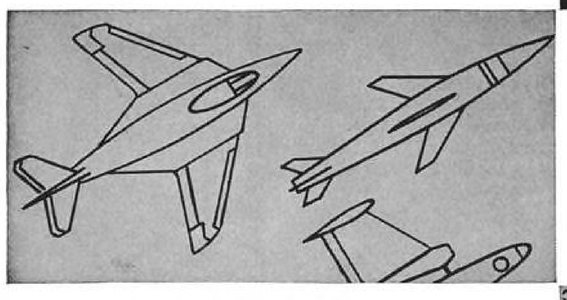
A fight for tourist air travel is shaping up in Canada. Newly organized Pacific Western Airlines started the ball rolling by filing the first application to Canada's Air Transport Board for permission to operate Class 2 aircoach service between Vancouver and Winnipeg via Calgary, Edmonton, Saskatoon and Regina.

Fares were proposed at a level approximately 30% lower than existing first-class rates.

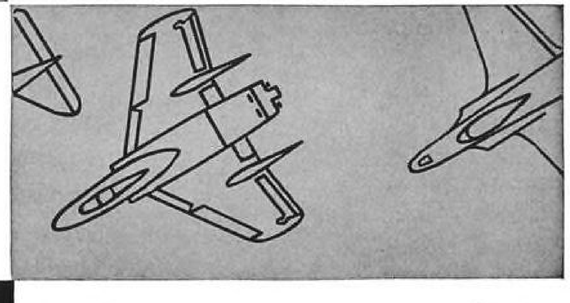
PWA's application was followed by an announcement that Trans-Canada Air Lines would inaugurate coach service by Feb. 1, 1954, if ATB approves proposed fares at 20% less than first-class tariffs.

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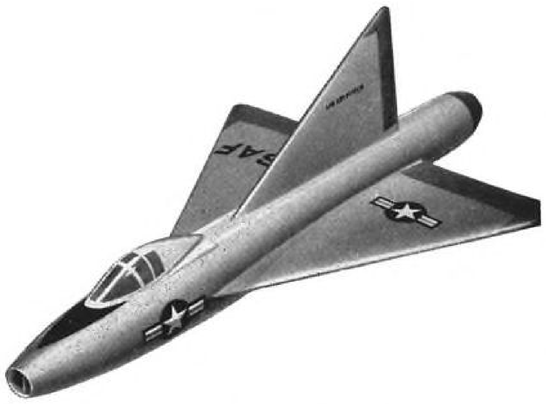
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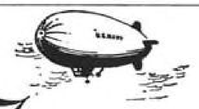
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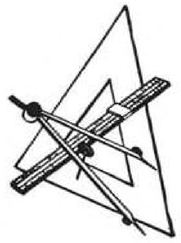
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P-9214, Aviation Week
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SHORTLINES

► **Air Industries and Transport Assn.** reports Canada's scheduled airlines carried 1,548,237 passengers in 1952 with only one fatality, a pilot. It was the fourth year since 1948 that no passengers were killed in Canadian airline disasters.

► **Aquila Airways, Ltd.,** "Britain's only flying boat operator," will operate two 42-seat Solents and one 31-seat Hythe this winter. Company says summer traffic doubled last year. Aquila recently bought two Solents and two Hythes. Solent starts service in December, the Hythes will open new routes "next year."

► **Avianca** Colombian airline has purchased two DC-4s from Scandinavian Airways.

► **Brazilian International Airlines** has ordered two Douglas DC-6s for New York-South America in early 1954. Company already has ordered 20 42-seat French Noratlas transports for delivery October 1953-June 1954 for domestic Brazil service.

► **Northwest Orient Airlines** will put tourist fares into effect on trans-Pacific Stratocruiser flights between the United States and major cities in the Far East Nov. 8.

► **Pan American World Airways** has provided trans-Atlantic tourist service between Paris and the west coast of South America via the U. S. PAA schedules less than a 24-hr layover in New York and Miami so that transit can be accomplished without passengers obtaining U.S. visas. Connections are made in New York for incoming Paris passengers for a Panagra flight to South America . . . Airline has increased its all-cargo flights between Miami, San Juan and Caracas, Venezuela, from two to 10 a week; another roundtrip is being added between New York and San Juan for a total of eight flights weekly in each direction.

