AIR FORCE

THE MAGAZINE OF AMERICAN AIRPOWER

Kill Devil Hill, North Carolina
December 17, 1903

DECEMBER 1953 • THIRTY-FIVE CENTS

HAMILTON STANDARD . . . . leader for years in propeller design and production, is supplying Turbo-Hydromatic propellers for such outstanding new aircraft as the Navy's Lockheed R7V-2 transport.

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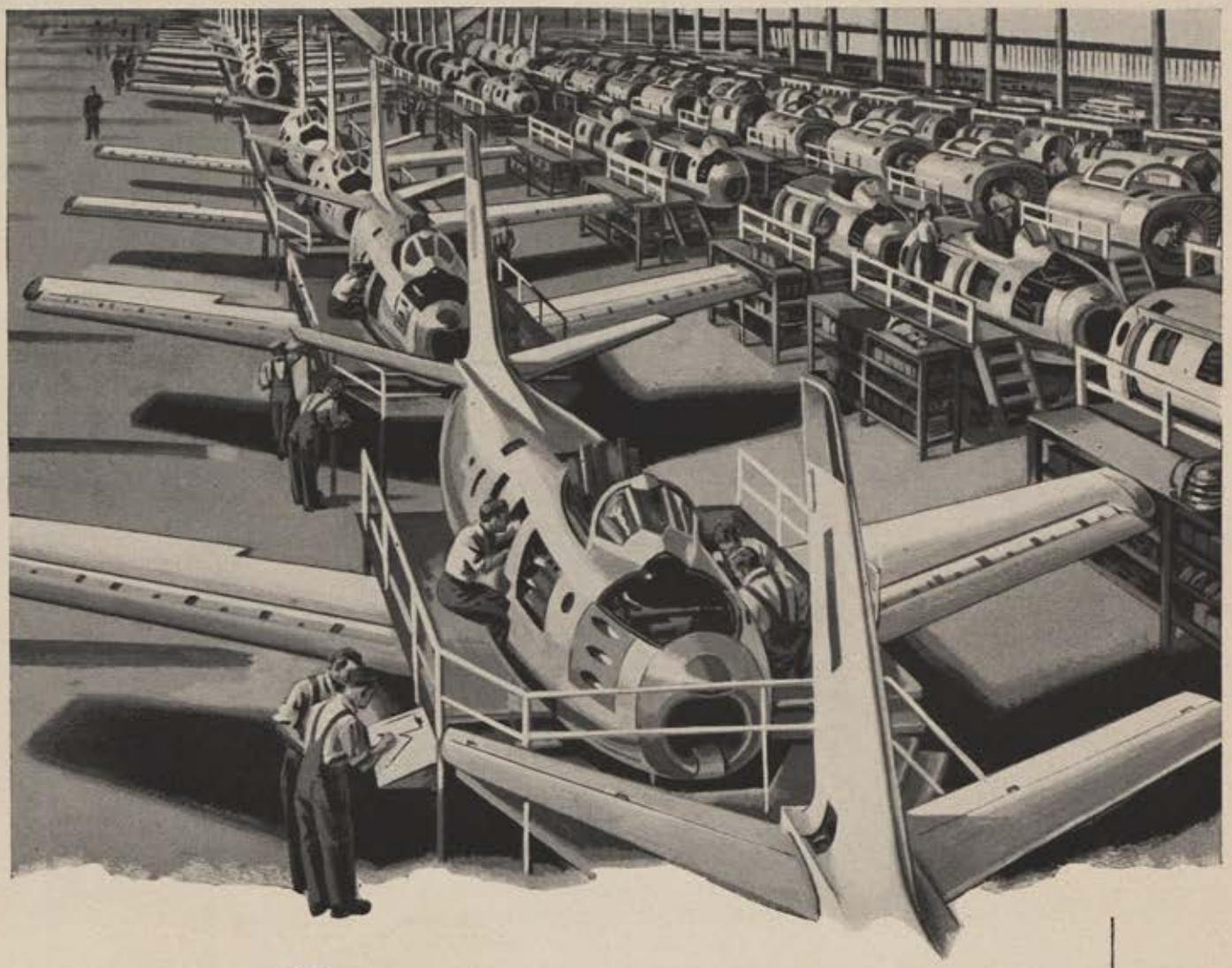

Production COUNTS— AT CANADAIR

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At Canadair one quickly senses the steady tempo... the vigorous production flow... the sense of responsibility among the Canadair people and their pride of accomplishment in the finished product.

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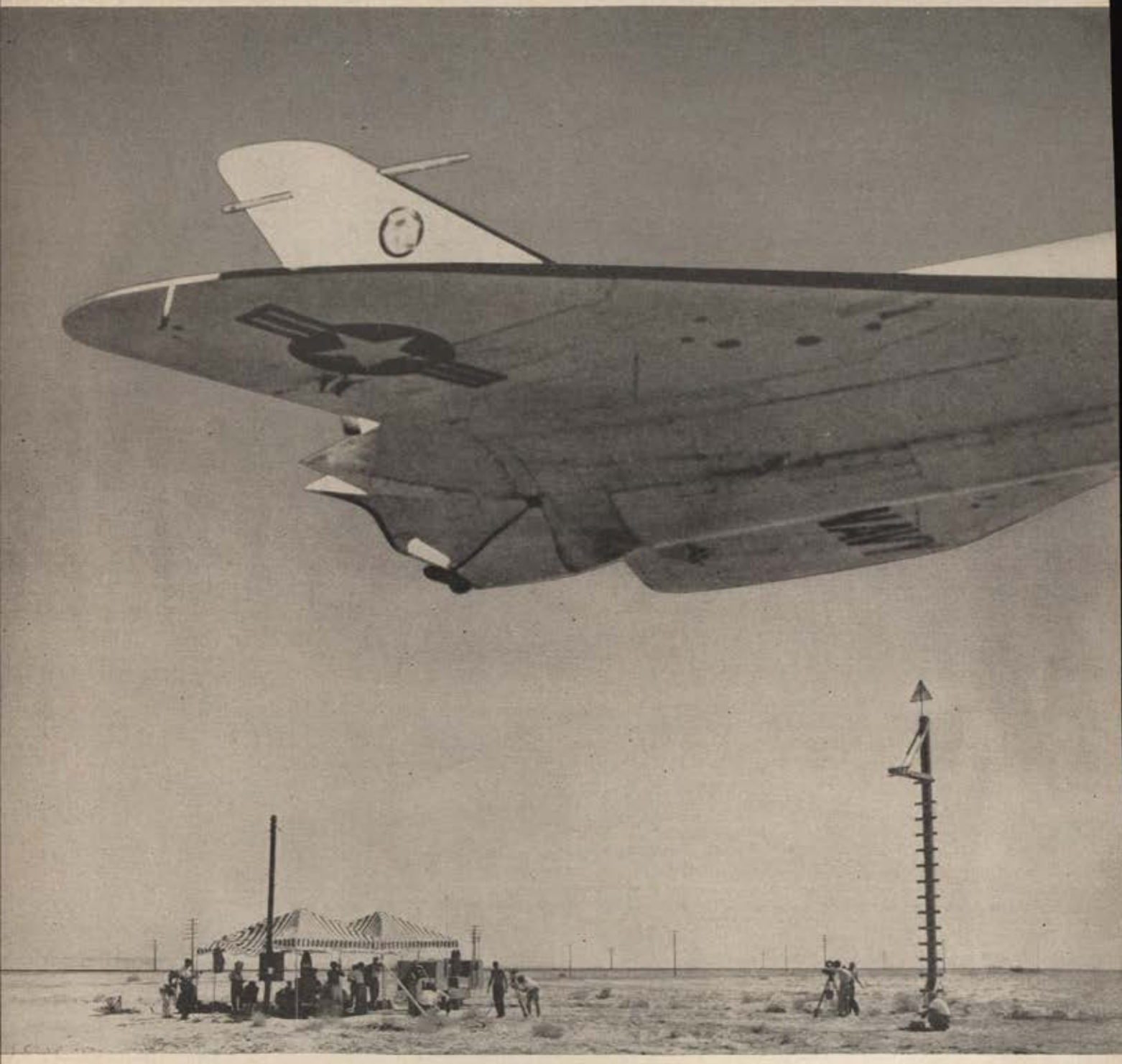
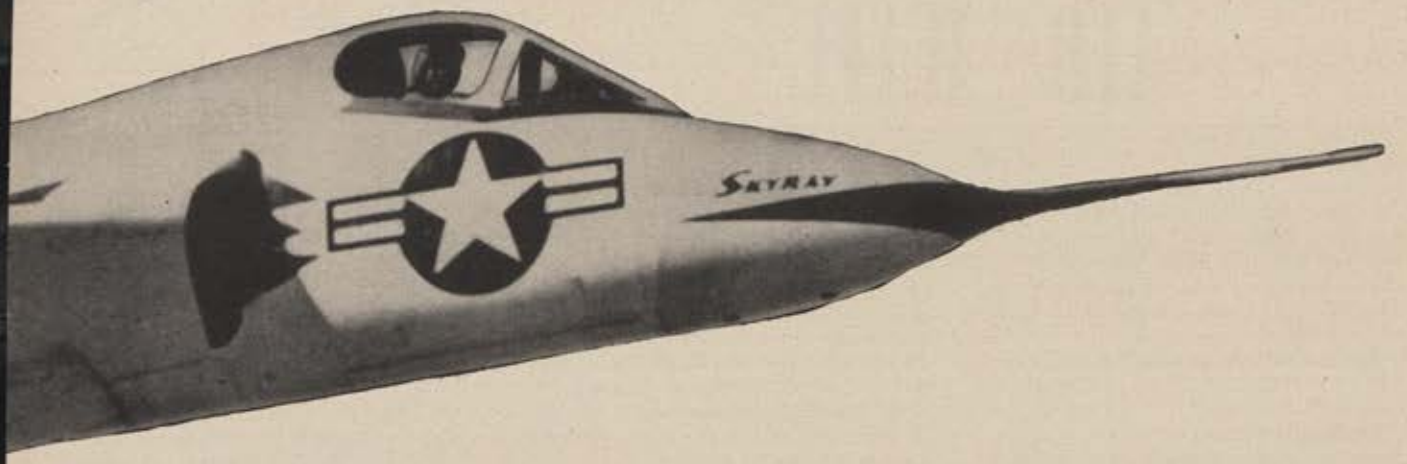


A technical ground crew monitors the F4D flight by recording four individual passes over a three-kilometer course.

Official representatives check film of individual passes to determine average speed attained by the Douglas F4D.

LDCR James B. Verdin returns after piloting Westinghouse-powered F4D to record-shattering runs of 746.075, 761.414, 746.053 and 759.499 mph.



Westinghouse J40 powers F4D to world speed record

U.S. Navy establishes mark of 753.4 mph

A Westinghouse J40 turbojet powered the Douglas F4D "Skyray" to a new high speed of 761.414 mph as it recaptured the world speed record for the United States by streaking to an official average of 753.4 mph over the required course.

Designed and manufactured by the Westinghouse Aviation Gas Turbine Division in South Philadelphia, Pa., the J40 and other outstanding turbojets now are being produced at the huge Westinghouse jet engine plant in Kansas City, Mo.

This J40 contribution to record-breaking jet progress is another example of Westinghouse turbojet leadership. Westinghouse Electric Corporation, Aviation Gas Turbine Division, Lester Branch P. O., Philadelphia 13, Pa.

J-54032

YOU CAN BE SURE... IF IT'S

Westinghouse

AIR MAIL

For the Record

Gentlemen: I have read your article in the September issue called "AF Speedsters At It Once More," and I am proud that my flying found a place in your story. However, you have a factual error which is a common one and which I would like to correct.

You say that starting in 1948 and culminating this year, I set a series of records "for women."

Practically without exception, my records are men's records. For piston-engine planes, I hold the open class records for 100 kilometers, 500 kilometers, 1,000 kilometers, and 2,000 kilometers. For jet engines, I hold the 15 kilometer record, as well as the 100 kilometer and 500 kilometer records. That takes in all of them, except the three kilometer in each case. I recently passed up the three kilometer record for jet planes because I could not beat Captain Nash's record in the plane I had and did not want just a women's record.

Indeed, I am opposed to "women's records" in the open class field. A record is a record, whether made by man or woman. As it stands, a woman can take away a man's record but a man cannot take away a woman's record.

You had the speed right for the 100 kilometer, but in the 15 kilometer straightaway I made a little better than 675 mph.

Jacqueline Cochran
New York, N. Y.

Non-Com Academy

Gentlemen: Your interesting and timely article "What's Wrong With the Air Force Non-Com" that appeared in the September edition of your magazine sums up and offers a logical solution to the problem that is facing us today.

We would like to reproduce the article and make it available to the students of our academy, which is how the Seventh Air Division of the Strategic Air Command is attacking the problem.

Maj. Arthur H. James, Commandant
NCO Academy, 7th Air Div.
APO 197, New York

• *Permission granted.*—The Editors.

Carrier Jets

Gentlemen: A device to "clock" the speed of a jet's landing approach is reported in *The New York Times* of September 21. The newspaper noted, "With military secrecy lifted, naval authorities yesterday permitted publication of a description of the device," and adds:

"With jet aircraft, unlike propeller-driven planes, there is only a narrow spread between too fast a speed and too slow. Pilots find it increasingly difficult to control the speed of modern fighter craft within the limits allowed by carrier operations."

This latter sentence reminded me of a comment by one of your writers many moons ago. He pondered the Navy's cheerful release of photos showing jets—big, booming jets—on carrier take-off. He noted the dearth of photos showing big jets landing on carriers.

Let's appreciate the "clocking" radar's saving of lives and equipment.

Let's hope the public appreciates the implications—which may be broader than the biggest carrier deck—of jet airpower confined "within the limits allowed by carrier operations."

1st Lt., USAFR
Rochester, N. Y.

Selling Youth Short

Gentlemen: Is the youth of America losing its interest in aviation? I think not. But the aviation industry and the Air Force are selling the youth of the nation short by failing to capitalize upon this interest.

As a nation we are increasingly dependent upon the airplane. Yet for the past four years the number of private flying licenses has decreased. The same applies to privately operated aircraft. Independent aviation schools are closing all over the country. The Air Force is having difficulty filling its quota of aviation cadets. Why? The high cost of private aviation and the failure of the Air Force to follow through with promises made to the youth of the nation.

The realization of the ambition to fly of the average high school senior or college student lies in allowing him to get his hands on the controls of an aircraft and fly by himself. The RAF in England has a practical and economical solution to this problem—gliders. Sailplanes operated by the Air Training Corps give young men an opportunity to fly by themselves with a minimum amount of instruction and expense. There is something about seeing a sailplane floating in the air that captures the imagination. And when you get into one and fly you are completely sold. You don't have high gasoline, oil, and repair bills with a sailplane. They can be winched off the ground or launched with a tow cable from the back of a truck and stored in a trailer when not in use. The Air Force, with a couple of gliders operating in conjunction with a university ROTC program or several mobile units visiting senior high school ROTC units, could do much to capitalize upon the enthusiasm and imagination of the American youth.

Charles B. Lanigan, Jr.

The Lifer

Gentlemen: The old-timers seem to be safe if they can take it or leave it—the indefinite reserve commission. Is there any hope for the newly commissioned officers who recently received letters from the Flying Training Air Force? The letters read as follows:

"Public Law 476, 82d Congress stipulates that all appointments of Reserve officers subsequent to 9 July 1952 shall be for an indefinite term. The provisions of this Act were not disseminated by higher headquarters until subsequent to the date you graduated from the Flying Training Program.

"By operation of law, your Reserve appointment is considered to be for an indefinite period even though your letter of appointment reads for a five-year period."

There are many newly commissioned officers who would like to know if they have any recourse or if they must accept this "life sentence" without notice.

Very Concerned Throttle Jockey

• *Although sentenced for life, you may submit a resignation. It may or may not be accepted, depending on the Air Force's "need" for your specialty at the time. However, as required by law, your eight years' Reserve obligation must first be completed.*—The Editors.

AIR FORCE Magazine is published monthly by the Air Force Association. Printed in U.S.A. Re-entered as second class matter, December 11, 1947, at the post office at Dayton, Ohio, under the act of March 3, 1879. **EDITORIAL CORRESPONDENCE AND SUBSCRIPTIONS** should be addressed to Air Force Association, 1424 K St., NW, Washington 5, D. C. Telephone, Sterling 3-2305. Publisher assumes no responsibility for unsolicited material. **CHANGE OF ADDRESS:** Send old address *and* new address (with zone number, if any) to 1424 K St., NW, Washington 5, D. C. Allow six weeks for change of address. **SUBSCRIPTION RATES:** $4.00 per year, $5.00 per year foreign. Single copy, 35 cents. Association membership includes one-year subscription: $5.00 per year (Cadet, Service, and Associate membership also available). **ADVERTISING CORRESPONDENCE** should be addressed to Sanford A. Wolf, Advertising Director, 114 East 40th St., New York 16, N. Y. (MUrray Hill 9-3817.) Midwest office: Urben Farley & Company, 120 S. LaSalle St., Chicago 3, Ill. (Financial 6-3074). Pacific Coast offices: Keenan, Hunter & Dietrich, 638 S. Van Ness Ave., Los Angeles 4, Calif. (Dunkirk 2-8458); 235 Montgomery St., San Francisco 5, Calif. (Douglas 2-1323.)

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Unequalled

experience, manpower and facilities available for post-Korean production.....

37

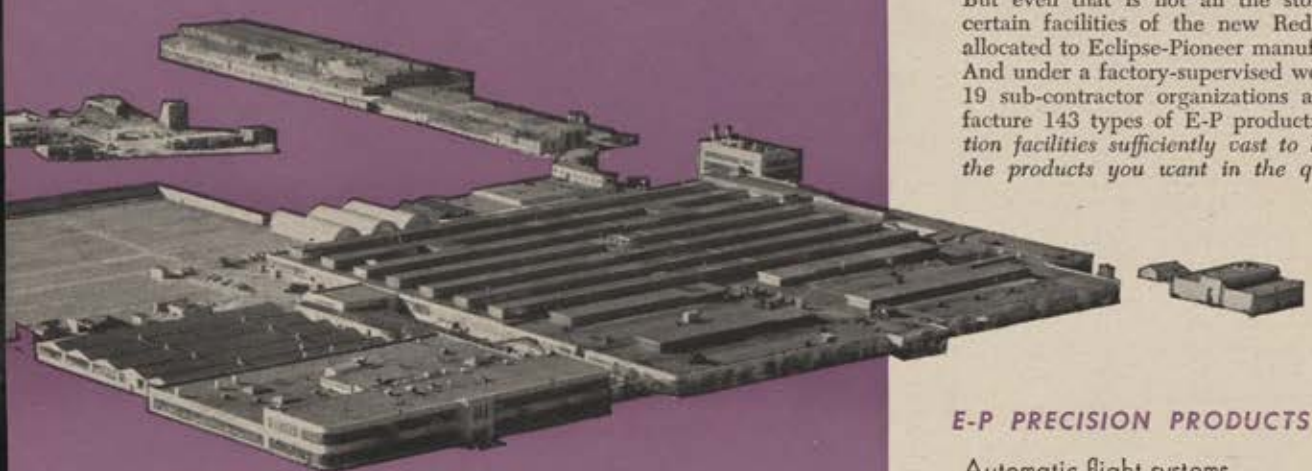
That's the number of years we have been in the aviation business—the number of years we have devoted to the creation, development and manufacture of precision products for the aircraft industry. They are years in which we have consistently paced the field with developments of fundamental significance to the evolution of powered flight. *They represent a wealth of practical experience that can play an important role in your post-Korean plans!*

19,142

That's the number of people available to serve you—skilled men and women who are designing, engineering, manufacturing and servicing the products that have developed Eclipse-Pioneer's standing as the world's largest producer of aviation instruments and accessories. *Here is massed manpower ready to satisfy your needs!*

1,444,224

That's the number of square feet devoted exclusively to Eclipse-Pioneer's tremendous operation which, besides our Teterboro plant, includes the complete facilities of the Pioneer-Central and Utica Divisions. But even that is not all the story, for in addition, certain facilities of the new Red Bank Division are allocated to Eclipse-Pioneer manufacturing operations. And under a factory-supervised working arrangement, 19 sub-contractor organizations are tooled to manufacture 143 types of E-P products. *Here are production facilities sufficiently vast to be able to turn out the products you want in the quantities you need!*



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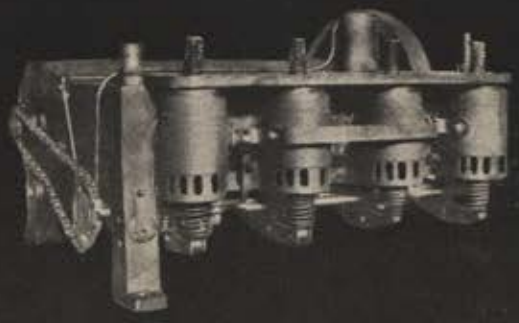
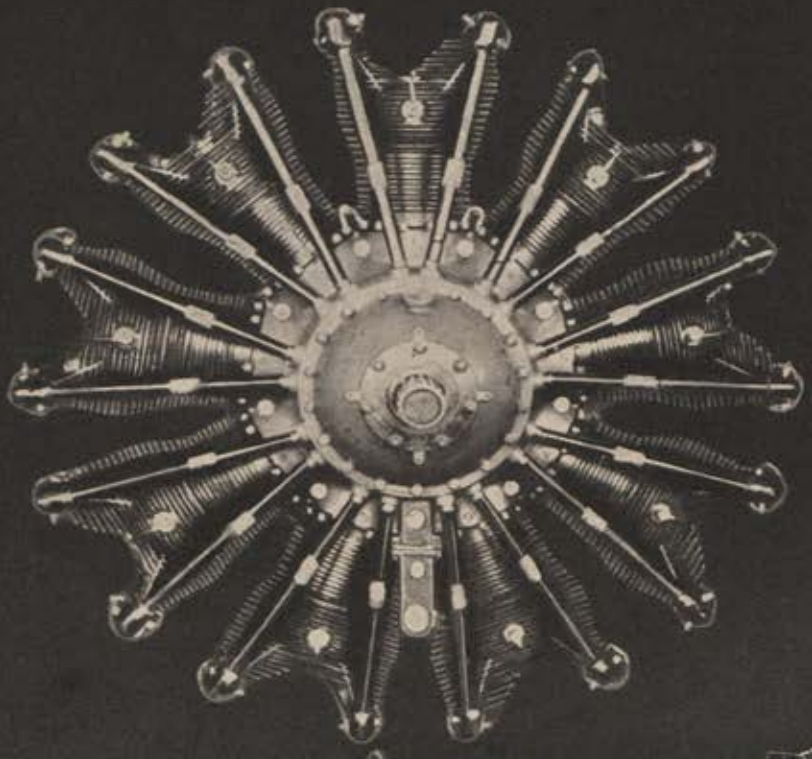
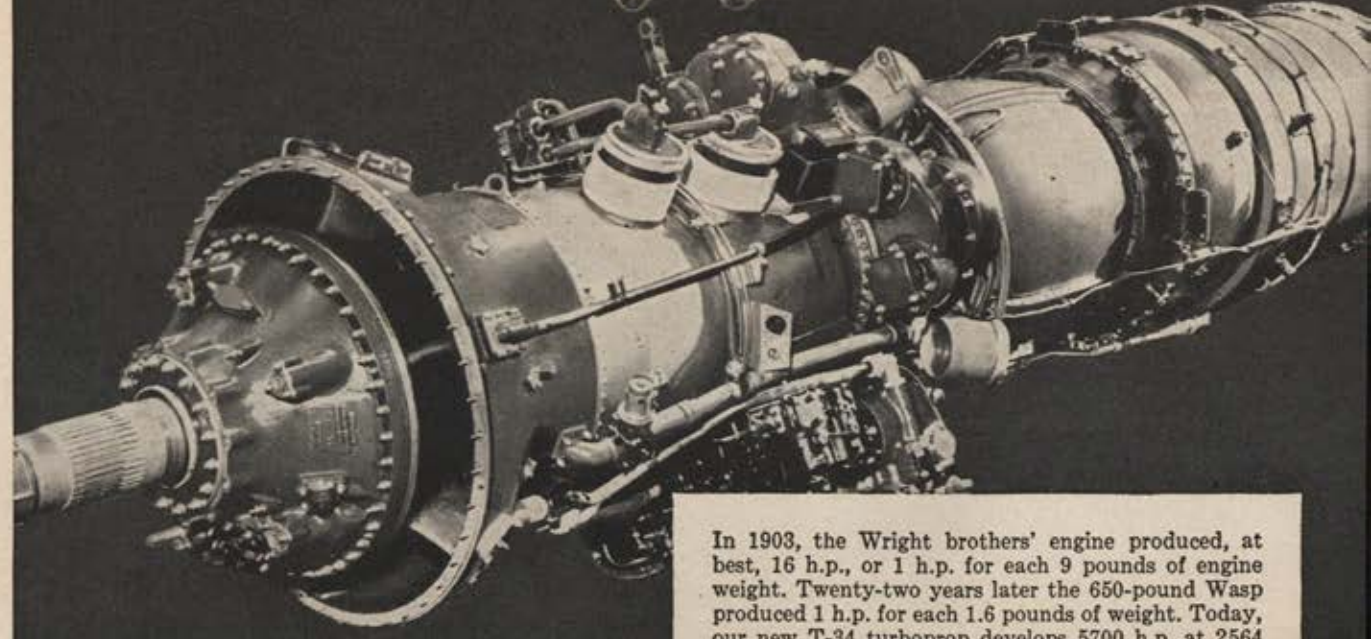


~~50~~ 28 YEARS





In 1903, the Wright brothers' engine produced, at best, 16 h.p., or 1 h.p. for each 9 pounds of engine weight. Twenty-two years later the 650-pound Wasp produced 1 h.p. for each 1.6 pounds of weight. Today, our new T-34 turboprop develops 5700 h.p. at 2564 pounds, or 1 h.p. for less than ½ pound of weight. And the J-57, not illustrated above, is even more powerful.

OF POWERED FLIGHT!

From horsepower to thrust, power plant developments are the measure of air progress

THIS YEAR the entire world is celebrating the 50th Anniversary of Powered Flight and the tremendous progress that has been made in that half-century.

The engine is the heart of the airplane, and for 28 of those 50 years, Pratt & Whitney Aircraft has been a leader in the manufacture of the world's best aircraft power plants. From 1925 to the present day, generations of civilian and military aircraft have been built around Pratt & Whitney power plants. In World War II almost 50 per cent of the aviation horsepower used by the Allies was provided by Pratt & Whitney Aircraft engines. Today our engines power over 75 per cent of the world's 4000 commercial airliners, and are a major factor in military aviation.

But building engines today has become an increasingly difficult task.

Our first engine, the 410 h.p. Wasp, was designed and built by 26 men in a mere seven months. It was engineered in a 2-car garage, and made in a shop that had once been a tobacco warehouse.

By contrast, development and production of today's most powerful engine, the J-57, required millions of engineering manhours . . . and much of Pratt & Whitney's 6,000,000 square feet of floor space. Thousands of special skills and more than 20,000 special tools are required to produce it.

Between the Wasp and the J-57 lies much of the history of aviation. And from this history many important lessons have been learned, not the least of which is this: America's security demands consistent development and production of better and more powerful aircraft engines.

Pratt & Whitney Aircraft

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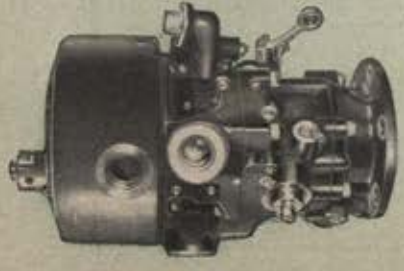
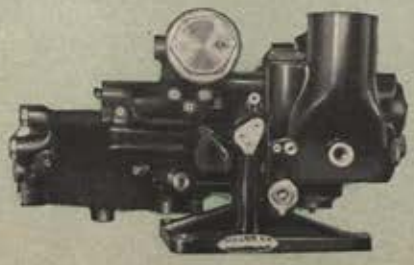
Within Seconds After Warning . . .

the Lockheed Starfire is in the air and on its way to altitudes of more than 45,000 feet. Holley designed and manufactured the turbine fuel control and the afterburner fuel control used on the F-94C's Pratt & Whitney Aircraft J-48 Jet Engine.





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LEADER IN THE DESIGN, DEVELOPMENT AND MANUFACTURE OF AVIATION FUEL METERING DEVICES.

A-17

Shooting the Breeze

AS IS entirely fitting, the Air Force Association is up to its ears in the celebration of the fiftieth anniversary of powered flight. Right now our program director, Ralph Whitener, is losing sleep each night worrying about the complicated schedule of fly-overs that will highlight the four-day observance at Kitty Hawk December 14-17. Whitener is an old hand at air shows but this four-day deal has even him gnawing at his nails.

AFA, in conjunction with the Kill Devil Hills Memorial Society, the National Park Service and the North Carolina Fiftieth Anniversary of Powered Flight Commission, is sponsoring the observance. It's a lot of work and one sample of the kind of activity in which AFA engages.

When Ralph saw the proof of our December cover, about which you'll read more elsewhere on this page, his eyes lit up and what we call the "Kitty Hawk syndrome" manifested itself.

"Why not," said Whitener, "print up an extra batch of these, suitable for framing, and make them available to our readers for a buck apiece?"

We liked the idea too, so that's what we're doing. If you want a four-color reproduction of this month's cover, minus the lettering, send us one dollar and we'll ship it to you post paid.

Write "First Flight Painting," Air Force Association, 1424 K St., N.W., Washington 5, D.C.—THE EDITORS

AIR FORCE

THE MAGAZINE OF AMERICAN AIRPOWER

Vol. 36, No. 12 • DECEMBER 1953

FEATURES

DEPARTMENTS

THE COVER

This is one cover we didn't order. Artist Arlo Greer last spring began to wonder how the historic scene might have looked from a different angle. He did a lot of research, visited the Smithsonian and sketched the original plane. Walked in our office one day and said, "I think you've got a cover." We thought so, too. The painting shows Wilbur Wright in the foreground, shortly after the plane left its monorail launcher. Orville's flying it, although you can't see him from this angle. In the background is the tiny group of local spectators which saw history being made.

MEMBERSHIP IN AFA

AIR FORCE Magazine is mailed monthly to all members of the Air Force Association. There are several ways you can become a member. If you were in the Air Force or its predecessor services, you're eligible. The $5 yearly dues include the magazine. Or if now on active duty, you can be a Service Member. Those interested in airpower can become Associate Members for $5 per year. The cost for CAP and AF-ROTC cadets is $3 per year. Details of membership in AFA on page 92.

CUT OUT AND MAIL TODAY

Air Force Association
1424 K St., Northwest
Washington 5, D. C.

12-53

Sign me up as marked below. I enclose a check or money order for the amount indicated.

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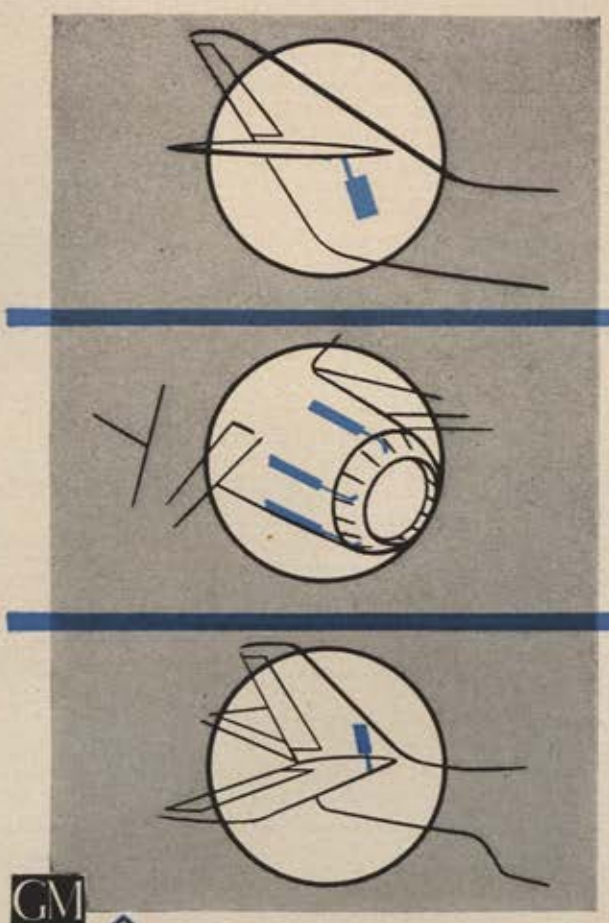
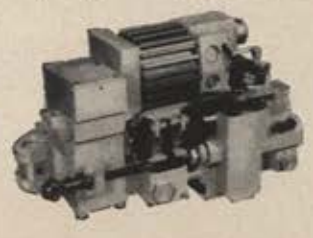
Let us know your requirements for aircraft actuators. Your inquiry will receive prompt attention.





Typical Aeroproducts Actuator

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AIRPOWER IN THE NEWS

BY JAKE CULPEPPER

TRAINING — Pilot training is now open to civilian high school graduates. Airmen high school graduates have been eligible since November of 1951. By increasing the number of applicants, the AF says it will have more leeway in selecting those trainees who demonstrate the greatest aptitude for flying. Besides having a high school sheepskin, pilot trainees must be single and between the ages of 19 and 26½. . . . AF has reduced from 2,800 to about 300 the number of "provisionally qualified" applicants for OCS training. It's a result of the cutback in the OCS program which will see fiscal year 1954 classes graduating only about 125 instead of 640 second johns.

PRODUCTION — Increases in aircraft production involving the B-52 and F-100 have been announced by AF. The B-52's second production source will be Boeing's Wichita, Kansas plant. The North American F-100 will go into accelerated production as result of successful first and second phase tests. AF says normally accelerated production is deferred until final tests but fine performance of this aircraft justifies increasing production now. . . . New orders and an expanded production program for the Douglas B-66 twin-jet bomber have been revealed by AF. . . . Lockheed Aircraft Corporation, Burbank, Calif., is presently conducting a preliminary design study on nuclear-powered aircraft under AF contract.

HUMAN ELEMENT — Personnel turnover is Sec'y Talbott's chief worry at the present time. Mr. Talbott has said he is "astounded" at the effect on AF personnel of the withdrawal of fringe benefits. He indicated the AF would "fight" for such things as commissaries, medical care, adequate PXs. Mr. Talbott estimated that the AF could operate efficiently with 100,000 men fewer than the present 970,000 if that staff were permanent. Knotty part of the problem is that AF must maintain strength of existing units and train additional men for newly created units, while losing trained men. In late 1954 and in '55 AF will lose large numbers of men who enlisted for four years after the Korean war began. As many as 200,000 men trained at high cost will leave the AF next year. Mr. Talbott estimated that, conservatively, it will cost the AF more than two billion dollars to train their replacements. (Estimates have run as high as $2.6 billion.)

RECRUITING — The AF, Army, and Navy are preparing a program to reverse the present reenlistment trend (rate has dropped from 53 percent to 21 percent). Budget restrictions placed on officer assignments to USA and USAF Recruiting stations have been lifted. Interested officers should apply for this duty under provisions of AF Reg. 36-34. Recruiting slots will soon open for approximately 600 airmen (both male and female).

BASES — Latest hat added to Sec'y Talbott's collection is that of executive agent for all US military activities in Spain to include the development of air and naval facilities. Navy's Yards and Docks will be responsible for US construction in Spain, under an agreement between the secretaries of the Navy and AF. . . . AF will build a new forty-acre air base at Prestwick, Scotland.

GLOBAL MOBILITY — Approximately forty-five Stratojet bombers of the 305th Medium Bomb Wing will take off from England for North Africa early this month for training exercises. This will be the first mass appearance of the AF's new medium bomber in North Africa. . . . The 465th Troop Carrier Wing will leave the US soon for Europe. Equipped with Fairchild

(Continued on following page)

C-119 aircraft, the 465th will be the tenth wing to be deployed by TAC to Europe.

VIPS — Air Marshall G. H. Mills, CB, DFC, Air Officer Commander-in-Chief of the RAF Bomber Command, was a recent visitor in US where he observed SAC Bombing and Navigation Competition at Walker AFB, New Mexico. . . . Lt. Gen. Choi Yong Duk, chief of staff of the Republic of Korea Air Force, was USAF's guest for recent visit which was arranged to give the ROKs first-hand information regarding organization, equipment, training, and operations of the USAF.

RELICS — AF Historical Foundation is looking for items of AF historical interest. Persons having items or who know where they might be found should write: Secretary, AF Historical Foundation, Hq, USAF, Washington 25, D. C. Do not forward items until Foundation informs you whether they can be accepted.

TOURS — AF has reduced normal tour in Japan from thirty months to twenty-four months while the tour, if accompanied or joined by dependents, has been raised from thirty months to thirty-six. In Guam and the Philippines normal tours have been reduced from twenty-four-months to eighteen months and tours with dependents remain at twenty-four months. The twelve-months' tour in Korea remains unchanged. AF says increases in tour lengths involving dependents are justified because of improved facilities and the necessity for achieving "maximum personnel stability" within the officer and NCO grades. Decreases in tour lengths for bachelor personnel were aimed at easing the morale problems in tropical climates.

STAFF — New assignments: Maj. Gen. Herbert B. Thatcher, Director of Plans (Actg.); Brig. Gen. John J. O'Hara, Assistant for Mutual Security; Brig. Gen. Frederick E. Calhoun, Director of Industrial Resources; Maj. Gen. Robert M. Lee, Commander, 12th AF, USAFE; and Maj. Gen. Samuel R. Brentnall, Assistant Deputy C/S for Guided Missiles.

ECONOMY — A national security budget of about seventy to seventy-five billion dollars by 1956 lies within the nation's financial and economic capacity, according to a recent report by the National Planning Association, a non-profit, non-political organization. Productivity of the American economy is so immense, the group's Project Committee said, that US need not be afraid of adopting sizable additional national security programs if they are found to be advisable in support of the cause of security and liberty.

PRESTIGE — First class of AF's new senior observer technical specialist course has opened at Mather AFB, Calif. New course, open to observers in ranks of major through colonel, will last forty weeks. About thirty senior grade observers are entered. One class of similar size is scheduled each year. . . . In another step to elevate the observer's status to that of the pilot, AF will remove the "for pilots only" signs for USAF Institute of Technology training (top-level school for technical and scientific subjects).

AIR ACADEMY — Odds are high that the AF will see some action next year on its request for an air academy. Rep. Dewey Short (R., Mo.,), chairman of the House Armed Services Committee, recently stated that his bill for an institution similar to West Point and Annapolis will be considered promptly when Congress reconvenes.

Weight for weight,

the world's strongest material,

now applied to use in planes

and trailers

Hexagonal cells give strength

Douglas AIRCOMB

Asked to design a trailer for electronic anti-aircraft equipment, engineers at Douglas turned to an existing company product of extreme lightness and great strength—Douglas Aircomb.

Aircomb is a paper honeycomb which Douglas makes under a patented process to be sandwiched between thin sheets of metal, plastic or plywood, thus forming a board. Result is a structural material recommended for scores of applications in aircraft, ships, buildings, furniture, containers . . . wherever strength with light weight is important in the finished product. In Douglas radar trailers it also provides much-wanted insulation to protect delicate equipment from effects of temperature changes.

Development of Aircomb is evidence of the progressive engineering that makes Douglas the aviation industry's leader. Better performance with less weight is always a basic Douglas rule in planes and other products, too.

Depend on *DOUGLAS*  **First in Aviation**

Gilfillan
LOS ANGELES

When Joel Rabin of Brooklyn, N. Y., landed his Piper Cub at Rockaway Airport, the helicopter that had stayed right with him all the way turned out to be unfriendly. The cop in the 'copter handed Rabin a summons for flying too low over the city. It was the first airborne arrest of the current season.

° ° °

When Wilbur Wright agreed to make an exhibition flight in 1909 in a land plane around the Statue of Liberty, he lashed

a canoe between the plane's landing skids to help keep things afloat, just in case.

° ° °

A US Army hospital in Japan claims to be the first in the world to have a landing area on the roof for patients arriving by helicopter.

° ° °

A new US airliner is going to be the size of two railroad cars.

° ° °

For every plane flying the world's scheduled air routes there are 1,000 air and ground personnel. The world aircraft fleet totals 3,000 planes, and 300,000 people are now employed to keep them flying.

° ° °

United's Miss Mary O'Connor of Chicago has completed twenty years as a stewardess. She's logged 4,500,000 miles. United's Mainliner O'Connor is named for her.

° ° °

A helicopter flying over the Gulf of Mexico recently spotted a fishing boat out of gas. The 'copter returned

to shore, landed at the nearest filling station, returned with a tank of gas, and lowered it to the stranded vessel.

° ° °

Seaboard and Western claims a new record transatlantic cargo haul, 16,873 pounds flown from New York to Britain and Western Germany. The mixed cargo was well mixed, with six California sea lions sharing the trip with a group of alligators en route to the circus in Hamburg.

° ° °

High density traffic areas that slow the motorist down to a crawl are finally catching up with the airplane. The speed limit for planes in congested metropolitan areas is now 180 miles per hour.