► **Philippine Air Lines** and Sabena, Belgian airline, have entered into a general sales agency agreement to give added sales strength to representatives of both companies.

► **Pioneer Air Lines** has added Mineral Wells, Breckenridge and Snyder to its Texas routes.

► **Sabena** will begin New York to Manchester, England, nonstop weekly service Oct. 29, putting the center of industrial Britain only 12 hr. from the U. S. via DC-6 . . . Airline is limiting its Royal Sabena first-class DC-6 flight to 28 passengers, effective Oct. 17, in order to provide a more luxurious flight. The service formerly carried 38.

► **Scandinavian Airlines System** will provide 1,130 weekly accommodations to Europe next summer, using 34-passenger DC-6B deluxe flights and 71-passenger tourist flights.

► **Southern Airways** has added Monroe, La., to its new service in the Mississippi valley.

► **Swissair** plans to introduce scheduled DC-6B service between Switzerland and South America early next year, will step up frequency of weekly flights to New York in 1954.

► **Trans-Canada Air Lines** will start DC-4 tourist service by Feb. 1. Fares will be reduced by about 20% . . . Carrier will begin weekly Toronto-London flights via Montreal Nov. 1 . . . Company has inaugurated "family fare" system.

► **Trans World Airlines** reports aircoach passengers accounted for 45% of the 1,917-million revenue passenger-miles flown by TWA in the first eight months of the year. In August, the airline set a single-month record with a total 231,724,000 revenue passenger-miles flown on domestic routes and 57,414,000 on international routes.

► **United Air Lines** flew about 1,000 roundtrips between San Francisco and Tokyo for Military Air Transport Service and carried more than 25,000 troops before it ended its 39-month contract Oct. 1. . . . Carrier has submitted the only bid on a 40-yr. lease for 40 acres at San Francisco Airport, plans to spend $1 million on buildings—including expansion of its maintenance base—if the offer of $17,600 a year is accepted.

Jet Noise

Noise from jet-powered aircraft would not effect ground service crews any more than that emanating from piston-powered planes, says Dr. K. E. Dowd, Trans-Canada Air Lines' medical director.

Dr. Dowd reports that "to date, as far as can be assessed clinically and by special examinations of the nervous and circulatory systems, including electrical recordings of heart and brain functioning, there was no evidence that personnel servicing jet aircraft, and who used the appropriate ear protectors, were adversely effected in any way."

AVIATION CALENDAR

Oct. 19-23—National Metal Exposition, Public Auditorium, Cleveland.

Oct. 21-23—National Metals Congress, City Auditorium, Cleveland.

Oct. 22—Institute of Aeronautical Sciences, New York Section meeting on turboprop engines for transports, Kohler's Swiss Chalet, Rochelle Park, N. J.

Oct. 22-23—Radio Technical Commission for Aeronautics, 1953 fall assembly, Sheraton Park Hotel, Washington, D. C.

Oct. 23—National Advisory Committee for Aeronautics, annual meeting, Illinois University Institute of Technology, Champaign, Ill.

Oct. 23-24—Fourth annual National Noise Abatement Symposium, Armour Research Foundation of Illinois Institute of Technology, Chicago. Airplane and airport noise will be discussed by NACA's H. H. Hubbard.

Oct. 28-30—Southeastern Airport Managers Assn., annual convention, Marlin Beach Hotel, Ft. Lauderdale, Fla.

Oct. 29-30—National Business Aircraft Assn., sixth annual meeting and forum, Park Plaza Hotel, St. Louis.

Nov. 2-3—Magnesium Assn., ninth annual meeting, Biltmore Hotel, New York. Convair's D. A. Tooley will discuss use of metal adhesives with magnesium.

Nov. 3-4—1953 Transport Aircraft Hydraulics Conference, sponsored by Vickers, Inc., Hotel Park Shelton, Detroit.

Nov. 4-6—Society of Automotive Engineers, meeting of Committee on Aircraft Hydraulic and Pneumatic Equipment, Statler Hotel, Washington, D. C.

Nov. 7—Air Education Day, sponsored by Junior Chamber of Commerce of Allentown, Pa., Allentown-Bethlehem-Easton Airport.

Nov. 9-12—Conference on radio meteorology, Austin, Tex. Sponsors include American Meteorological Society.

Nov. 16-17—American Society for Quality Control, conference of the Aircraft Technical Committee, Biltmore Hotel, Dayton, Ohio.

Nov. 17-20—Aviation Distributors and Manufacturers Assn., 11th annual meeting, Jefferson Hotel, St. Louis.

Nov. 19-21—National Aviation Trades Assn. 14th annual convention, Hotel Broadview, Wichita.

Nov. 23-24—Operations Research Society of America, fall national meeting, Statler Hotel, Boston.

Dec. 1-2—American Society of Mechanical Engineers, frequency response symposium, Hotel Statler, New York.

Dec. 3-5—Seventh Annual Arizona Aviation Conference, Yuma.

Dec. 17—Seventeenth Wright Brothers Lecture, U. S. Chamber of Commerce building, Washington, D. C.

Jan. 25-28—Plant Maintenance & Engineering Show, International Amphitheater, Chicago. Conference will be held concurrently at the Hotel Conrad Hilton.

Feb. 3-5—Society of Plastics Industry, ninth annual division conference on reinforced plastics, Edgewater Beach Hotel, Chicago.

May 5-7—Third International Aviation Trade Show, sponsored by Aircraft Trade Shows, Inc., 71st Regiment Armory, New York.

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Agency—Russell T. Gray, Inc.

WARNER DIV., DETROIT HARVESTER CO. 87
Agency—Clark & Robertz, Inc.
WATERTOWN DIVISION, THE NEW YORK AIR BRAKE CO. 35
Agency—Humbert & Jones Adv.
WESTINGHOUSE AIR BRAKE CO. 58
Agency—Batten, Barton, Durstine & Osborn, Inc.
WESTINGHOUSE ELECTRIC CORP. 55, 56, 57
Agency—Fuller & Smith & Ross, Inc.
WESTINGHOUSE ELECTRIC CORP. 94
Agency—H. W. Buddemeir Co.
WILLYS ELECTRONIC DIVISION, WILLYS MOTORS, INC. 44
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Agency—Merrill & McEnroe & Assoc., Inc.

SEARCHLIGHT SECTION

(Classified Advertising)

H. E. Hilty, Mgr.

EMPLOYMENT
Positions Vacant 103-106
Positions Wanted 106
Selling Opportunities Wanted 106
Employment Agencies 103

PLANES-EQUIPMENT
(Used or Surplus New)
For Sale 107

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EDITORIAL

Aviation—Big-Time Employer

Is the aviation manufacturing industry hiding its light under the proverbial bushel?

Mundy I. Peale, president of Republic Aviation Corp., hinted as much in an address the other night.

He estimates that there now are more than 750,000 Americans who depend directly upon aviation for their livelihood. This does not include employes of commercial airlines, which total something under 100,000.

The latest figures released by the Bureau of Labor Statistics of the U. S. Department of Labor indicate that Mr. Peale is pretty accurate. BLS estimates aviation manufacturing employes at 731,000 as of last June.

"That means that the aviation industry is just behind the automobile industry as an employer," Mr. Peale said. "It is ahead of the steel and textile industries in terms of numbers of workers."

Obviously, the 750,000 estimate does not include thousands of others who also are dependent in some measure upon the aircraft industry.

"We do know that many thousands in the rubber industry, for example, are engaged in making tires and other equipment for airplanes. We know that many of our great companies, as well as hundreds of smaller businesses, devote a large percentage of their efforts to turning out jet engines and airplane components."

Mr. Peale makes the observation that "it is probably not too far off to estimate that perhaps as many as two or three million people in American industry earn their living by doing aviation work."

Yet, he says, "if somebody stood up in Congress and proposed a law that would affect the employment of the automobile or steel or textile industries, you can bet that the subsequent shouting would make the Tower of Babel seem like the reading room of the public library.

"But great debates that go on over air power are not closely followed by very many people outside the aviation industry itself. And this is true, even in face of the fact that the continued prosperity of the country, quite apart from its military safety, is very significantly bound up with the preservation of a stable and solid aviation industry."

Aviation is no longer a barnstorming competitor of the American carnival. An industry that directly employs more persons than steel or textiles deserves public recognition as an industry that is here to stay, a vital part of the national economy.