By Wilfred Owen

PEOPLE IN THE AIR NEWS

"Dad" Montee in flying gear

At San Diego, Calif., in observance of the fiftieth anniversary of flight, **JAMES W. (DAD) MONTEE** paid tribute to the Wright Brothers in unique fashion. Illustrating "it's never too late, etc.," Montee climbed aboard a USAF T-33 jet trainer. With him, alternating at the controls, was an AF major. Together they logged nearly 100 miles, hit speeds of 500 mph. After taking members of his family aloft and piloting a 1929 monoplane and a twin-engine transport, Montee called it a day. Montee, a former west-of-Dodge City stage coach driver who got his pilot's license when he was sixty-five years old, is now nine-one years young.

President Dwight Eisenhower at the Aero Club of Washington's Wright Memorial Day Dinner this month is scheduled to present **REP. CARL HINSHAW** (R.-Calif.) with the National Aeronautical Association's Wright Brothers Memorial Trophy for "significant public service (as a civilian), of enduring value to aviation." The trophy, a twelve-inch replica of the original Wright airplane, is given for service over a period of years. Representative Hinshaw has been one of Congress's most authoritative spokesmen on aviation matters. Previous trophy winners include Charles A. Lindbergh and James H. Doolittle.

Norwegian-born **BERNT BALCHEN,** pilot, explorer, author, and pioneer in development of USAF arctic air bases—Thule's one—has received one of aviation's most prized awards. In ceremonies at the White House, President Eisenhower presented the veteran hero of arctic, antarctic, and transatlantic flights with the International Harmon Trophy in recognition of his "outstanding service to the advancement of aviation in connection with arctic operations, explorations, and pilotages." Along with USAF's Colonel Balchen (see cut at right), who received the aviator's award, **MME. JACQUELINE AURIOL** of France won the Harmon Trophy as outstanding aviatrix, and **WALTER L. MASSIC** as aeronaut. Madame Auriol, daughter-in-law of France's President, established a one-time women's speed record, flying a jet 531.8 mph. Massic, chief pilot for Goodyear Aircraft Corp., has long been recognized for his piloting and test flying of airships.

A long missing member of the Harmon family of International Awards was back in circulation, briefly. Since 1940 the whereabouts of the Harmon Aeronaut Trophy was a mystery. Its last custodian had been the International League of Aviators in Paris, but it vanished during the German occupation. Presumably the three-foot, 150-pound bronze sculpture was a victim of a German scrap metal drive. Then, **WILLIAM E. SCHRAMEK,** a trustee for the Harmon trust, was notified the trophy had reappeared—found in a Parisian junkyard. It arrived in the US in time to be presented to Walter L. Massic (see above). And then it was again retired from circulation. Its new home, however, was quite respectable:

Balchen

Lanphier

the Smithsonian Institution, in Washington, D. C.

THOMAS G. LANPHIER, JR., vice president of Consolidated Vultee Aircraft Corp., and board member and former president of Air Force Association, has been elected president of the National Aeronautic Association at its meeting in Portland, Ore. Elected to the first vice presidency of NAA was another noted AFA'er —Miss Jacqueline Cochran.

(Continued on page 19)

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.

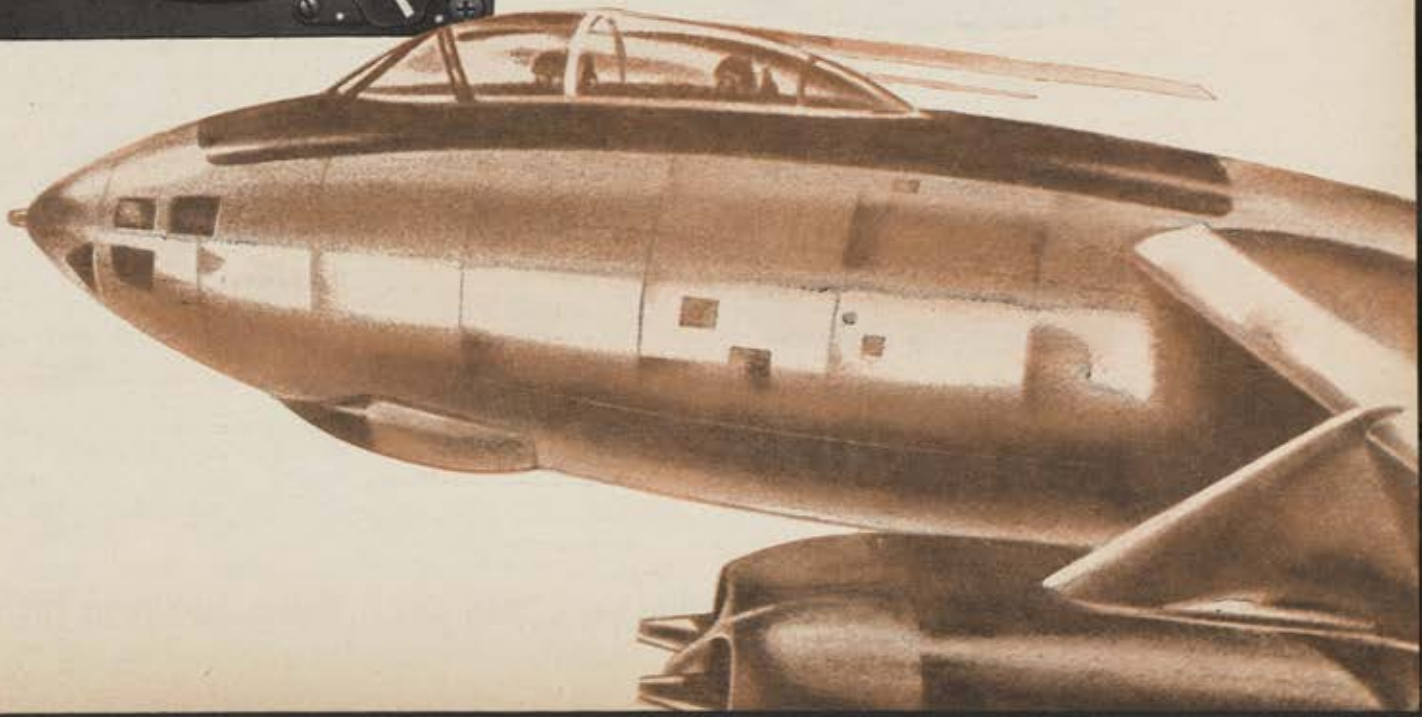
Operating as the plane's "sixth sense," the Lear VGI system is designed to measure and display deviation from horizontal flight with near-perfect accuracy and speed. All necessary gyros, amplifiers, and power supplies are contained in one compact unit which is remotely installed, transmitting pitch and 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.

Let us discuss *your* problems in instrumentation. We have been solving the tough ones for almost a quarter of a century.

LEAR INC. GRAND RAPIDS DIVISION
110 IONIA AVE., N. W., GRAND RAPIDS 2, MICHIGAN
Executive Offices: 3171 S. Bundy Dr., Los Angeles 34, California

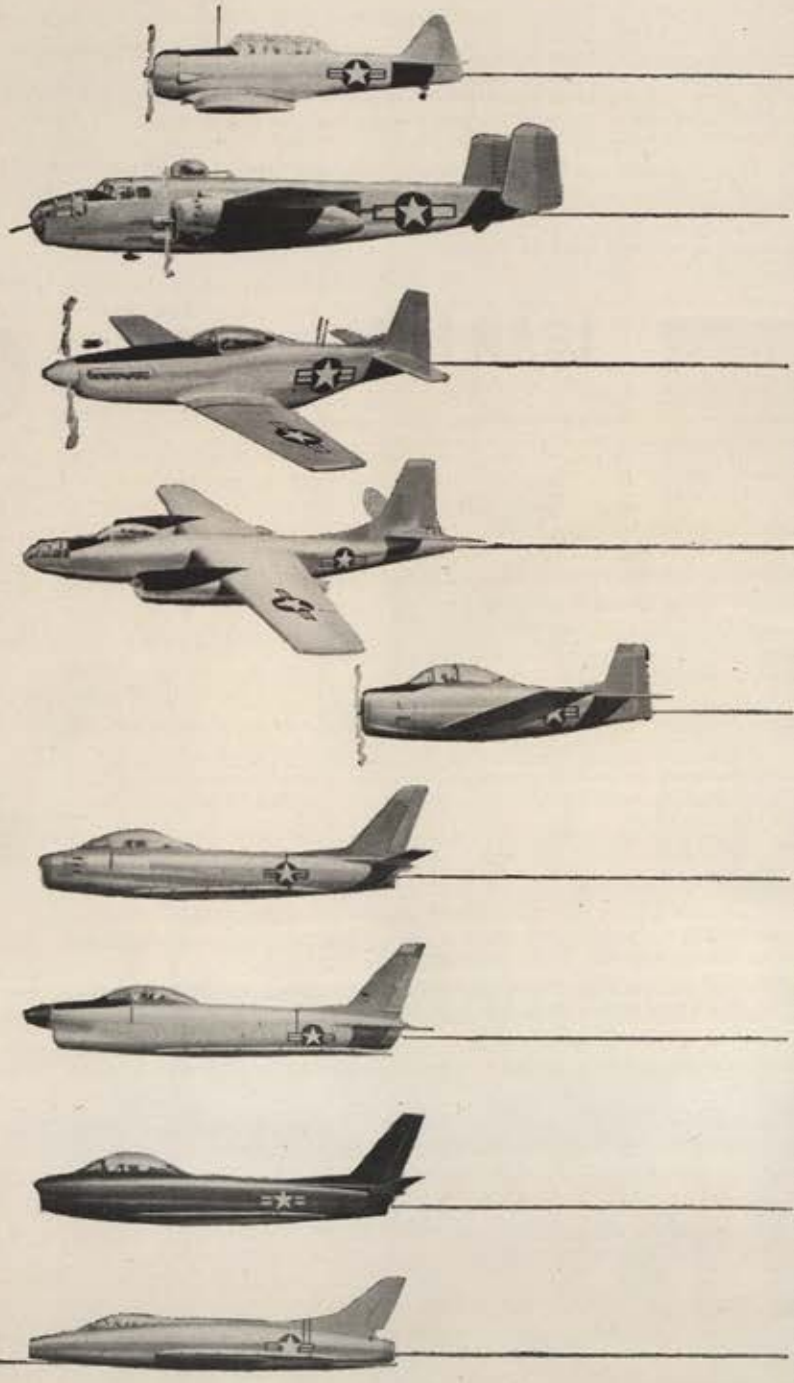
LEAR VGI SYSTEM Non-tumbling horizon gyro (in roll), provides greatly improved accuracy, reduced turn errors. The system includes 24,000 rpm gyro motor and a highly sensitive Lear electrolytic erection switch.

IP-3



North American Aviation

delivers its 50,001st airplane



T-6 Advanced Trainer—Used by 33 Allied Nations in W. W. II. Provided close tactical ground support in Korea.

B-25 Mitchell Bomber—Served in all theaters in W. W. II in several different bombing capacities... including famous first bombing of Japan. Rugged, practical, heavily armed.

P-51 Mustang—Leading fighter of W. W. II. Served as photographer, dive bomber, strafer, escort, spotter, for close ground support. Held line in Korea before *Sabres* arrived.

B-45 Tornado—First operational multi-jet airplane to fly in the U. S. First to fly non-stop across the Pacific.

T-28 Trainer—Faster than many W. W. II fighters with top speed of 346 MPH. 1,000 already delivered to Air Force. Now being delivered to Navy.

F-86 *Sabre* Jet—News making king of MiG Alley with kill ratio of 12 to 1 over MiGs. Produced in Australia and Canada and in Italy for NATO. Acclaimed as best all 'round fighter in the world.

F-86D *Sabre* Jet—America's only one-man, all-weather interceptor. Rocket firing. Now operational as primary continental defender... with 700 MPH *plus* speed.

FJ-3 Fury Jet—Latest of North American's FJ Series of Navy carrier-based fighters. With faster speed and rate of climb and superior firepower.

F-100 *Super Sabre*—Tri-sonic performance with overall weapon effectiveness. Now in production for Air Force. Flies faster than speed of sound in level flight.

NORTH AMERICAN HAS BUILT MORE AIRPLANES THAN ANY OTHER COMPANY IN THE WORLD

PEOPLE IN THE AIR NEWS — CONTINUED

New York City, in a recent week-long celebration of fifty years of powered flight, honored two of its most distinguished citizens for their contributions to airpower. They bore two of the most famous names in American aviation—**LT. GEN. JAMES H. DOOLITTLE** (USAFR) and **CAPT. EDWARD V. RICKENBACKER,** both holders of the Congressional Medal of Honor, Doolittle in World War II,

Doolittle

Rickenbacker

Rickenbacker in World War I. For AFA's founder and famed Tokyo raider Jimmy Doolittle it was a parade, complete with bands, marching men, and 150,000 onlookers, from the Battery up lower Broadway to the steps of New York's City Hall. (Rickenbacker was unable to attend.) At City Hall Mayor Vincent R. Impellitteri made the presentation.

A Bolling AFB airman, **A/1C JAMES I. HOOE,** has been named the best staff car driver in the US, winning his championship at Wright-Patterson AFB. He's the son of retired **M/SGT. ROY W. HOOE,** crew chief for Billy Mitchell, Charles Lindbergh, and the 1929 world endurance plane "Question Mark."

ARTHUR F. KELLY, past president of AFA and present chairman of its board, has been named vice president of the Air Traffic Conference at a meeting of the group in Dallas, Tex. ATC is the policy-making group for scheduled certificated airlines in matters of traffic, sales, advertising, and public relations. Kelly is vice president-sales for Western Air Lines.

Who holds the world's air-speed record? The answer seems still very much up in the air. USAF's **LT. COL. F. K. (PETE) EVEREST,** in North American's new YF-100 Super Sabre, has set a new low-level mark which has been recognized by the Federation Aeronautique Internationale. In two passes over a 15-km course laid out over southern California's Salton Sea, he averaged 754.9 mph, exceeding 767.8 mph on one pass. But his assault on **LT. CMDR. JAMES B. VERDIN'S** 3-km record failed to better the Navy speedster's mark by the FAI's required one percent (see "People in the Air News," Nov. '53). Everest was the air-world's newest fastest human in the middle distance, but Verdin was top man in the sprints.

"Pete" Everest and the YF-100

RENDEZVOUS

Where the Gang gets together

JAPANESE WAR PLANES: I am writing a book on Japanese war planes from 1920 to 1945 and am looking for information, photos, plans, drawings, etc., on late models. *David Swaja, 1235 S. W. Carson St., Portland 19, Ore.*

401ST BOMBARDMENT GROUP: All persons who were members of the 401st Bombardment Group during World War II are entitled to free copies of the Group's history. A few copies remain and those eligible may obtain their copy by writing to *Mr. Gordon R. Closway, Executive Editor, Winona Republican-Herald, Winona, Minn.*

9TH AF SERVICE COMMAND: Where can I get a cloth-bound edition of "The 9th Air Force Service Command Pictorial Review"? *Stanley J. Krantz, 146th Ftr. Sqdn., Pennsylvania ANG, Greater Pittsburgh Airport, Coraopolis, Pa.*

OLD ISSUES: I'm trying to complete my library of back issues of AIR FORCE Magazines. Can anyone supply me with copies for March and May 1943; July 1944; Feb. 1945; June 1946; and May 1947? *Bill Dean, 808-17th St., N.W., Washington, D.C.*

To be sure your Rendezvous item appears in the February issue, we should have your request by December 15.—THE EDITORS.

Civil Air Patrol

Part-Time Flyers Give USAF A Hand

By T/Sgt. Frank Burnham

CAP cadets learn at summer camp.

EVERGLADES Rescue—Hollywood, Fla.—A Hollywood man and his 12-year-old son, lost for two days and a night in the Florida Everglades, were rescued today from the watery, insect-infested wilderness after being sighted by Civil Air Patrol flyers who had joined in the area-wide search for the pair."

"Downed Pilot Saved — Geneseo, Ill.—Thirteen hours after he ejected himself from a crippled Navy Banshee jet fighter, Lt. (jg) J. J. Meder of Pittsburgh, Penna., was spotted in a muddy soybean field by Illinois Wing CAP searchers. Lieutenant Meder was suffering from multiple fractures of both legs, internal injuries, shock and exposure. Physicians at Glenview Naval Air Station said he would not have lived another night if he had not been found."

"CAP Planes Rush GG to Stricken Montana Town—Great Falls, Mont.—Staff members of the Montana Wing, Civil Air Patrol, took to the air today to rush shipments of precious gamma globulin to Livingston where mass inoculations against polio were underway."

As the more than 80,000 adult and cadet members of Civil Air Patrol, civilian auxiliary of the US Air Force, celebrate CAP's twelfth birthday December 1, they can reflect on a year during which almost every week was punctuated by such news reports.

In its main flying role as the domestic air arm of Air Rescue Service, Civil Air Patrol's volunteer members flew seventy-eight percent of the total hours and sorties flown on Air Rescue-directed searches for missing aircraft in the continental US the first six months of 1953. This amounted to more than 6,000 hours on some 3,499 sorties.

Air Rescue officials point out that CAP serves four purposes. First, with only about fifty USAF Air Rescue planes and crews on duty in the country, CAP's 7,600 lightplanes can get there first, as a rule. Second, CAP pilots are local men, familiar with their respective areas. Third, it permits Air Rescue Service to deploy its men and equipment to guard USAF's world air lanes. Finally, CAP volunteers receive no pay or allowances. Their lightplanes can be operated at a fraction of the cost of heavier Air Force types.

Founded December 1, 1941, CAP flew anti-submarine patrol, courier and liaison service, border patrol, and anti-aircraft tracking missions during World War II. Its peacetime missions include search and rescue, mercy flights, air support for Civil Defense, tracking missions for GOC and Air Force filter centers, blood lift for the American Red Cross, forest fire patrol and other non-combatant missions at the direction of the Air Force.

In addition, its corps of some 48,000 teen-age cadets get groundwork in basic aviation subjects. The Certificate of Proficiency given to any cadet who completes academic courses and attends at least one summer encampment entitles the individual to enlist in the Air Force with the grade of Airman Third Class and also waives the two-year college requirement for entrance to Aviation Cadet training.

CAP also conducts general aviation education programs aimed at the American public. Its aviation education course is used in some 225 schools. Annually CAP sponsors the National Aviation Education Workshop for teachers.

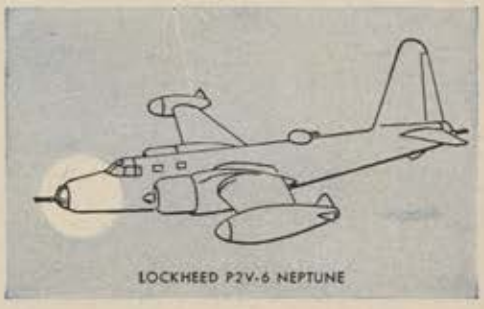
In the words of Maj. Gen. Lucas V. Beau, the Air Force general who commands this civilian volunteer group, "Civil Air Patrol is an organization solidly behind the concept that only absolute supremacy in the air can keep America free."—END

AIRCRAFT Rheem DIVISION

Serving the Aviation Industry

...as prime contractors to the United States Government and subcontractors to Douglas, Northrop, Convair, and Lockheed. The complete fuselage nose assembly for the U. S. Navy's Lockheed P2V-6 Neptune, pictured here, is a product of Rheem.

Contact us for the answers to your production problems.



LOCKHEED P2V-6 NEPTUNE

RHEEM Manufacturing Company • • • Aircraft Division, Downey, California

MERGER WITH AFA

Addition of Air Reserve Association membership makes AFA the only national group devoted to military aviation

THE AIR Force Association became the only national organization devoted to military aviation with the merger last month between AFA and the Air Reserve Association. All former members of the Air Reserve Association, under terms of the merger agreement, automatically become members of the Air Force Association. Chapters of ARA have the choice of becoming squadrons of the Air Force Association or merging with AFA squadrons in their areas.

The merger agreement, culminating five years of negotiations, was signed October 28, 1953, by George C. Kenney, AFA president, and Frank T. McCoy, Jr., newly elected ARA president, who now becomes Chairman of the National Air Reserve Council of the Air Force Association. The merger became effective October 31.

In announcing the merger of the Air Reserve Association—the leading national organization of AF Reservists—with the Air Force Association—the nation's largest airpower organization—General Kenney said the agreement states: "The officers of both associations are of the opinion that a merger would strengthen both associations by eliminating competition for membership, and that a concentration of finances, facilities, personnel, and equipment would more effectively accomplish the purposes and objectives of both associations."

In August, AFA, at its seventh annual convention in Washington, adopted, without dissent, a resolution authorizing the merger.

In October, at Orlando, Fla., delegates to the ARA convention considered and discussed the possibility of an agreement between the two organizations. Simultaneously, ARA was invited to merge with the Reserve Officers Association.

The ARA delegates, after full consideration and discussion, unanimously went on record with the statement that:

"While both AFA and ROA had made proposals for a merger with ARA, the Air Force Association has been able to offer the most advantages."

Under the agreement's terms the merged organization will be known as the Air Force Association. Its constitution and by-laws will be the constitution and by-laws of AFA.

It was further agreed that officers and directors of AFA will continue to serve as officers and directors of the merged groups.

The merger agreement provides that the national and regional officers of ARA shall serve during the next twelve months as members of the National Air Reserve Council of the Air Force Association. With McCoy as chairman, it will be the responsibility of the Council, working under AFA's President and Executive Director to:

"Plan, coordinate, recommend, and direct programs and policies for improving the organization, administration, training, and combat efficiency of the Air Force Reserve."

In addition to the creation of the Council, AFA will employ a full-time specialist at its national headquarters in Washington to administer plans and programs pertaining to the Air Reserve and Air National Guard. And *Contact*, the ARA's official publication, will be incorporated into AIR FORCE Magazine.

Each ARA member in good standing as of October 31 has received notification of his AFA membership, along with his AFA membership card, lapel button and notice of his subscription to AIR FORCE Magazine.

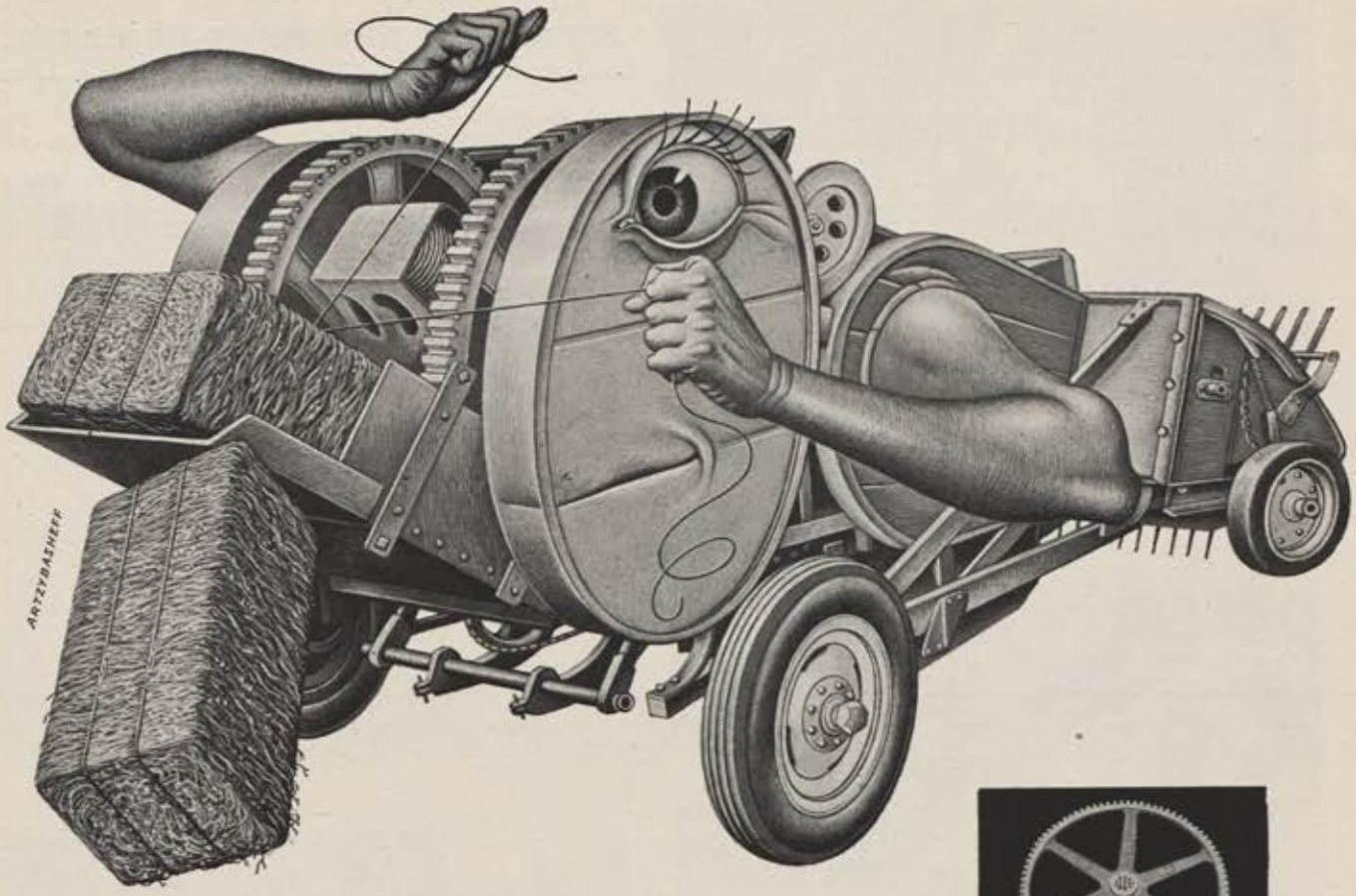
In a farewell letter, dated October 30, 1953, President McCoy, who is also an AFA regional vice president, said:

"General George C. Kenney, President of AFA, is one of the nation's great air leaders, and he believes strongly in a powerful Reserve force. I served under his command in the Pacific, and will be proud to serve under him in this new undertaking . . .

"It was a great honor for me to be elected President of ARA, if even for so short a period. ARA has a proud history and record of proud accomplishment. Since its formation, it has fulfilled a vital role in the struggle for adequate defense posture. It has given new stature to the Air Reservist.

"As members of the AFA we can give added strength to our objectives. Since membership will be our strength, I am in hopes that all of you will renew your affiliation with AFA upon expiration of your present membership, and meanwhile will encourage others to join this common endeavor."

—END



Strong "wrists" for America's new hay balers

Whisking through fields of hay . . . picking up and handling an almost incredible 2,500 bales per day . . . this man-saving, time-saving, money-saving NEW IDEA hay baler needs mighty tough gears to keep its tying mechanism on the job. To be certain these steel "wrists" have maximum strength and durability . . . NEW IDEA looks to Lycoming.

Do *you* need a precision part . . . volume production of a metal product . . . a dependable air-cooled engine . . . or development of "just an idea" in the rough or blueprint stage? Then remember—many of America's industrial and military leaders credit Lycoming with solving their most complex metal-working problems. Whatever your problem . . . *look to Lycoming!*

More than 6,000 machine tools, a wealth of creative engineering ability, and 2½ million square feet of floor space stand ready to serve your needs when you look to Lycoming.

AIR-COOLED ENGINES FOR AIRCRAFT AND INDUSTRIAL USES • PRECISION-AND-VOLUME MACHINE PARTS • GRAY-IRON CASTINGS • STEEL-PLATE FABRICATION

For sturdy, unfailing spur and bevel gears—"wrists" that drive the tying mechanism of its "one-man" hay baler—NEW IDEA looks to Lycoming for precision production.

FOR RESEARCH • FOR PRECISION PRODUCTION

LOOK TO **LYCOMING**

Lycoming-Spencer Division, Williamsport, Pa. AVCO MANUFACTURING CORPORATION Bridgeport-Lycoming Division, Stratford, Conn.

For a more complete story on Lycoming's varied abilities and facilities, write—on your company letterhead—for the illustrated booklet, "Let's Look at Lycoming."

TRIBUTES TO SOME PEOPLE WE ALL LIKE:

WAGING PEACE IS

This is an especial salute for the men and women in the "enlisted ranks" of Uncle Sam's armed forces. Whether serving at home or overseas, these people have elected to put 10, or 20, or 30 years of their lives against the essential job of holding a hard core of trained personnel ready to man the implements of national defense.

As a nation, we live a long cry from that day in April, 1775, when a handful of rugged Colonists lifted their muskets from their mantel-pieces and went to meet the enemy at Concord.

Amazing as this country's ability has been to turn its people and its production swiftly from needs of peace to those of emergency, it is also grimly clear that a man cannot come home from the office and -

DEADLY ACRID FLAMES spurt from a white phosphorus grenade as Corporal Henry W. Roark signals his flame thrower into action for the final assault on an "enemy" pillbox. Corporal Roark, fire team leader of a rifle squad at Marine Corps Schools, Quantico, Va., will see no enemy during this problem, is prepared for the real thing in time of war.

by EDGAR A. GUEST

They are the strength of freedom's wall,
The men and women, one and all,
Who serve by land and sea and sky
That liberty shall never die;
Sworn all to keep our country free
From every threat of tyranny.

Army, and Navy and Marine!
All that life holds for us they mean.
Those Air Force lads who hasten by
Are valiant guardians of the sky,
And those who stand at lonely posts
Are brave defenders of our coasts.

G.I.'s or Gobs or Leather Necks!
The humblest boy who swabs the decks,
The Wacs and Waves, at work or ease,
For us are freedom's guarantees,
All are our stalwart, steadfast friends.
On them our way of life depends.

Brave youth! Draftee or Volunteer
It matters not. When foes appear
Who would destroy our glorious land,
Behind the wall you build we stand,
Assured that freedom, by your worth,
Shall never perish from the earth.

If you would like a reprint of this poem, suitable for framing, write Chrysler Corp., Dept. RS3, 341 Massachusetts Ave., Detroit, Mich.

40 MM TWIN MOUNT SCOWLS DEFIANTLY from the after-island gun tub of the U.S.S. Tarawa as AB 3/c John Robertson mans the No. 1 loader during general quarters. John enlisted in the Navy in 1950, spent 6 months in special schools after boot camp. Unmarried, John plans to see the world as he furthers his own career in the Navy.

This advertisement appears in **LIFE** *December 7, 1953*

ENLISTED WOMEN of the Army, Navy, Air Force and Marines are represented by this color guard quartet. All voluntary enlistments, these four typify the loyalty to country of 46,000 women currently serving in the armed forces.

THE NATION'S ONLY NAVY from 1790 to 1798, the U.S. Coast Guard is still making history in pioneering new developments of sea rescue and coastal defense. Here, a helicopter, unaided, dips a lone crash survivor from the sea. Under the Navy in war, the Coast Guard is now controlled by the Treasury Dept.

THEIR CAREER . . .

take down a 75 mm howitzer, or a 46-ton tank, or a jet plane, or a snorkel-breathing submarine, or a sky-sweeping radarscope, or a 16-inch gunned battlewagon, and just step forth to meet the foe.

Highly technical modern fighting equipment is both vital and hard to handle. The people who man and serve these devices must be trained long and hard and well. In times of peace, especially, there will not be much glory for the folks who take on this job.

But, peace or war, there can be only gratitude in the hearts of their civilian neighbors for the diligence with which they dedicate the good years of their lives to these jobs.

Yes, the people of Chrysler Corporation are proud to tip their hats deep to those people in the enlisted ranks of the U.S. Army, Navy, Air Force, Marines, and Coast Guard.

Without them standing by, armed might would not be very mighty.

This message about people we all like is presented by your PLYMOUTH—DODGE—DE SOTO—CHRYSLER—DODGE "JOB-RATED" TRUCK dealers, and

CHRYSLER CORPORATION

Enjoy "Medallion Theatre" . . . dramatic entertainment for all the family . . . every week. CBS-TV. See local paper for time and station.

PHOTOS BY PHILIPPE HALSMAN

THIRSTY WING TANK rapidly consumes 230 gallons as S/Sgt. Robert Dieffenderfer refuels his T-33 jet trainer at the end of a routine flight. Attached to the 5th Fighter Interceptor Squadron at McGuire Air Force Base, N.J., Crew Chief Dieffenderfer, a skilled technician at only 26, has sole responsibility for maintenance and upkeep of $100,000 plane.

RUGGED TRAINING for rugged soldiers is all part of Army life, as M/Sgt. James Matthews shows two recruits the ropes at Ft. Dix, N. J. Only 29, Matthews is top sergeant over 234 men in the 60th infantry regiment. A typical career man, Matthews is married, has two children, plans to "try for 20 years, then buy a place at the shore and just fish."

LANDS WITH A 12-TON LOAD ...ON AN 855 FOOT STRIP!

No cargo airplane ever built can get into and out of the tight spots with a big bulk load, like the combat-proven Fairchild "Flying Boxcar." The C-119 lands and brakes to a stop on an 855 foot runway with a 12-ton load! Designed in every detail as a general military bulk cargo transport, the C-119 is equipped with reversible propellers and a powerful main and nose wheel braking system that enable it to land on the aircraft equivalent of the proverbial "dime." Here is the medium transport cargo airplane that so exactly meets the combat-transport needs of the U. S. Armed Forces!

ENGINE AND AIRPLANE CORPORATION
FAIRCHILD
Aircraft Division
HAGERSTOWN, MARYLAND

Guided Missiles Division, Wyandanch, L. I., N. Y.
Engine Division, Farmingdale, L. I., N. Y.

AIR FORCE
DECEMBER 1953

American infantrymen in Paris in World War II.

THE CONSCRIPTION FALLACY

Conscription, by any name, as a solution to our defense manpower problems, just doesn't make military sense

By Brigadier General Bonner Fellers, *US Army (Retired)*

THE STAGE is being set to sell conscription to the American people.

This month the National Security Training Commission, which has been revised and strengthened by President Eisenhower, will report on the feasibility of superimposing universal military training upon the present draft.

They do not call it Universal Military Training any more. National Security Training is the new and more palatable trade name. But whatever the label on the package, it means mandatory military service for America's eighteen-year-old sons.

The National Security Training Commission will supposedly give us an objective appraisal of this vital issue. But it is no secret that every member of the Commission favors National Security Training. In fact, its president, Dr. Karl T. Compton, recently wrote in a national magazine that National Security Training would "guarantee adequate defense at a cost we can afford for the years that may be necessary."

This conclusion fits neatly into the current official trend in defense thinking. To Russia's H-bomb threat, the Administration has replied with a $6 billion *cut* in the Air Force budget and an *increased* budget for the Army. And the Administration has left the door open for National Security Training implementation, which will be supported, as it is perennially, by the large and powerful veterans' organizations of the country. The Administration recently may have sent up a trial balloon on the subject in the form of a strong pro-Administration commentator who declared flatly, "We have got to give Ike UMT."

In this atmosphere, the new Joint Chiefs of Staff have made it apparent that the old strategy of balanced forces—with each of the three services getting roughly one-third of the defense budget—is to continue. At the same time, the Joint Chiefs have indicated their belief that our most critical military shortage is in trained manpower.

For many years we have heard propaganda, largely tax-subsidized, that Universal Military Training is the only

(Continued on following page)

answer to this manpower problem. Indeed, so powerful is this effort that many of our citizens have been led to believe that National Security Training is synonymous with defense. Those who have opposed it have been sneered at as pacifists and dupes of the Communists.

Thus far, the opposition has come exclusively from those who argue the non-military aspects of the case. Churchmen have opposed UMT on moral grounds. Others have been concerned with the prospect of placing our youth under the thumb of big government. Others have opposed it as being an impingement on personal liberties. What our citizens have not been told is that universal conscription—call it what you will—just does not make *military* sense. Even worse, it can lull us into a false and fatal sense of security.

Conscription must be judged first by the military yardstick. Let us take a look at the facts.

No thinking person now doubts that the Kremlin has both the A- and H-bomb and the means to deliver them. The President has announced that "the Soviets now have the capability of atomic attack on us and such capability will increase with the passage of time."

Will National Security Training "guarantee adequate defense at a cost we can afford," in the face of this rising Red peril?

Except for her large submarine fleet, Russia has no formidable navy. She has no sizable merchant marine. So long as our Navy controls the seas, no Red army invasion of the United States is possible. Our most serious danger lies in Russia's growing strategic Air Force, now estimated at more than 1,000 intercontinental bombers. These bombers were not built to strike at Europe. They have far more range than is required to reach European targets. But, on one-way flights, at least, they can strike—with A- or H-bombs—any military or industrial target in the United States.

This newly created strategic capability is evidence that the Kremlin knows the United States is the most formidable obstacle to worldwide Communist expansion. Before Lenin's dream of world domination can possibly be realized, Russia's long-range bombers must cripple American industry and military power.

A glance at a globe or a polar projection map makes it graphically clear that Russia's present arctic bases are as close to the industrial heart of the United States as any bases the Russians could capture or build in Western Europe. Russia does not need to overrun or dominate Europe in order to bomb the United States. That this deadly peril from the arctic region is separate and distinct from any situation—favorable or unfavorable—which might develop in Europe, unfortunately is not widely understood.

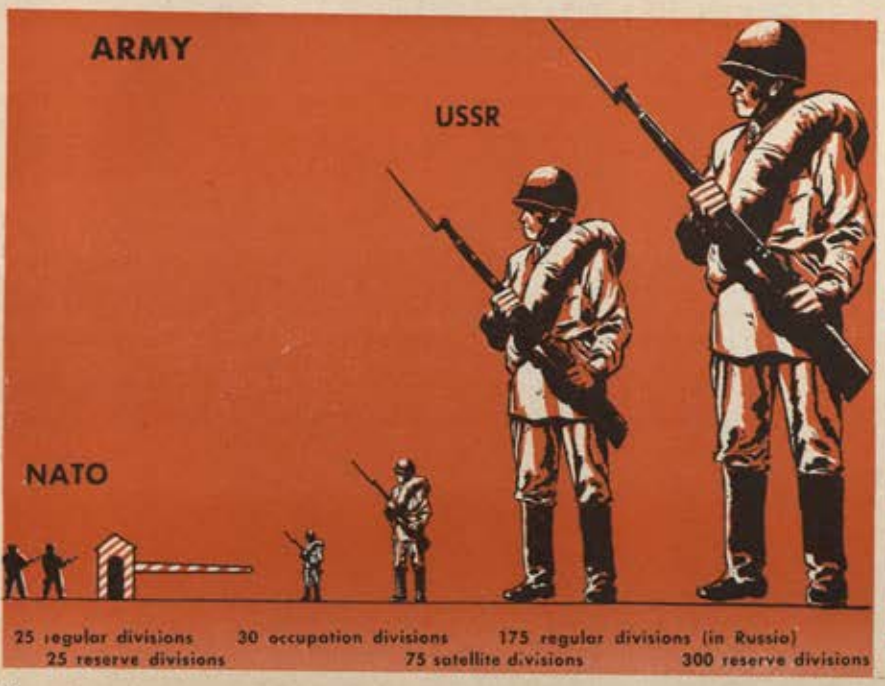
And there is a second great threat to the United States. In addition to the havoc submarines can play with surface shipping they now can be used to launch atomic missiles. Consequently our coastal cities now lie exposed to this new danger from the sea.

How would National Security Training attempt to meet these two mortal threats to our survival? Suppose that all American youth were trained as well as West Point cadets. Could this reservoir of trained manpower appreciably lessen the Red air and submarine threats against our homeland? It seems evident that they can only be countered with superior air and naval forces, *in being*. To be effective, these essential forces must be modernly equipped, superbly trained, sharpened for battle, *instantly ready to strike*. Only trained, talented, experienced men can hope to do the job.

Advocates of National Security Training claim that conscription would speed war mobilization. But another war would come with lightning rapidity, with little or no warning, coupled with appalling devastation. Only seasoned, forces, *in being and instantly ready*, could resist and strike back. No longer can we think of America as a vast and secure base, providing trainees and munitions to speed full-scale mobilization for war.

Today, and in the future, we must rely on the armed forces, *in being, when the war starts*. In fact, the initial atomic and hydrogen assault against us might, and probably would, be so devastating as to make troop mobilization utterly impossible. And the outcome of the war might well be decided during this first short and ghastly phase.

Even if trainee mobilization were possible, the training called for in the National Security Training program would be wholly inadequate to meet the stunning blows of the



THE AUTHOR

Bonner Fellers, World War II veteran of the African Desert and Pacific campaigns, has frequently lectured and written on military subjects. His articles have appeared in *Reader's Digest, Mercury, The Freeman, Coronet, Nation's Business* and *Human Events*. His recent book, *Wings for Peace* (Henry Regnery, Chicago), won an AFA Citation of Honor. General Fellers is a 1918 graduate of West Point. The views he expresses here on the controversial topic of compulsory national conscription are entirely his own and are not to be construed necessarily as reflecting those of the editors of AIR FORCE Magazine or of the membership and officers of the Air Force Association.

initial phases of the next war.

It takes seven years to train a hand-picked man to be a proficient pilot, bombardier, or navigator for our most modern bomber—the B-47. Airmen must be thoroughly trained in five complex and exacting technical fields:

- Pilots and Combat Crews (must be volunteers).
- Aircraft, maintenance and repair.
- Weapons, maintenance and repair.
- Electronic and Radio Operation.
- Weather Systems.

Army and Navy personnel standards and training requirements are also high.