Cheers for the C&O

Let the record show today that we are handing one railroad laurels for a broad-minded willingness to learn better ways to serve the public.

Passenger traffic salesmen of the Chesapeake & Ohio Railway gathered recently for their annual meeting at Old Point Comfort and the news is that they traveled there by every manner possible except C&O.

Of course, C&O happens to be controlled by that progressive railroad financier, Robert R. Young, whose unconventional ads about hogs that didn't have to change trains at Chicago brought about the first transcontinental through passenger service in railroad history.

And Mr. Young's vice president in charge of passenger traffic and public relations is Thomas J. Deegan, Jr., whom many of us knew once as an American Airlines public relations man.

Nevertheless, the fact that such men as these can get along at all in the railroad business is a compliment to their industry as well as to them.

Mr. Deegan ordered everyone attending the C&O meeting to get there by competing transportation. Their reports were so informative that Mr. Deegan will give passenger salesmen and certain other officials two weeks every year, in addition to regular vacation, to travel on everything in common carriage except their own railroad.

"Airlines and bus lines are doing a wonderful job in attracting travelers, and many railroad men have failed to realize this," Mr. Deegan told local newspapermen.

Those who flew found no waiting in ticket lines, that telephone reservation clerks were courteous, that plane crews were excellent and that baggage handling at starting points was good.

But they also found poor handling of baggage on arrival, and they reported that travel and waiting time before departure and between stops sometimes took more time than the actual flying time. And additional costs, such as for excess baggage and taxi and limousine service, increased their total trip cost by as much as a third of the original price of the ticket. Reconfirming reservations was described as confusing.

Those who traveled by bus rated drivers tops but buses weren't on time, terminals were poor, and there was frequent crowding. Long trips were tiring.

Those who drove found higher costs and driving hazards. "You feel you're taking your life in your hands when you travel by auto these days, with the trucks taking over the roads on weekdays, and the Sunday drivers out on the weekends," one motorist said.

Mr. Deegan contends that one agent hitchhiked. His complants were "poor dependability, delays at terminal points, poor luggage handling, varied personnel, and questionable safety," although his total cost was 55 cents for a 225-mi. trip from Washington.

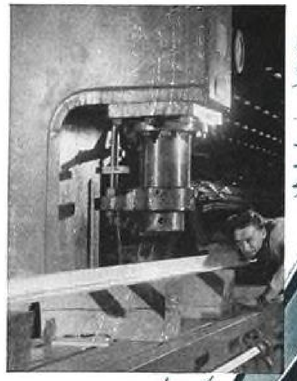
Cheers for the C&O.

—Robert H. Wood

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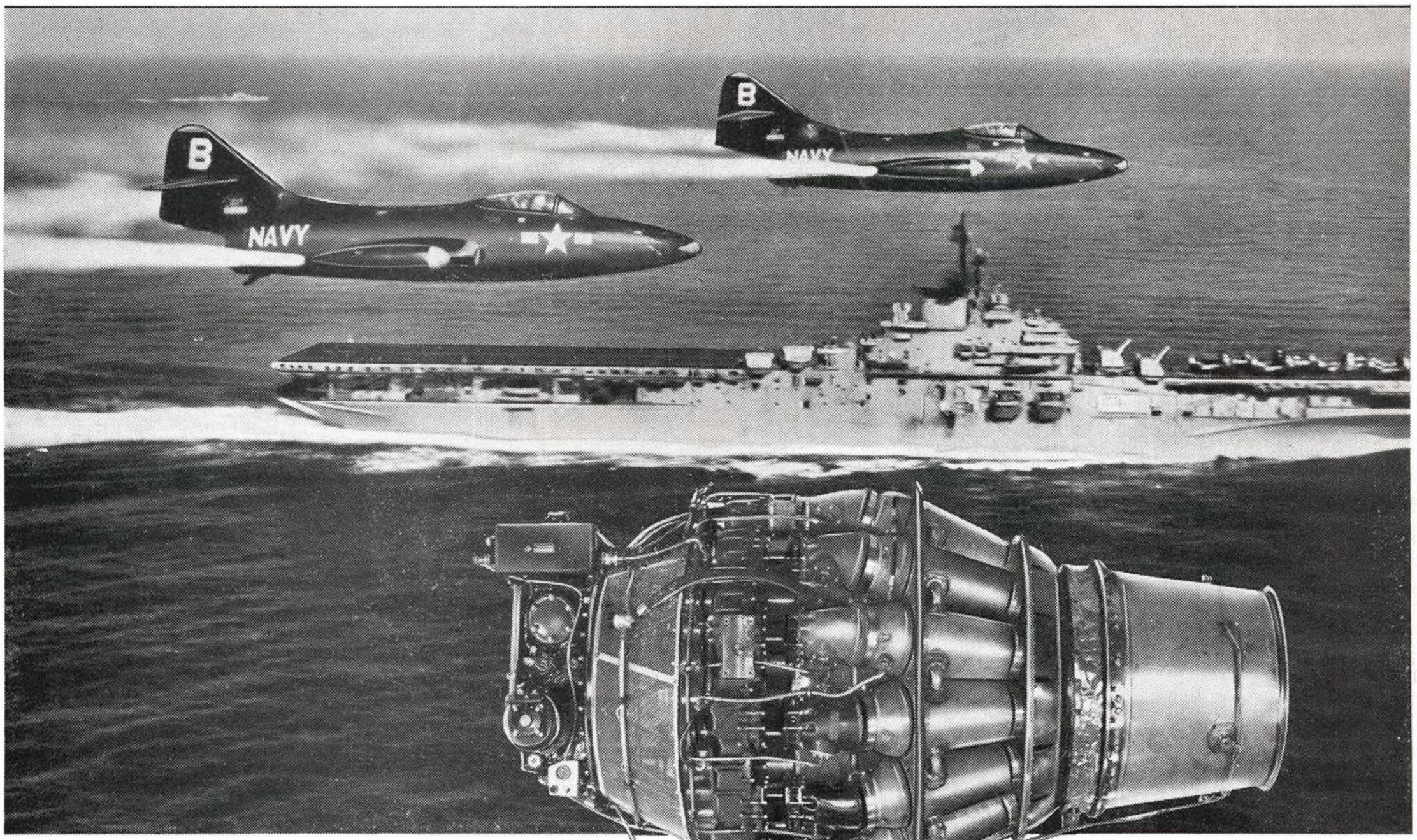
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ANOTHER REASON ALLISON LEADS IN THE AIR



First Navy Jet engine

to score 1,000 hours without overhaul

Record made by Allison J33 Turbo-Jet in carrier-based Grumman F9F-4 Panther

Allison does it again! An Allison J33 Turbo-Jet recently became the first Navy jet engine to operate 1,000 flight hours without overhaul.

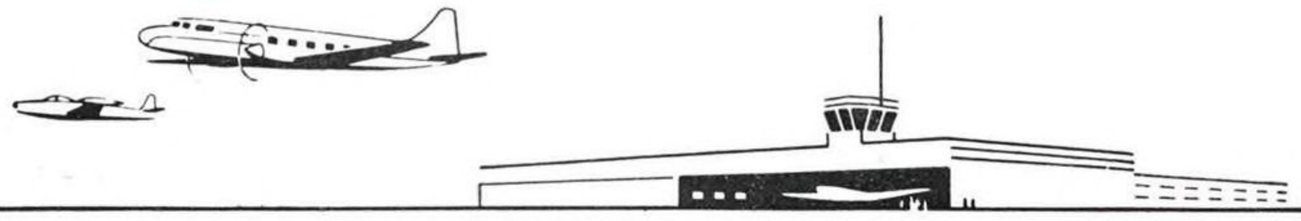
This engine was the first production engine in the J33-A-16 series and began its service life under the Accelerated Service Trials of the F9F-4 Panther, operating from the Naval Air Test Center, Patuxent River, Maryland. At the 500-hour mark, the engine became a test vehicle for engine modifications and for evaluation of extended service life under the severe conditions imposed by carrier landings.

This U.S. Navy achievement adds new laurels to the already well-known endurance records of Allison Turbo-Jets. For both the J33 and the J35 were the first jet engines which our Armed Forces actually operated 1,000 hours without major overhaul.

Proof once again of Allison leadership—where it counts most—*in the air!*

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