It is revealing to compare the stern requirements for men in the regular services with those proposed in the NST program. Suppose the NST trainee and the four-year regular enlisted volunteer start even, each with a six-months' basic training period. During the next seven and a half years the NST trainee will have received two weeks' training, in seven successive summers, plus two hours' night instruction once every two weeks. This totals twenty-one weeks or 2.8 weeks a year.

During the next three and a half years, the regular enlisted volunteer will have received a total of 182 weeks training. At the prescribed NST rate, it would take the trainee sixty years to equal the training a man gets in a four-year enlistment in the regular service!

Even the two-year draft is far too short a time to train Navy and Air Force men properly. As a consequence of this rapid turnover, both these services already have a heavy surplus of *untrained* or *partially trained* men. At the same time there is an acute shortage of qualified personnel. The proposed NST program would only make this unsatisfactory situation even worse.

Ever since soldier-statesman Gen. George C. Marshall became Army Chief of Staff in September 1939, our defense policy has been strongly influenced by ground officers who advocated compulsory universal service. The Navy and the Air Force, however, have gone along most reluctantly. In fact, were they free to express themselves, the Navy and the Air Force would actively oppose NST.

Even Army leaders recognize privately that six months of NST would be of little value. They justify it only on the grounds that it might lead to longer training periods. The Army also supports NST because it would swell Army strength without producing an excessively large "standing" Army. The reserve organizations will support it because it might lead to compulsory reserve training. But the questions of what these NST trainees would be worth as a defensive force against air-atomic attack has been carefully avoided.

The United States is not the only power vulnerable to Red attack. Europe's position is far more precarious. There, the Red air force, the Red army, and Red submarine missiles can all strike effectively.

Should war start in Europe, the United States is bound by treaty to intervene. On the highest governmental levels, our national defense is shaped by the conviction that come what may, "We must save Europe." Somehow the delusion persists that, as long as Europe is safe from invasion, America cannot be attacked. Some hold that aid to Europe is the best possible investment in our own security.

If these premises are accepted, two more steps follow in logical sequence: *first*, continuance of substantial foreign aid lest NATO fall apart, and *second*, if war comes, American reinforcements by the million for the flimsy NATO Army.

The slim NATO forces in Europe face unprecedented military might. In East Berlin, Poland, and East Germany, Russia has thirty occupational divisions; back of these are seventy-five divisions of the Central European satellites; behind these are 175 regular Red Army and 300 reserve divisions, equipped and trained.

Facing this formidable array, NATO along the Rhine has some twenty-five regular and a like number of reserve divisions in a generally poor state of readiness. These flimsy forces can, in no way, be considered as a war deterrent. Since they have no power of retaliation, should Russia strike, they pose no counter-threat against Russia itself.

Several hundred Red twin-jet bombers, poised on new bases in Central Europe, are capable of instant atomic strikes on NATO nations. The 20,000 combat planes of the Red Air Force are overwhelmingly stronger than our largely obsolescent 4,000 NATO aircraft. The NATO Air Force, like NATO ground forces, is too weak to be called a deterrent to Red aggression.

Should war come to Europe, Red forces could quickly reach the Atlantic Coast.

The recent deep cuts in our Air Force budget indicate that Communist air supremacy over Europe is now accepted as inevitable. Even if we could hold our lines along the Rhine, our fighting forces would soon become dependent upon supplies and reinforcements from America. The Reds, able to destroy our industrial plants and ports of embarkation as well as European ports of debarkation and forward supply lines, could shut off the flow of Ameri-

(Continued on following page)

A good crew chief is a critical item in today's Air Force.

can support to the fighting front. Without freedom from enemy air attack, NATO forces could not long hold out. Our men would soon be dead or on their way to Siberia.

In this kind of situation, it is hard to see how conscription would be of assistance to our European allies. As a matter of fact, it has already been determined, although not announced, that the European program cannot be supported from the United States. Apparently, for political or psychological reasons, this decision has not been, and probably will not be, officially made known.

A military decision against Russia on the seas is impossible. Although we can control the surface of the sea, blockade against the Communist states canot be decisive. Behind the Iron Curtain lie all the resources and heavy industry necessary to support total, sustained, modern war. And these resources are safe and well protected, both militarily and geographically from land or sea attack.

Since neither the US nor Russia can gain a victory on land or sea, a final decision can be won only in the sky. *The side which controls the air can win the next war and National Security Training cannot influence this decisive phase of modern combat.*

The 1951 NST Commission report contended that "full implementation of UMT may eventually save in excess of $13 billion annually." This claim is worth looking into. The Commissioners estimated their program would cost $4 billion the first year with a recurring annual cost of nearly $2 billion. One of the services, however, placed the annual cost after the first year at $7,200 for each trainee, or $5.7 billion for the program. Assuming the annual recurring cost could be held to $2 billion, $15 billion would have to be cut from the defense budget to save the $13 billion the Commission predicted.

And there's a hidden cost, not even considered. As soon as this proposed universal conscription program gets into full swing, some six million trainees, led by professionals, will be demanding benefits—bonuses, pensions, medical care, educational subsidies, pressuring the Congress from all sides.

Perhaps the Commission may have intended that NST take the place of a $15 billion defense investment. Since NST cannot directly contribute to the initial, and probably the decisive phase of the next war, what is its proper place in the defense program?

In view of known enemy capabilities, the following defense priorities are indicated:

- The best possible intelligence system.
- The strongest Air Force in the world (to strike the enemy and defend the homeland).
- Continued naval supremacy.
- A small professional army (largely airborne).
- Ample research funds.
- Full strength National Guard.
- A realistic voluntary Air Reserve program to place the Reserve on a par with the Guard in terms of readiness.

We need all of these elements in our defense establishment. In the light of the present world tension, no objective estimate could conceivably place NST ahead of these seven priorities. Their cost, however, is so staggering that no funds would remain for NST. To hold out for conscription at the expense of basic defense elements would be criminal bungling.

Those who cling to the old-fashioned strategy of mass combat resist any tendency to reduce the size of the Army. Fortunately for the free world, however, the development of modern weapons is forcing our strategy away from mass surface combat. Once the enemy air force is cleared from the sky, total mobilization of our military manpower would be unnecessary. And the numerical strength of the Communist armies would become a liability rather than an asset. Our small, well-trained ground forces could be flown anywhere, even deep into enemy territory. There they could be air-defended and air-supplied. Airpower could deny supplies to Communist armies, destroy their transport, immobilize and demoralize them.

The proponents of conscription claim that the NST corps represents the best hope for an effective Civil Defense Organization. The trainees could deal with the death and confusion resulting from air strikes against our cities. Despite this fact, to spend $2 to $5 billion annually to handle a debacle which could be prevented if we spend our defense money wisely, is a defeatist solution.

Every man a soldier was George Washington's wise defense prescription. In his day the most formidable weapon was a rifle in the hands of a man who knew how to use it. Today's greatest weapon, the H-bomb, can destroy instantly everything in a ten-mile circle. This is the kind of destruction which we must prepare to deter or to retaliate against if it comes. NST can make no appreciable contribution toward this goal. *It must not be permitted to lull us into a false sense of security.*

For those who believe—as many do—that NST is the answer to our military manpower problem, consider the most critical phase of this problem—reenlistment in the regular forces.

The NST trainee is in no way obliged to enlist in the regular services. Their problem of recruitment remains acute and the turnover tremendous, even if NST becomes a reality.

At the end of four years of duty, an enlisted man in the regular forces is just beginning to master his job. Yet, for a combination of reasons, only about fifteen percent are reenlisting. No business concern could survive the extravagance of such a rapid turnover in technical personnel.

Take electronics, for example, without which modern air and sea power would have no meaning. Electronic devices take the place of human perception when speed,

DEFENSE PRIORITIES

On a first-things-first basis, here's the minimum we need to meet the Russian threat:

- **The best possible intelligence system**
- **The strongest Air Force in the world (to strike the enemy and defend the homeland)**
- **Continued naval supremacy**
- **A small professional army (largely airborne)**
- **Ample research funds**
- **Full strength National Guard**
- **A realistic voluntary Air Reserve program to place the Reserve on a par with the Guard in terms of readiness**

It takes seven years to train a hand-picked man for the triple-threat crew job on a B-47.

fatigue, or darkness impair proper physical reaction. Electronics actually improve upon human perception and are as essential in modern warfare as were pebbles for David's slingshot.

About the time a serviceman has mastered his job in electronics, his enlistment expires. Commercial companies, with millions of television sets to make and other millions to service, lose no time in making attractive offers. The service specialists would not be human if they spurned the lure. And the armed forces, on which our survival may depend, have to start all over, training new and green men. Conscription, instead of offering a solution, only compounds these problems.

If advocates of NST are sincerely interested in solving our military manpower dilemma, let them concentrate their efforts—and their propaganda machines—on service pay competitive with commercial practice, on better living conditions for our military men and their families, on more attractive retirement inducements. In the long run, these considerations would save money. Heavy reenlistments would follow so as to insure the highest possible personnel standards. *The time is long since past when just anyone can "soldier."*

It is appalling that the American people have been denied the facts on National Defense. While Pentagon propaganda has proclaimed the dire necessity for NST and cleverly extolled the effectiveness of obsolescent weapons and World War I strategy, the Air Force has failed utterly to educate our people. The Defense Department has dropped an iron curtain about the Air Force. It would appear that its leaders remain silent lest they be punished and Air Force appropriations cut still deeper. The gag rule is in force.

As a consequence the enormous deterrent power of modern weapons has never caught the imagination of the American people.

But the Kremlin senses this terrific power. For more than thirty years Russia has been building up her heavy industry. Russia is the base for the Communist operation to encompass the world. Heavy industry is an essential part of this base and Russia cannot afford either to lose it or to see it crippled.

If we possess the power for sustained strikes against Russia's war machine and war industry until it is totally destroyed, the chances of World War III are indeed remote. In view of the total destructiveness of modern weapons, it is clear that the only way we can save Europe and protect America is to *avoid war.*

The adoption of NST merely would be preparation for past wars. It would mean that our leaders have failed to grasp the nature of the new, rising Red peril from the sky.

Somehow these issues must be taken to the American people.—END

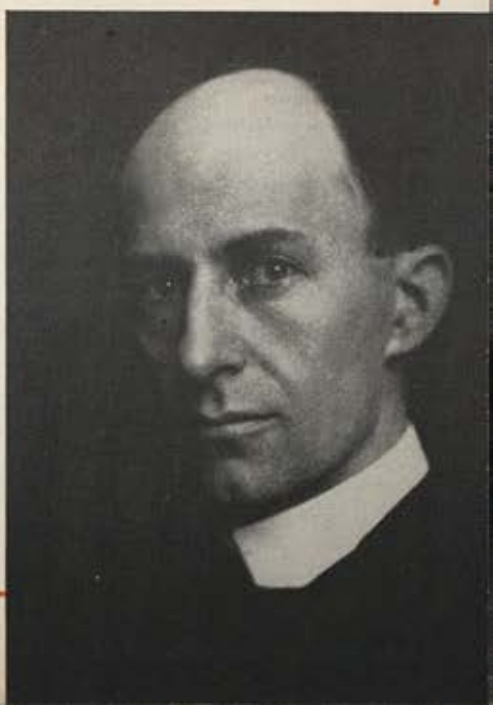
AVIATION'S HALL OF FAME

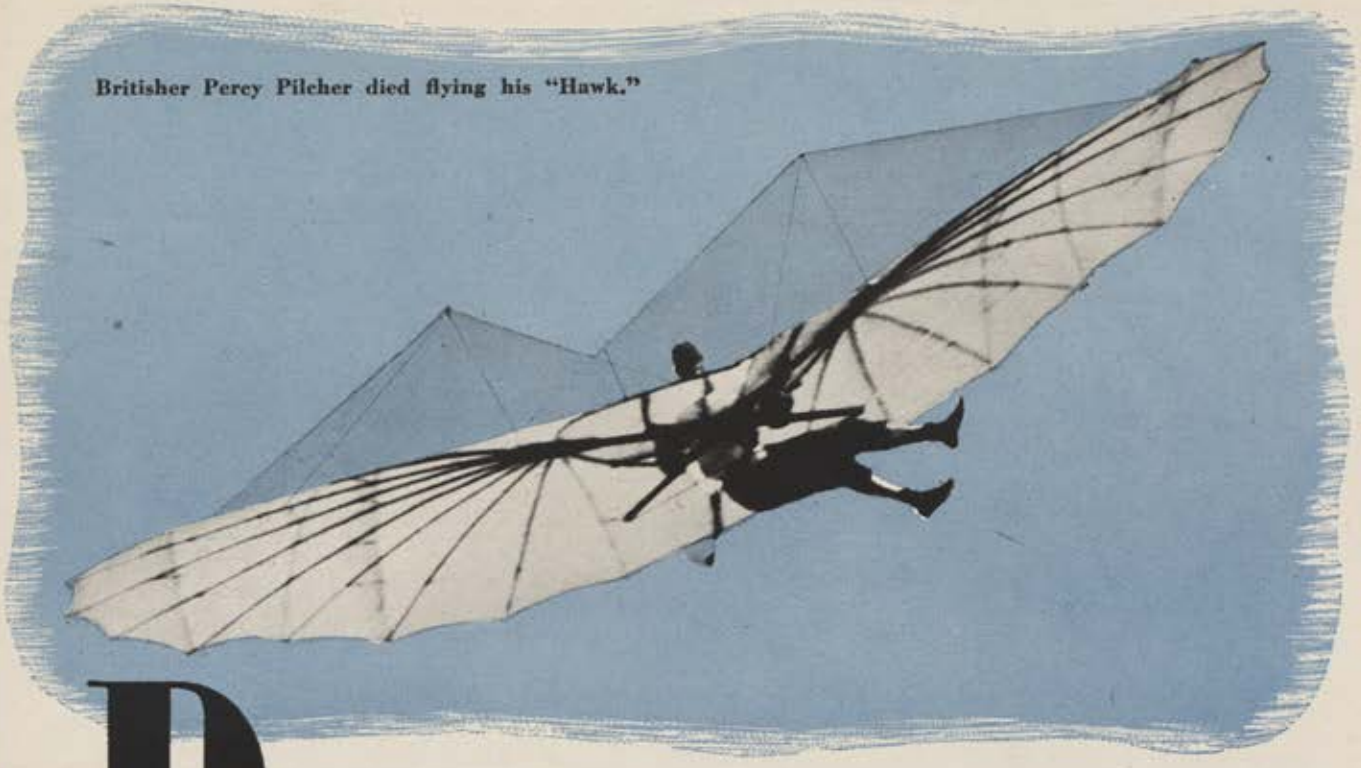
The fiftieth anniversary of powered flight seems a fitting time to pay special tribute to the courageous Wright Brothers

One of the more thankless tasks in the aviation writing business these days is thinking of something new to say about the Brothers Wright and their remarkable achievement of fifty years ago. The story of that first flight has been told and retold, often with a lacing of fancy intermingled with the facts. We don't intend to add our version to the rest. We did feel that, in this fiftieth anniversary year, we had an obligation to help place the significance of this great event in proper perspective and to shed a little sidelight on the early days of aviation. Hence, on the following pages you will find, first, a highly condensed but complete roundup of the truly early birds—those intrepid pioneers whose attempts at flight preceded the successful one at Kitty Hawk. Next is the story of how bureaucratic bungling and lack of foresight on the part of the military very nearly put the US government in the position of failing to benefit from the inventive work of two of its own citizens—how the Wrights almost didn't sell their airplane to the US Army. In conclusion is the tale of the contributions of the military, once their eyes were open to the potential of this new instrument, to the progress of powered flight through the years. It occurred to us, too, that since baseball has its "Hall of Fame" and government and other fields of activity have theirs, it would be only fitting and proper that an "Aviation Hall of Fame" be added to the list. The Air Force Association, therefore, hereby announces the establishment of its own "Aviation Hall of Fame" with the nominations for the first two places therein going to the two men who started it all—Wilbur and Orville Wright. — The Editors.

Orville Wright

Wilbur Wright





Britisher Percy Pilcher died flying his "Hawk."

PRELUDE TO KITTY HAWK

Man probed the mysteries of flight for centuries before Kitty Hawk.

Early aviation history brings the Wrights into perspective

By Walter T. Bonney

DREAMS, visions, creeping progress . . . and then accomplishments! Untold milleniums when man paused from his plodding to watch enviously the soaring and wheeling birds.

Centuries when man had visions of "magickal vapours" and other occult devices that would solve the secret of flight. In the dream world of legend and mythology the ways of flight were many. There were the winged men of Egypt, and the winged bulls of Assyria. Sinbad the Sailor had his great Roc, and the Arabs their magic flying carpet. There was the tragedy of Icarus, whose wings came unstuck when he flew too close to the sun, and Pegasus, perhaps the most fabulous of the winged steeds of yore.

From 400 years before Christ until the 15th century, there was produced a mass of apocrypha. In this category are the stories about the wooden dove built by the learned geometer, Archytas. Possessed of such special qualities as an "aura of spirit," even this marvel of the pre-Christian era, "if it fell, it could not raise itself up any more."

Towering high above the mists and vapors of 15th century legend and doubtful history is the incredible genius, Leonardo da Vinci. His invention of the aerial screw, or propeller, with which he equipped his small, sometimes successful helicopter models, was a contribution to the ages. From it has come modern marine transport as well as airplane and helicopter flight. Hardly less important was his invention of the parachute. On the theoretical side, he anticipated, by two centuries, the findings of Newton, when he wrote that "the movement of the air against a fixed thing is as great as the movement of the moveable thing against the air which is immovable."

After Leonardo there was little aeronautical progress for some 200 years. In 1662, in England, King Charles granted a charter for the formation of the Royal Society to give status to the hitherto private meetings of "divers worthy persons inquisitive into natural philosophy." Among the early members of that body was the Lord Bishop of Chester, John Wilkins, who listed four ways by which man could hope to fly: With the spirits of angels, with the help of fowls, with wings fastened to the body, and with a flying chariot. If this smacks of necromancy, be tolerant and remember that Wilkins' was the voice of 17th century science proclaiming that the seemingly impossible was in reality not impossible.

On the eve of the 19th century, man still had a long, long way to go. Lacking engines even remotely suitable, lacking metals light and strong, lacking even the most rudimentary knowledge of aerodynamics, he was still (except for the balloon) earthbound. Nevertheless, he continued to dream, and to find comfort in visions. He was beginning to learn some of the necessary knowledge that eventually would lead to flight. He was beginning to experiment.

The year 1776 is memorable, but not only because it

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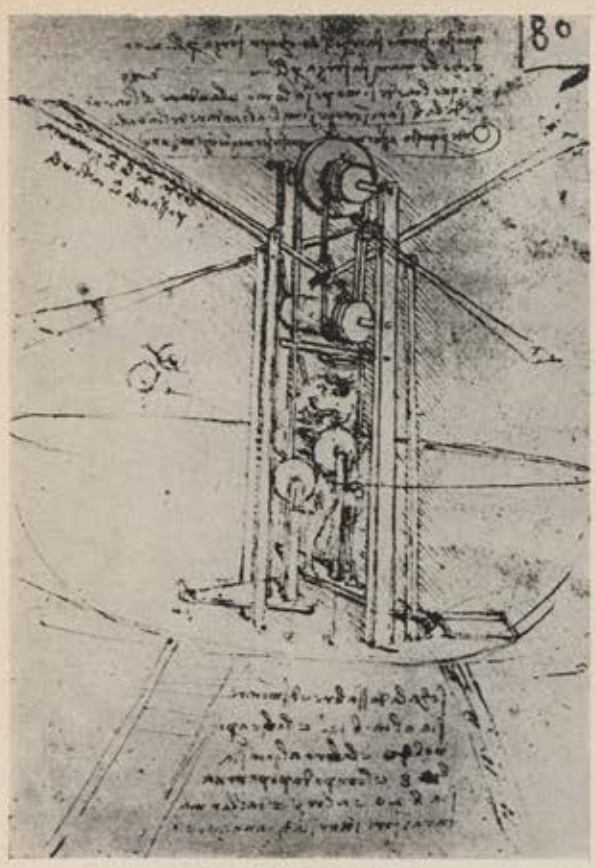


Leonardo da Vinci, the 15th century genius, claimed his pedal-driven "helicopter" would lift a 200-lb. operator.

was the date our forefathers declared their independence of kings. In that year, too, Boulton and Watt produced their first effective steam engine; and, in the doing, sparked an industrial revolution which has yet to run its course. The steam engine indirectly deserves credit for hastening the advent of the airplane because—although it never proved practicable as an aircraft engine—it caused men for the first time to think in terms of the existence of a mechanical power plant.

Among the first to propose an airplane propeller-driven by an engine was Sir George Cayley.

Called the father of British aeronautics, he lived from 1773 to 1857. He saw the need for streamlined construction, and is credited with realizing that a cambered wing, rather than a flat surface, would be required. He conceived, as one solution to the problems at hand, biplane construction with struts and diagonal bracing. He used this in building a glider, which he fitted with both horizontal and vertical rudders, the beginnings of today's airplane controls.

Beginning about 1840, a prosperous English manufacturer, John Stringfellow, began building a lightweight steam engine to power a monoplane model, with two six-bladed propellers, designed by William S. Henson. By 1848 the model was flown a distance of 120 feet. Some writers credit this as being the first practically powered airplane model capable of approaching sustained and directed flight.

H. H. Phillips was another of the experimenters who contributed to the advance of aeronautics. As a result of painstaking work on air foils in "artificial currents of air, produced by induction from a steam jet in a wooden trunk or conduit," Phillips in 1884 patented a series of curved wing shapes for airplanes. These, in the main, borrowed the concave lower surfaces, and the convex upper surfaces of a bird's wings.

In France, too, aeronautical interest heightened as the 19th century moved into its last quarter. Alphonse Penaud (1850-80) was among the most brilliant of the pre-Wright experimenters. He built many models including one powered by a rubber-band motor, which flew 131 feet. In 1876 he undertook construction of a two-passenger airplane. But Penaud was almost thirty years ahead of his time. Virtually penniless and in poor health, he died at thirty.

Clement Ader, a wealthy French engineer who had prospered with development of the telephone, spent more than twenty-five years—and some $120,000—seeking to fly. He built four machines, all of which were smashed during tests. His efforts, gallant though they were, lacked even the shaky aerodynamic knowledge of those who had preceded him. Ader did, nevertheless, succeed in harnessing to an airframe steam engines which were powerful enough to provide sufficient thrust for flight.

There was the work of Sir Hiram Maxim, inventor of a machine gun and the silencer. His airplane was a veritable behemoth, powered by two steam engines developing more than 300 hp and weighing two and one-half tons. Sir Hiram had no ambitions for immediate free flight, and used a captive-track arrangement. On the last of several runs, a rear axletree broke, and it was necessary to throttle down to avoid a total smashup.

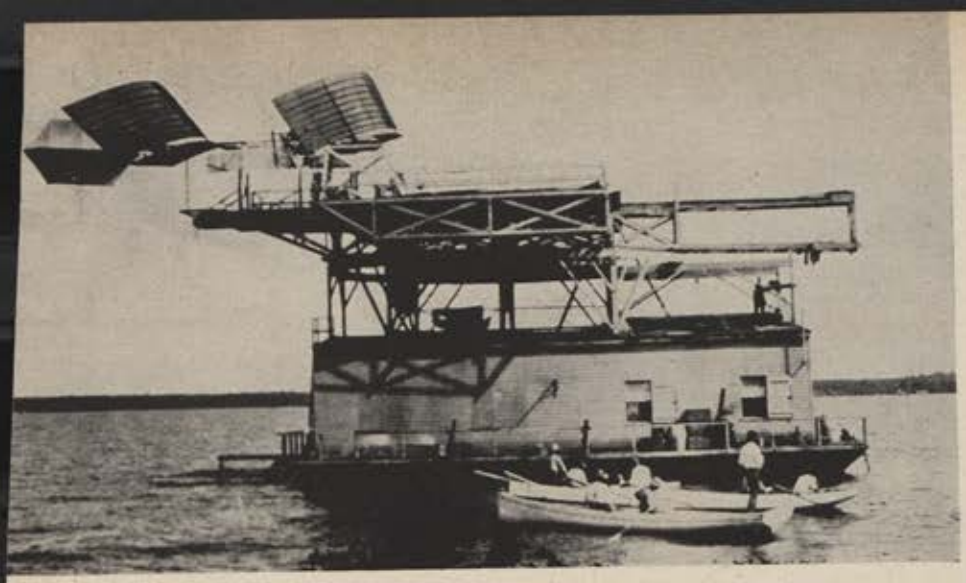
Within the course of the 19th century, aeronautics had been transformed from the pursuit of visionaries to a goal attainable by talented, practical men. The laws of aerodynamics were as yet imperfectly understood, but at least there had developed a broad awareness of definite ways how not to attempt to fly. Power plants, if not yet suitable, were being improved rapidly.

During the latter part of the 19th century a small number of determined men followed another course and struggled to wrest the secret of soaring flight from the birds. Perhaps chief among these was Otto Lilienthal who, with his brother Gustav, prefaced his important work with gliders by a long period of speculation and calculation of aerodynamic principles.

In 1891 Lilienthal decided to compare the actual lifting power with the results he and his brother had derived from their work with model wing shapes. The result, in the years up to 1896, was development of a series of gliders with fixed wings. With them, Otto made some 2,000 flights, the best of which were as far as 1,200 feet. At first, he used monoplane gliders, but later he built biplanes and appeared to favor this design.

On August 9, 1896, while flying in a new machine, Otto Lilienthal lost control and was fatally injured in a crash from a height of about fifty feet. He performed much re-

Pioneers. Dr. Langley with his aide, Charles M. Manly.



Poised for take-off (left), Langley's aerodrome atop its catapult. Plane crashed when the launching gear failed. Below, a quarter-scale model.

search into the problems of flight, but he realized also that in the air itself were to be found many answers. His work represented an especially happy mating of the theoretical and experimental approaches to the problem.

Passing quickly over the work of Percy Pilcher, English engineer and glider enthusiast who was killed in an accident in 1899, and that of John J. Montgomery, Santa Clara (Calif.) college professor who became interested in aeronautics in the early '90s and was killed in an accident in one of his gliders in 1911, one comes to Octave Chanute. Trained as a civil engineer he was in his middle sixties when he moved, about 1895, from reading and writing about aeronautics to the building of gliders. In 1896 and 1897 Chanute and his associates made some 2,000 gliding flights along the shores of Lake Michigan. After some experimentation, they settled upon the biplane form of construction which was to be employed generally in aircraft as recently as the 1920s and '30s. Chanute had transferred to the field of aeronautics the strut and diagonal wire bracing of the Pratt truss.

Chanute published papers on his work in 1897 and invited "other experimenters to improve upon our practice." The invitation remained unaccepted until March 1900, when, Chanute later recalled, "Wilbur Wright wrote to me, making inquiries as to the construction of the machine, materials to be used, the best place to experiment, etc. He said that he had notions of his own that he wanted to try, and knew of no better way of spending his vacation. All that information was gladly furnished."

Each year, through 1903, as the Wrights went to Kitty Hawk, Chanute visited them at their camp, giving encouragement and counsel. Except for delays due to mechanical failures, and bitterly cold weather, for which he had no liking, Chanute might have seen the first successful flight—because he was at the Wright camp in November of 1903.

The year 1886 marked the beginning of Samuel Pierpont Langley's researches in aerodynamics. For the twenty years previous he had been professor of physics and astronomy at The Western University, since 1908 the University of Pittsburgh. However, it was not until he went to the Smithsonian Institution in 1889, where he soon became Secretary, that he began to concentrate upon study and experiment of aeronautics.

In 1893, he began his most intensive and fruitful period of aeronautical activity. He pondered the problems of airframe design and construction. He studied propellers. He gave attention to such matters as stability and control. He directed a systematic program to develop and perfect the elements of a steam engine, which in power and in lightness would be suitable for his models, which had grown to nearly ten pounds, "flying weight."

Until May 6, 1896, the Langley work was marked by a long succession of failures. That day, two of his models —by now weighing about twenty-six pounds each—were launched from a houseboat on the Potomac river and were flown 2,300 feet and 4,200 feet, respectively. They had two pairs of wings, in tandem like a dragonfly's.

The following year, Dr. Langley wrote in *McClure's* Magazine, "I have now brought to a close the portion of the work which seemed to be specially mine—the demonstration of the practicability of mechanical flight—and for the next stage, which is the commercial and practical development of the idea, it is probable that the world may look to others."

And so it might have been, except that in 1898 the United States became involved in war with Spain, and Langley was invited to construct a flying machine with possibilities as a weapon of war. Prior to undertaking the project, Langley sought a reliable engine builder, and contracted with S. M. Balzer of New York to build two gasoline engines, each producing not less than twelve horsepower and weighing not more than 100 pounds, with delivery to be made not later than February 28, 1899.

Charles M. Manly, a Cornell University graduate, was hired in 1898 to take charge of the technical aspects of designing a sturdy, full-scale airframe. The choice could hardly have been more fortunate. In addition to possessing the engineering background required for the job, Manly was to prove himself something of a genius when it came to powerplant design.

By the summer of 1900, it became apparent that despite a determined try, Balzer could not make good on his agreement to build suitable engines. So, Manly designed and built a five-cylinder, four-cycle radial engine which, in weight and performance, was little short of revolutionary. Weighing only 207.47 pounds, it developed a constant load of 52.4 horsepower during three runs of ten hours each.

Ready for flight in the summer of 1903, the Langley machine measured forty-eight feet from wing tip to wing tip and fifty-two feet from nose to tail. The framework was of steel tubing and bevel gearing transmitted power from the

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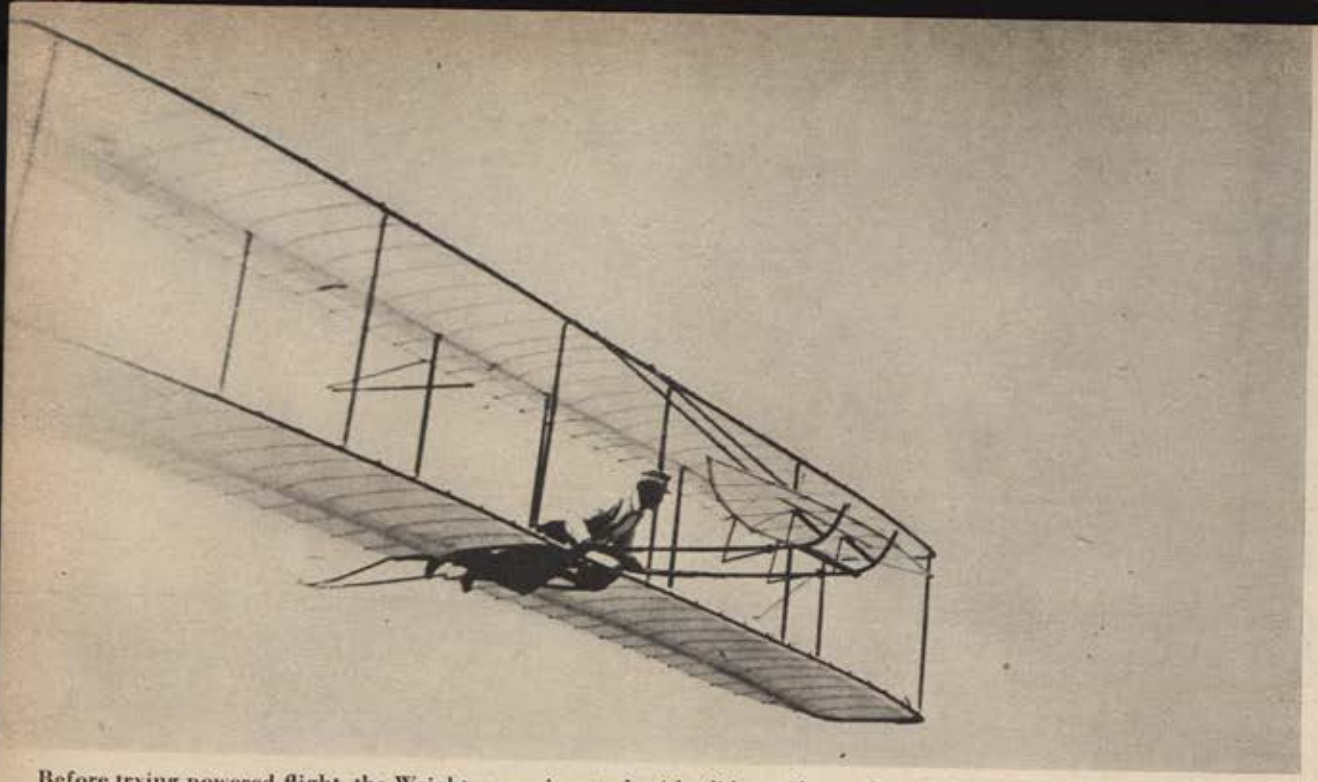


Before trying powered flight, the Wrights experimented with gliders. Above, their 1902 model at Kitty Hawk.

PRELUDE TO KITTY HAWK

CONTINUED

engine to the two pusher propellers. Total weight was 850 pounds, including the pilot, Manly.

After three months of delay, the machine was launched from the houseboat on October 7, 1903. Something went wrong, according to a contemporary account, . . . "there was a roaring grinding noise and the Langley airship tumbled over the edge of the houseboat and disappeared in the river, sixteen feet below. It simply slid into the water like a handful of mortar."

Inspection of the wreckage showed it could be repaired. It was decided a part of the launching gear, supposed to fall clear at the moment of takeoff, had fouled, twisting and pulling the airframe down to disaster.

On December 8, 1903, the repaired aircraft was again launched from the houseboat. Again something went wrong with the launching gear, and the rear wings and rudder were wrecked before the machine was free of the catapult.

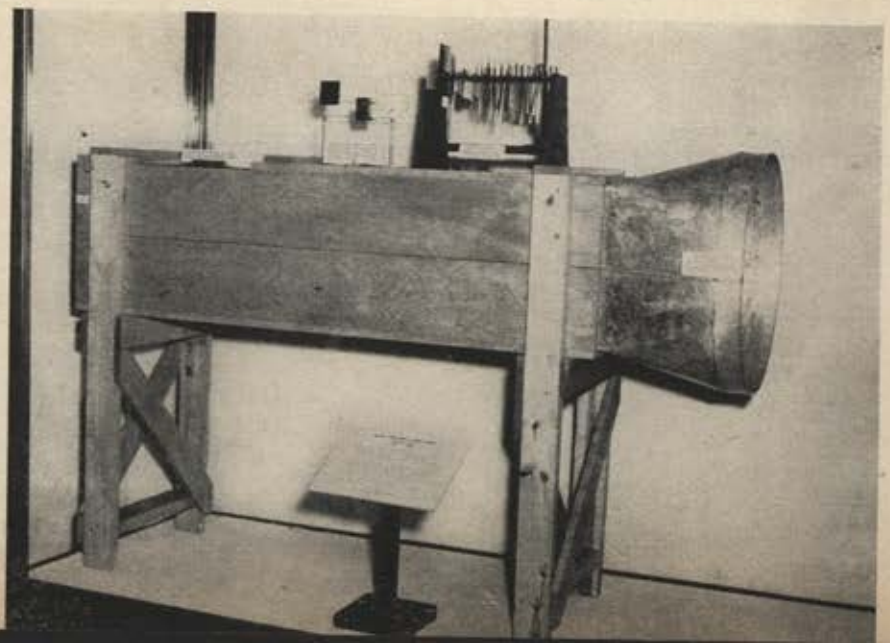
The Army was quick to tell the world it was not "prepared to make an additional allotment at this time for continuing this work," and the floodgates of jibes and criticism were opened. In 1906 Langley died; the press reports referred to him as a victim of a broken heart.

In 1914, the Langley aircraft—with modifications, and fitted with floats—was flown from Lake Keuka, near Hammondsport, N. Y. The event has been described as *prima facie* evidence that, except for malfunctions of the launching gear, most certainly Dr. Langley's airplane would have made successful flights in 1903. With equal conviction it has been described as a fake operation, perpetrated by men who stood to gain financially.

By 1942, fortunately, agreement was reached among the persons most concerned, and yet alive, respecting the changes which had been made to the Langley machine prior to the Hammondsport tests. The Smithsonian observed that "inferences from the comparisons (between the 1903 and 1914 versions) are primarily the province of interested experts . . ." and with that the controversy was officially ended.

Dr. Langley has been likened to a prophet of old who, after forty years of wandering in the wilderness, was permitted to view the promised land upon which he never

No dabblers, the Wrights approached powered flight as scientists. To study aerodynamics they built the crude wooden wind tunnel at right.



THE AUTHOR

This article is a condensation of a series originally published in Pegasus, Fairchild Engine & Airplane Co. magazine. The company plans to reprint the entire series in book form. Walter Bonney, since 1949 assistant to the executive secretary of NACA, has written about aviation since the early 1930s. For 8 years he was public relations director for Bell Aircraft.

set foot. His accomplishments in aeronautics were notable, even though his man-carrying machine failed in 1903.

The story of Wilbur and Orville Wright—and what they accomplished—is a tale told too many times to warrant retelling here. It may be possible, though, by focusing on some of its details, to provide essentials which will enable the reader to decide for himself what kind of miracle was wrought at Kitty Hawk.

Sons of a bishop of the United Brethren church, the Wrights early developed the habit of reading, to learn more about the many subjects in which they were interested. It was from such reading that they first became aware of the experiments of Lilienthal and were infected with the aeronautical contagion.

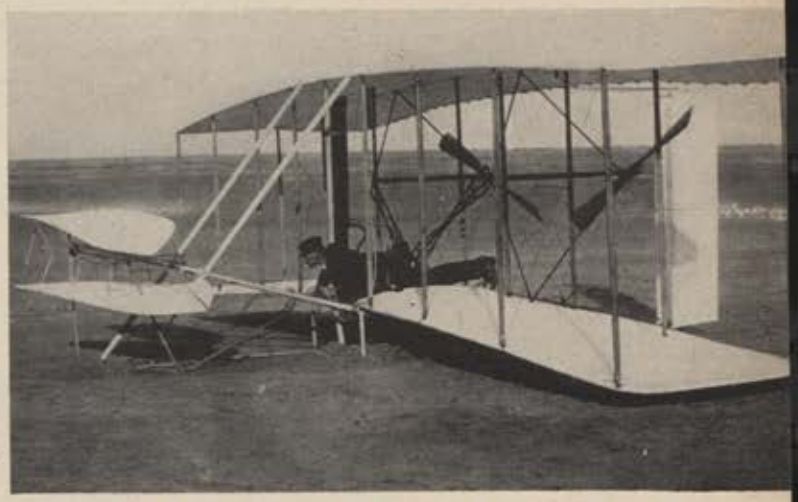
Fully as important, they read critically. Even as they absorbed accounts of the faltering efforts by so many over the years to solve the problems of heavier-than-air flight, they pondered the "whys" of the unbroken succession of failures. When their own experience taught them how difficult it was to amass even a few minutes of gliding flight, they refused either to become discouraged or to attempt too rapid progress on the basis of shaky and incomplete information.

In the spring of 1900 the Wrights were ready to move beyond the first phase of study and speculation which had lasted four years. They now proposed to construct a glider and by its use to master the art of motorless flight. In most respects, their biplane glider was not markedly different from those used by earlier experimenters. In one particular, though, it was quite different. Where others had sought to maintain equilibrium in flight by shifting the weight of their bodies, the Wrights devised a method of warping the wings to achieve lateral balance.

Although the performance of their 1900 glider had been gratifying with respect to attainment of satisfactory lateral control, the Wrights were puzzled by the fact that its lifting capabilities did not equal their expectations, which had been based on Lilienthal's tables of air pressure.

Their second glider, flown in 1901, had performance characteristics even poorer, although the wing curvature corresponded closely to that used by Lilienthal. Disillusioned, they undertook to make their own measurements and chose the wind tunnel as their research tool. For months they worked, collecting and analyzing a fund of information indispensable in designing their successful plane.

In 1902 they went again to Kitty Hawk with a new glider which incorporated the results of their wind tunnel work. So successful was the machine they felt justified in returning to Dayton, there to begin design and construction of their first airplane and the motor to power it.



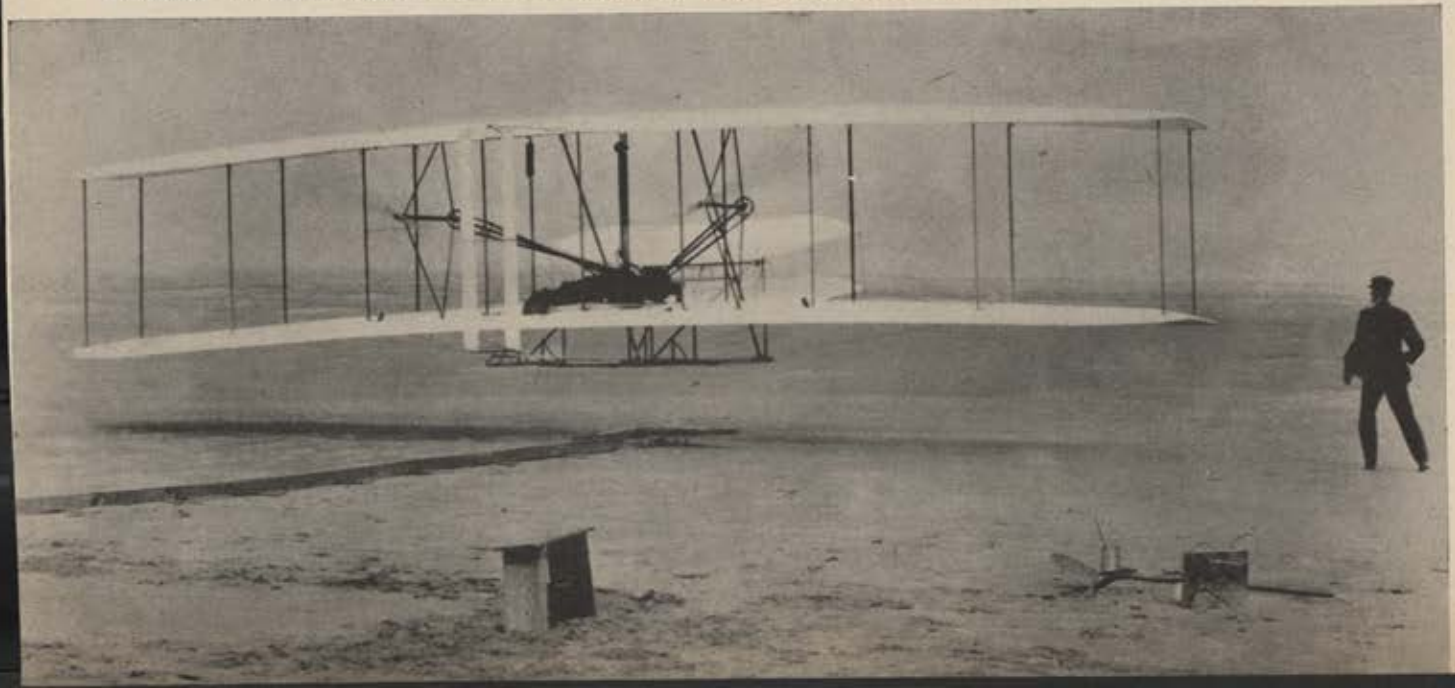
On December 14, 1903, Wilbur Wright flew for 2½ seconds, but the Wrights didn't count it as their first flight.

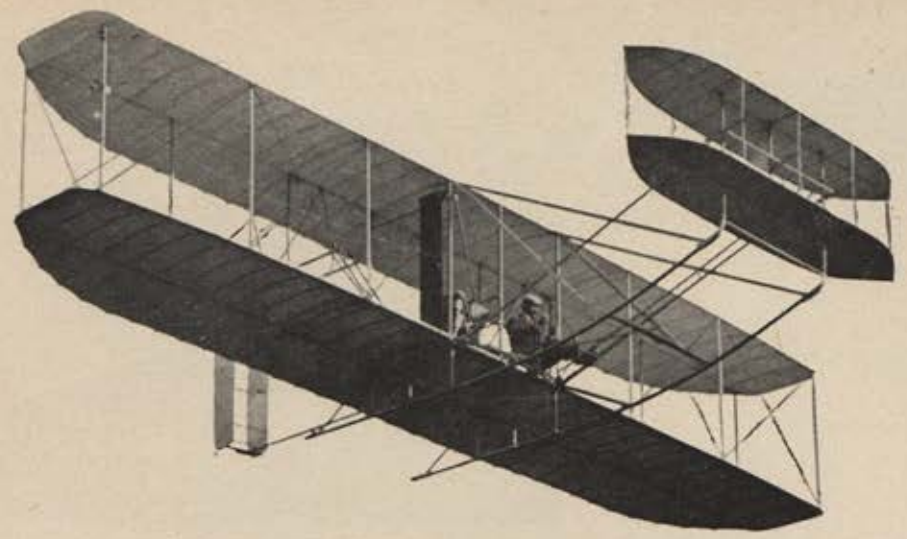
The Wrights possessed a quality ascribed to men more often than is deserved—Yankee ingenuity. It was natural for them to make things which they lacked. In their shop, where they first repaired and later manufactured bicycles, was constructed the engine for their Wright Flyer. It was a product characteristic of the Wright brothers; it was dependable if not fancy.

They possessed the characteristics and talents of many professions and trades. They were craftsmen, knowledgeable in the fabrication of parts from wood and metal; in the best sense of the word, they were mechanics. They learned how to plan and conduct the systematic research which marks the scientist. They could break a complex problem into soluble parts, and, conversely, they could visualize the individual pieces which could be fitted together into a workable whole; they merited the name of engineer.

They were remarkably self sufficient. Working together, thinking together, they conceived and designed and built and flew the world's first successful airplane . . . on December 17, 1903 . . . from the sands of Kitty Hawk.—END

December 17, 1903. Man's centuries-old dream of flight is reality. Orville's at the controls and Wilbur at right.





THE WRIGHT BROTHERS' WORST BRUSH-OFF

How the War Department almost muffed the chance to purchase the Wrights' airplane

By Fred C. Kelly

Above, the plane the Army finally bought, but only after years of stand-offishness.

IT WAS by a narrow squeak that the United States government formally recognized the work of the Wright Brothers before the Wrights had completed arrangements for the sale of their machines in Europe. The first contract with the Wrights by the United States War Department was executed on February 10, 1908, only three weeks before a Wright company was formed in France.

The Wrights had repeatedly offered their machine to the United States government before entering upon the French negotiations. As early as the autumn of 1904, Col. J. E. Capper, representing the British government, had called upon the Wrights, and asked them to make his government a proposal. But the Wrights were slow about doing so, for they did not intend to take any steps that could prevent their own government from having the opportunity to control all rights in their invention for the entire world.

They knew that, with improvements they had made in their machine, the airplane could have military uses. Observations from scouting planes could prevent surprise attacks by an enemy. They saw, too, that it would be possible to drop bombs on enemy territory. And they hoped no government would want to risk starting a war and subjecting its people to the kind of devastation the airplane could inflict. One thing they particularly believed might prevent war was the opportunity the airplane provided promptly to drop bombs on buildings occupied by the highest government officials or rulers of the country that declared war. They hoped their invention would thus make war so inadvisable that no government would dare to start one.

With all this in mind, on January 18, 1905, they wrote to their representative in Congress, Mr. Nevin, asking him to find out if the US War Department would be interested in the invention, explaining that "the numerous flights in straight lines, in circles, and over S-shaped courses, in calms and in winds, have made it quite certain that flying has been brought to a point where it can be made of great practical use."

The Congressman forwarded the letter to the War Department.

In reply, Maj. Gen. G. L. Gillespie, of the General Staff, who was President of the Board of Ordnance

and Fortification, sent an absurd letter. "The Board has found it necessary," the letter said, "to decline to make allotments for the experimental development of devices for mechanical flight," and it added that before the Board could consider suggestions with that object in view, "*the device must have been brought to the stage of practical operation*, without expense to the United States."

"It appears from the letter of Messrs. Wilbur and Orville Wright," the perspicacious General Gillespie went on, "that their machine *has not yet been brought to the stage of practical operation.*" (Italics added.)

The Wrights had not even hinted at wanting money for experimental work and had explained that their machine had already reached the stage of practical operation.

Naturally, the Wrights were disinclined to expose themselves to further rebuffs from the War Depart-

Dreams of flight pervaded these sleeping quarters of the Wrights.

ment but, urged on by their friend Octave Chanute, nine months later, in October 1905, they made another offer of their machine to the government, pointing out that the government would not need to accept any contract until after the machine had made a trial performance of at least twenty-five miles at a speed of not less than thirty miles an hour.

This time another major general, J. C. Bates, a member of the General Staff, signed the reply, but part of it was almost word for word the same as the previous one. The government would not be interested *until after the machine had been brought to the stage of practical operation!* Before considering a contract, the letter said the government would want to see drawings and descriptions, to make possible a definite conclusion as to the machine's practicability.

The Wrights curbed their irritation and replied to the letter, stating once again that they were not asking financial assistance and proposed to sell the results of experiments completed at their own expense. To this Capt. T. C. Dickson, Recorder of the Board of Ordnance, replied that they did not care to take any further action on the subject *until a machine is produced which by actual operation is shown to be able to produce horizontal flight and to carry an operator.* (Italics added.)

There wasn't much the Wrights could do in the face of such nonsense, and they then began dickering with foreign governments, while leaving the door open for negotiations with US Government.

As Wilbur Wright wrote to Chanute, "We offered our flyer to the United States Government before offering it elsewhere—our consciences are clear and we will keep them so."

Eventually the Wrights got more intelligent letters from the War Department. But there was no sudden turn-around. The Wrights felt sure that the Department no longer doubted the existence of a flying machine, but certain Army officers were unwilling to admit how blundering their behavior had been.

In the spring of 1907, Herbert Parsons, Congressman from New York, sent President Roosevelt a clipping from the *Scientific American*, whose editor had somehow learned about the Wrights' work.

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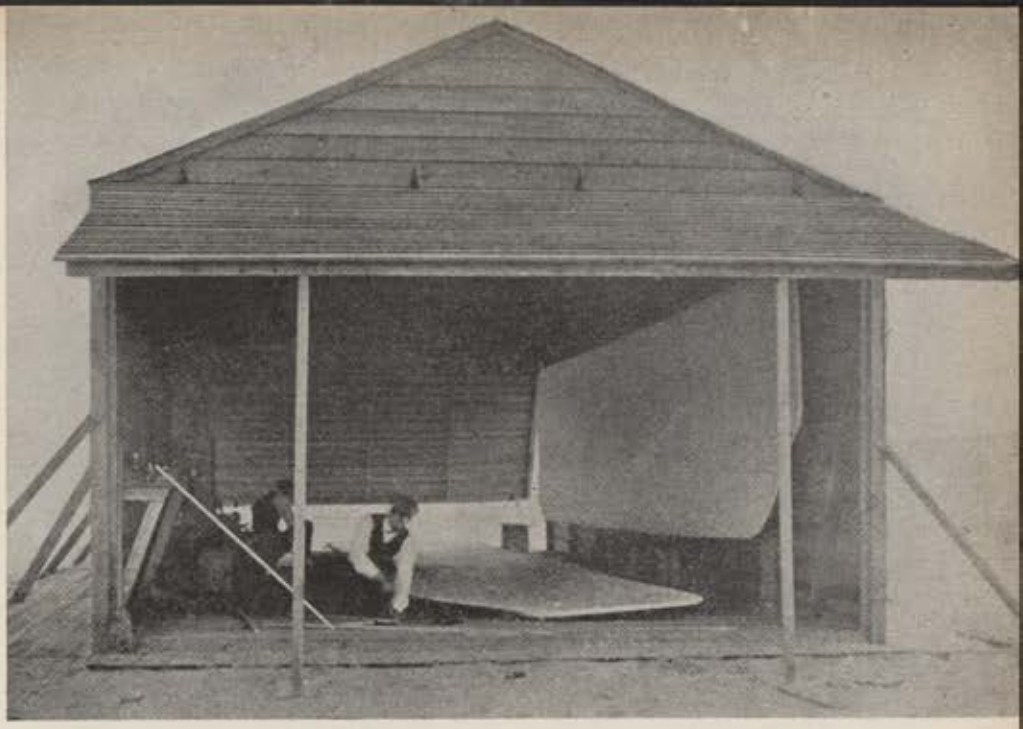

These 1903 pictures (taken by the Wrights) show Kitty Hawk as they saw it while constructing the world's first powered aircraft. Above, their hangar.

Wright's kitchen shows their penchant for orderliness. These scenes are being reconstructed in observance of powered flight's 50th anniversary.

Web of Circumstance

How a "peculiar combination" of facts contributed to man's first flight

IN A letter to Octave Chanute, October 28, 1906, Wilbur Wright observed, "If the wheels of time could be turned back six years, it is not at all probable that we would do again what we have done. The one thing that impresses me as remarkable is the shortness of the time within which our work was done. It was due to peculiar combinations of circumstances which might never occur again."

What were some of those circumstances? First, that the Wright Brothers were bachelors, with no domestic ties to prevent their being almost constantly in each other's company, with all possible opportunity to thresh out the flying problem. They lived in the same house and worked in the same bicycle shop. And they were young enough to put both energy and agility into their gliding experiments, starting in 1900. At the time of their first powered flights in 1903, Wilbur was only thirty-six years old and Orville thirty-two. What they were doing was a job for young men. Of modest means, they had spent as much money as seemed prudent unless success seemed probable. They had repeatedly risked their lives in gliders, and the mathematical probabilities of escaping fatal injury were becoming less favorable. That is, the chances of serious accident increased with the number of glides. Putting it another way, statistically, they should both have been killed.

All sorts of other things could have interfered with their returning to the sand dunes of Kitty Hawk year after year. In 1902 when they were ready to test their latest glider, based on their own data obtained by wind-tunnel experiments with miniature wings, Wilbur was not sure up to a few days before they started for Kitty Hawk that he would go. His father, Bishop Milton Wright of the United Brethren church, was engaged in a bitter church controversy, and Wilbur had been helping him prepare his side of the case. If his father had needed him badly enough, Wilbur would have felt duty-bound to stay at home. And Orville would not have gone alone. If they had not continued their experiments that year, they might never have resumed them.

On a previous trip they had to think seriously of pulling up stakes and returning home because of an exceptionally troublesome mosquito plague. After they became convinced in 1901 that all published tables of air pressures on curved surfaces were inaccurate and undependable, they thought of dropping their experiments. Their hope had been to go on where others had left off. But with no reliable data to use, who were they, they thought, to try to solve the flying problem? Except for their friend Chanute, it is doubtful if they would have gone on. Chanute well knew that they were far ahead of all others anywhere in the world who had ever made flying experiments, and he told them that their work promised "important results"; that if they quit, the loss to science would be great. They heeded Chanute's urging and did continue.

Many other circumstances could have interfered. Wilbur might have been stricken with typhoid fever in 1902 instead of 1912. Or if the Dayton flood had come in 1903 instead of 1913, they could have suffered too much financial loss to feel like spending any more money on experiments.

It is interesting to conjecture what the world would be like today if the "peculiar combinations of circumstances" that Wilbur mentioned had not existed. Other experimenters one after another had quit, and leading scientists were explaining why any solution of the problem of human flight was an impossibility. If the Wrights had not solved the problem perhaps there would be no airplanes today and the world would not be nearly so small!

By Fred C. Kelly

BRUSH-OFF——CONTINUED

Roosevelt sent the clipping with a note signed by his secretary, to Secretary of War Taft. The note suggested a talk with Representative Parsons to discuss the idea of experimenting with the Wright machine. Taft sent the clipping and White House note to the Ordnance Board with a note signed by his own secretary and headed "Endorsement."

The personnel of the Ordnance Board had changed, but the same aloofness about flying machines persisted. The Board could not, however, ignore a letter from the White House with an endorsement from the Secretary of War. It might have been expected that the Board members would feel bound to investigate the reported flying machine. But they couldn't bring themselves to go quite *that* far. All they did was to send, on May 11, 1907, a brief letter to the Wrights, signed by Maj. Samson M. Fuller, who had become Recorder of the Board. The letter said:

"I am directed by the President of the Board to enclose copies of two letters referring to your aeroplane, for your information, and to say that the Board has before it several propositions for the construction and test of aeroplanes, and if you desire to take any action in the matter, will be glad to hear from you on the subject."

Accompanying the letter were copies of the notes from the White House and the Secretary of War. The Wrights naturally were amused by the suggestion about "several propositions for the construction and test of aeroplanes." Who else was prepared to submit a "proposition"?

Stand-offish as the letter was, it did not imply as the earlier letters did that the Wrights were a pair of cranks seeking funds.

In their reply the Wrights said they had some flying machines under construction and would be glad to make a proposal. But they suggested a conference to discuss the situation.

The next letter from the Ordnance Board said nothing about the Wrights' suggestion for a conference, but it did request that they make a formal proposal. The Wrights did so. Nothing came of it for some time.

Months later it became evident that the Ordnance Board had been hearing from military attaches and others in Europe about the Wrights'

(Continued on page 42)


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negotiations there. The Board began to show signs of uneasiness. Moreover, the Wrights now had a friend in the War Department. While in France they had become acquainted with a young Army lieutenant, Frank P. Lahm, whose father was a member of the French Aero Club. In the autumn of 1907 young Lahm was transferred to a job in the War Department at Washington, where he was able to make it clear to those higher up that the Wrights were men of character and that there was no question about the performance of their machine being as represented. Still, it was months later, February 1908, before the contract with the Wrights was signed.

THE AUTHOR

Author Fred Kelly *(The Wright Brothers)*, a personal friend of Orville, is the authorized biographer of the Wrights. He also edited the Wrights' letters *(Miracle at Kitty Hawk)*. He lives near Washington, D. C.

When the War Department went through the formality of advertising for bids, editorial writers showed themselves as uninformed as those Army officers who signed letters to the Wrights had been. The New York *Globe* said: "Nothing in any way approaching such a machine has ever been constructed. . . ." And the *American Magazine of Aeronautics*, (later *Aeronautics*) said, "There is not a flying machine in the world which could fulfill these specifications. . . . Perhaps the Signal Corps has been too much influenced by the 'hot air' of theorizers. . . ."

Because of a serious accident in which Orville Wright was injured in 1908, the first Army plane was not delivered until 1909.

When World War I broke out in 1914, the US Army had hardly more than a dozen planes that could take to the air. Adoption of aviation had moved that slowly.

Though the Wrights soon forgave the War Department for the earlier stupidities of the several Army officers who had written them, Orville Wright never got over a kind of suspicion or distrust of Army bureaucracy. Even during World War II, when the newspapers sometimes indicated that the US Army in Europe had committed what looked like a tactical error, he would say: "That's the Army for you!"—END

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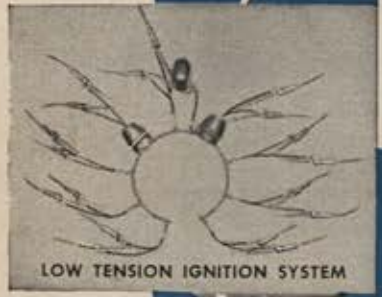

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The Needs of War... SPUR TO AIR PROGRESS

Safer, speedier planes today because of military aviation

By Edmund F. Hogan

SOMEONE once defined the ultimate in air transport as "nonstop from everywhere, to everywhere, every ten minutes." Fifty years after the miracle at Kitty Hawk about the only ingredient missing is the word non-stop.

This year the scheduled airlines of the US will carry some 32 million passengers more than 15 billion miles. Add the commercial operations in every corner of the globe and it becomes apparent that airplanes are leaving from everywhere to everywhere and, probably, closer than ten minutes apart.

The airplane as a means of transportation is accepted without question in the modern air age. But it was not always thus. The fight against public apathy to the flying machine began with Kitty Hawk and has been as constant as the progress of Powered Flight itself.

Early in their careers Orville and Wilbur Wright observed that the public viewed their followers and themselves in the same light "with the inventors of perpetual motion." And the story still is told of how the Army Signal Corps, after acquiring the first Wright "Military Flyer" in 1909, tried for two years to buy another. So insistent were the Army's appeals that one Congressman queried: "Why all the fuss about airplanes? We already have one, don't we?"

The contributions military aviation has made to the general progress of man's conquest of the air have had much to do with dispelling this apathy permanently.

Although the possibilities of aerial warfare were realized as far back as the Civil War when balloon observations were made for the Army of the Potomac, military aviation was born on August 1, 1907, when the Army created an Aeronautical Division in the Office of the Chief Signal Officer "to study the flying machine and the possibility of adapting it to military purposes."

It is true that the Army was slow to recognize that the day of Powered Flight had arrived. But in the years since the first military airplane was delivered in 1909, the men in uniform have more than made up for that early aberration. In fact, the contribution began when the Army set up its first flying school at College Park, Md., and established the first standards for pilots.

Those early qualifications bear little resemblance to the standards of performance demanded of modern fliers, but they were a beginning. To become a rated "Military Aviator," the Army pilot had to fly at an altitude of at least 2,500 feet; carry a passenger to a height of 500 feet; fly in a wind fifteen miles an hour; make spot landings from 500 feet to within 150 feet of an aiming point with power on and to within 300 feet of the same point with power off; and make a reconnaissance flight of at least twenty miles, averaging an altitude of 1,500 feet.

In 1912 a young Army lieutenant named Henry H. Arnold astonished the public by setting an altitude record of 4,674 feet, a performance duly noted in large, bold headlines in newspapers throughout the country. The military's preoccupation with raising the ceiling has endured throughout the years.

Fourteen years after Arnold's record-breaking performance, Army Lt. John A. Macready climbed to 38,704 feet. Granting that the 1926 aircraft engine was more powerful than anything available in 1912, the most important difference between the flights was that Macready's airplane had a turbo-supercharger.

The supercharger was developed by General Electric, largely because the military required aircraft capable of performing at high altitudes. This accessory permits the engine to maintain full power in the extremely thin air found at this altitude. Still, its full potential could not be realized with a propeller designed for low altitudes. The next stop was the development of the variable pitch propeller. Few will dispute that commercial aviation has received as much benefit as the military from these two refinements.

Arnold once took note of the military contributions to aviation. In discussing the see-saw fight for aerial supremacy between the Allies and Germany in World War I, he said:

"As a result of military necessities, five desirable qualities of an airplane were improved: speed, reliability, great strength for a minimum of weight, low gross weight, and high-powered engines."

Power plants are a fine example of improvements that have come about under military pressure. The original military airplane of 1909 developed about thirty horsepower. By 1939 engines were capable of delivering 1,000 horsepower. At the end of World War II we were producing engines rated at more than 3,000.

The value of the military's research in its constant quest for an improved product is nowhere better demonstrated than in World War II.

In the thirty-seven years between 1903 and 1940, fewer than 40,000 airplanes were produced in the United States. Yet in the forty-four months between Pearl Harbor and V-J Day, this nation's aircraft indus-

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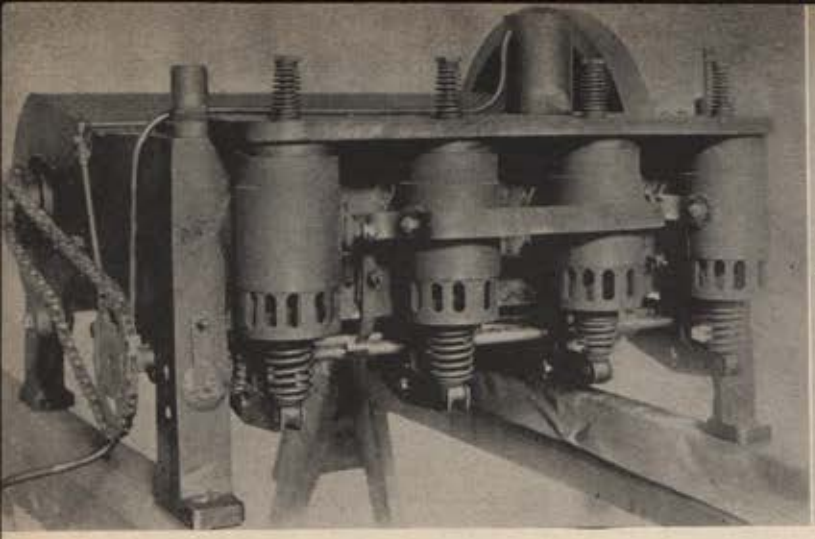

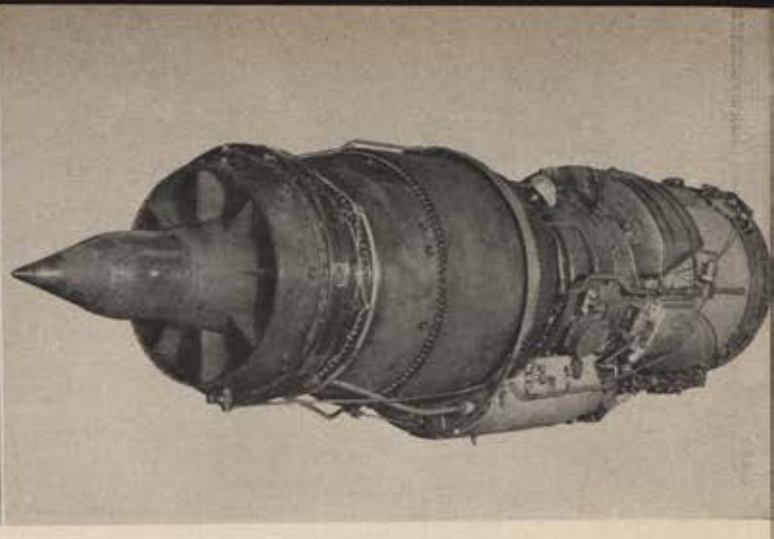

THE NEEDS OF WAR . . . SPUR TO AIR PROGRESS—CONTINUED

Fifty years of engines: left, the Wrights' 1903, four-cylinder, 12-hp engine weighed 170 lbs. Today's giant P&W, axial-flow J-57 turbojet develops over 10,000 lbs. thrust.

try turned out 274,674 planes of all types for the Army, Navy, and our allies.

Each bomber improved meant a better future transport. The lessons learned in producing trainers and fighters were translated into the improved light aircraft flying today.

Laminar-flow wings came into being. These provided high lift, with minimum drag—both important safety factors. Improved superchargers permitted aircraft to draw maximum power at 40,000 feet. The petroleum industry learned how to produce fuel roughly 300 percent more powerful than that in use before the war. Electrical systems were four times more powerful at war's end than at war's beginning and yet weighed only one-half as much. The first successful pressurized cabin appeared in the B-29, forerunner of the Boeing Stratocruiser, and passengers now ride modern aircraft in complete comfort at three and four miles above the earth's surface.

In 1927 a graduate of the Army's pilot training program and a Missouri Air Guardsman, Charles Lindbergh, captured the imagination of the entire world with his historic nonstop flight across the Atlantic. Last Memorial Day a DC-6B flew from the Douglas plant in Santa Monica 5,700 nonstop miles to Paris in twenty hours and twenty-eight minutes—almost double the distance of Lindbergh's flight in about thirteen hours less. In this area of extending the airplane's range, military considerations have been pre-eminent.

Back in 1911 Lt. Benjamin D. Foulois, later a major general and Chief of the Army Air Corps, made a nonstop flight of 106 miles from Laredo to Eagle Pass in Texas to prove the usefulness of the airplane to doubting members of the ground forces. By 1923 Macready and Lt. Oakley G. Kelly were able to prove the feasibility of a nonstop transcontinental flight. The two Army Air Service pilots completed the 2,500 miles from New York to San Diego in twenty-six hours and fifty minutes.

This flight set the Air Service to thinking about a global endeavor. Special aircraft, drawn to Air Service specifications and produced by Donald Douglas, were built. The epic 26,000-mile flight was undertaken in 1924. It required 175 days from start to finish, although actual flying time amounted to only 363 hours.

Just twenty-five years later—in 1949—the Air Force B-50 "Lucky Lady II" was refueled at four points by KB-29 tankers and accomplished a nonstop world flight of 23,452 miles in ninety-four hours. In a generation the airplane had compressed the circumference of the earth from a matter of months to hours.

Douglas World Cruiser (right) was Air Service's first plane to circle the globe, in 1924. Flying time was 363 hours. Twenty-five years later it took the Lucky Lady II (below), a Boeing B-50, only ninety-four hours to do the same, but non-stop. It was refueled four times en route by KB-29s.

It has been said, and with great accuracy, that the airplane has turned the world into one vast neighborhood. The Swedish merchant who wants a face-to-face meeting with a buyer in Paris is only hours away from his appointment by air. And if, when they have talked, the two decide to see a banker in New York, an airplane will deposit them at La-Guardia airport in little more than half a day.

One reason this is possible is because of the network of airways, bases, and aids to navigation which dot our globe. The essential impetus to developing this network was provided by our own military aviation.

Before the outbreak of World War II, the largest transoceanic operator was Pan-American Airways. This airline had thirteen flying boats in service, and its European flight terminated in Lisbon.

The war made immediate expansion of transoceanic flying necessary to support global military operations. Air Transport Command stepped into the picture. To 35,000 miles of domestic routes, ATC added 148,900 miles of foreign routes. At the peak of wartime operations, the Command had fifty-two flights every day—east and west across the Atlantic Ocean alone! When our commercial airlines expanded their international operations after the war, they were able to fall back on the experience, facilities, equipment and the training required to accomplish the ATC job.

Lt. Gen. Donald L. Putt, who heads the AF's Air Research and Development Command, has observed that steady progress is being made in developing completely automatic navigational systems, which some day may conquer the two major problems which have always been with aviation—weather and darkness. The constant evolution of military aviation toward all-weather capability has served to develop instrumentation and, in direct proportion to the rate of progress, safety.

Before World War I there was little cross-country flying; hence, pilots had few navigational aids. The war changed the outlook. Our bombers flew from bases behind our own lines to targets in the rear of enemy lines. They even flew operational missions at night. Under the pressure of military necessity, cockpits by Armistice Day were equipped with instruments that are basic today but at that time represented great progress. These included such items as a compass, air speed indicator, altimeter, tachometer, drift indicator, and inclinometer.

When we consider today's directional gyro, gyrosyn compass, artificial horizon, automatic pilot, omnirange, Zero Reader, and other aids, we might reflect on the work the Army Air Corps did in the days subsequent to World War I to develop instrument flying.

One of the most famous instru-

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Army Lt. John A. Macready set altitude records in 1921, 1923, and 1926. Above, he soars to 34,509 feet in his La Pere in September 1921. Below, the vaguely familiar chap is 25-year-old 2d Lt. H. H. Arnold, learning to fly at Dayton, 1911.

ment pioneers was Lt. Gen. James H. Doolittle, chairman of the Committee to Observe the 50th Anniversary of Powered Flight and one of the founders of the Air Force Association. His list of "firsts" would fill a volume.

Of all Doolittle's achievements, none was more important than his first all-blind flight in 1929. Working with the Guggenheim Foundation and Lawrence Sperry, who had made important early contributions to aviation, Doolittle proved it possible to fly an airplane without external visual reference. He took off under a completely covered cockpit, flew the airplane around Mitchel Field, and landed. Although accompanied by a safety pilot, only Doolittle handled the controls.

Another instrument pioneer was Albert Hegenberger, who became an Air Force major general. In 1927 Hegenberger and Lt. Lester J. Maitland made the first nonstop flight from the West Coast to Honolulu. Hegenberger navigated the 2,400 miles from Oakland, using radio beams to guide him. In 1932 he made the first all-blind instrument flight without a check pilot aboard.

The young Army flier took off from McCook Field, made two 180-degree turns and landed after five minutes. In these days of VHF, UHF, ILAS, etc., his performance is remarkable in that he used only normal flight instruments and two radio transmitters—a portable stationed 1,000 feet from the edge of the field and another a mile and a half away.

One of military's greatest contributions to instrumentation was the World War II development of GCA (Ground Controlled Approach). The value of this system to commercial aviation was recognized in 1949 when the Civil Aeronautics Administration gave general authorization for commercial aircraft to use GCA as a "primary aid" for landings in bad weather.

The automatic systems of which General Putt has spoken contemplate the pilot's controlling the aircraft during take-offs and landings but, once in the air, the automatic pilot will do the work during the entire flight pattern. In this connection, the invention of the electronic transistor can be classified as one of the greatest advances in instrumentation in the fifty-year history of Powered Flight.

The transistor consists of a tiny

(Continued on page 51)

ANOTHER REASON ALLISON LEADS IN THE AIR

9 to 1, his jet trainer is powered by Allison

NEXT time you see a jet plane streaking across the sky, it's 9 to 1 the pilot was trained in an Allison-powered jet trainer. Because 9 out of every 10 Air Force and Navy jet pilots earn their wings in jet trainers powered by Allison J33 Turbo-Jets.

There's a good reason for this—the J33 was the first jet engine to be built in production quantities in this country. Today, these J33's power nine Navy and Air Force planes, including the Air Force T-33 and Navy TV-2 trainers. Through Allison engineering, these engines have established records for dependability and long-time operations as proved by an Air Force technical order permitting 1200 hours' operation between major overhauls.

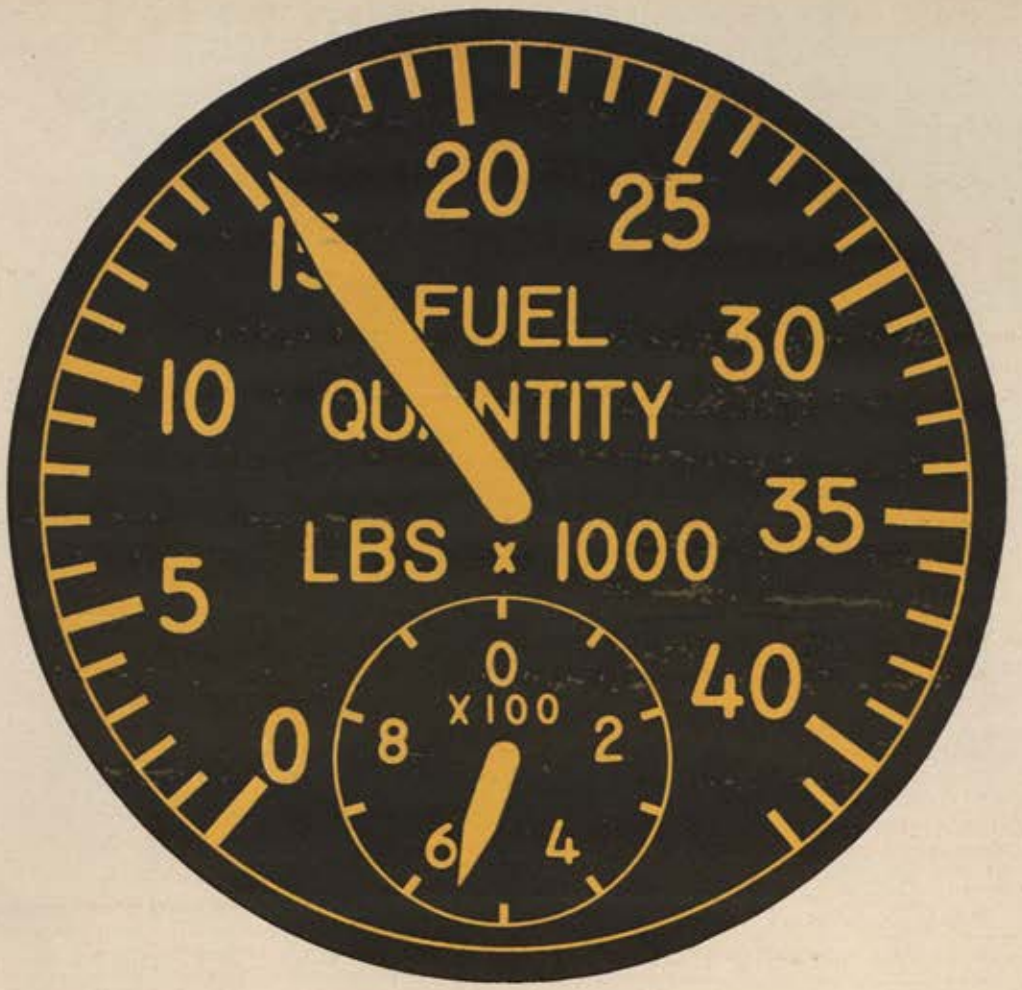
This vast background of experience in both design and manufacture of turbine engines is the reason our Armed Services rely on Allison engines to train the Free World's jet pilots.

GM GENERAL MOTORS

Allison

DIVISION OF GENERAL MOTORS
INDIANAPOLIS, INDIANA

World's most experienced designer and builder of aircraft turbine engines—*J35 and J71 Axial, J33 Centrifugal Turbo-Jet engines, T38 and T40 Turbo-Prop engines.*



Can you see the BIG difference?

On the face of it, Avien's Two-Unit Fuel Gage looks like previous systems, but there's a big and important difference behind it all.

Behind this Avien dial face (shown here three times actual size) is Avien's brand-new concept of fuel gage system "packaging."

Previously, you'd find these units behind a dial: an indicator case, motor and balancing potentiometer; and elsewhere a bridge-amplifier, a shockmount and a tank unit.

Now, in the Avien Two-Unit Gage, the necessary components for the bridge and amplifier functions have been built right into the indicator case.

The result: a fuel gage system of "plug-in, plug-out" simplicity, which weighs 50% less and eliminates the need for any field calibration.

What a BIG difference this makes in money!

First of all, the basic system costs less. Less time is spent in installation. Less wiring and connectors are needed. Less maintenance is required, because there are fewer components to maintain. Trouble-shooting time is cut for the same reason. And fewer parts must be stocked for maintenance and repairs.

Because of this new package, Avien gages are now "shelf items." They're completely interchangeable in the aircraft for which they are designed.

Additional functions for fuel management can be easily integrated into the basic Two-Unit system.

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

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

The Avien Two-Unit Fuel Gage will make such a BIG difference in your cost sheet, we suggest that you write or call for more information today.

Avien

AVIATION ENGINEERING DIVISION

AVIEN-KNICKERBOCKER, INC.

58-15 NORTHERN BOULEVARD, WOODSIDE, L. I., N. Y.

drop of germanium metal, about the size of a pea. In certain instances it does the work of a vacuum tube but at one-millionth of the latter's power and with greater reliability. The transistor can substitute for some tubes and supplement others, at a reduction of fifty to seventy-five percent in size and weight.

The modern metal airplane is not so old as many might think. It had its genesis in World War I when the Germans used welded steel tubing in their Fokker fighters. Immediately, other nations began to experiment with the use of metal.

By 1922 the framework of the fuselage was made of steel. It was then that the US Army decided to build an all-metal airplane. The decision was not wholly popular. Many intelligent persons believed an all-metal aircraft would be too heavy to get off the ground. But the Engineering Division at McCook Field went ahead with the design. It was a high-wing monoplane, powered by a Liberty engine of 400 horsepower, and it was flown successfully on June 20, 1923. Its appearance presaged the end of the airplane made of wood and doped fabric and held together with baling wire and hardware store bolts.

As the first half-century of Powered Flight comes to a close, there is a new language abroad. It is the language of "thrust" and "Mach," the idiom of Powered Flight, Jet Version.

Great Britain already has commercial jet liners in operation and Boeing has announced it is working on a civil jet transport capable of carrying sixty to eighty passengers. The power plants will be four Pratt and Whitney J-57 turbojet engines, each producing about 10,000 pounds of thrust. The airplane will operate from fields used normally by the DC-6B and Super Constellation. But it will have one important difference. It will be able to cruise in the vicinity of 550 miles per hour at about 40,000 feet.

Jet development to date has been almost exclusively military and in the very brief space of ten years. The jet age began in this country in 1943 when Bell Aircraft delivered the P-59 to the Army Air Forces. This fighter was powered by two General Electric engines which produced about 2,000 pounds of thrust each.

A decade later we are producing aircraft which have engines five

(Continued on page 53)

MOUNTAIN...dead ahead!

New radar "sees" it through darkness

You are looking at the makings of a crash. But it won't happen. Through the darkness a new Aircraft Radar revealed a mountain range directly in the flight path. Now the pilot is climbing to clear it.

Like a powerful telescope, this advanced-type radar equipment enables the pilot to study obstacles "close-up"—in a choice of five different ranges between 5 and 200 miles. Here is a compact lightweight radar that will readily indicate mountains and near-by aircraft. It can locate thunderheads and other cloud formations—permit the pilot to navigate a safe course. It can map terrains, showing the pilot the salient characteristics of the ground he's flying over. It can help the pilot keep his plane on the desired flight path. It can even be used as a visual check against the landing and approach instruments in his plane.

This new Aircraft Radar, made by RCA for the Navy Bureau of Aeronautics, is another technical achievement worked out in close co-operation with the military to insure U.S. supremacy in electronics. Meet the RCA engineers and field technicians in your branch of service.

RCA

RADIO CORPORATION of AMERICA

ENGINEERING PRODUCTS DEPARTMENT CAMDEN, N.J.

times more powerful and which drive aircraft through space at twice the speed. The experience the military has gathered in this field will point the way for future jet operations by the commercial carriers in the US.

Aviation's progress over this half-century, spurred constantly by the military necessity, has not been confined to the development of big and safe aircraft. A little more than a year ago the President's Airport Commission, which Doolittle headed, concluded its definitive report on "The Airport and Its Neighbors" with the observation that aviation has become "indispensable to our national economy."

The aviation industry is the second largest in the nation. In World War II it was number one. Some 750,000 persons are employed directly by aircraft manufacturers. Another quarter of a million work for some 60,000 subcontractors. The income of millions is affected by the need of the aircraft industry for raw materials and for tools and parts.

The industry upon whom these millions depend for their livelihood is making it easier for them to communicate with relatives and friends all over the world, permitting them to maintain personal contact with little sacrifice of valuable time. Indeed the airplane has produced both an economic and social revolution throughout the world.

Notwithstanding the ever-present specter of awesome destruction represented in the combination of the airplane and atomic power, our way of life is more rich and more full for the progress of aviation.

Gen. Hoyt S. Vandenberg, former Air Force Chief of Staff, once observed that the Air Force "is the principal sponsor and customer" of aircraft manufacturers, scientists and research agencies. On the other hand, he noted, the Air Force "is increasingly dependent upon them."

This interdependence has resulted in each contributing the sum of his knowledge to the other so that, in the long run, the United States has led the progress of Powered Flight. It has not been a one-way street in which the military has played the waiting game.

When the real ultimate of "non-stop from everywhere, to everywhere, every ten minutes" at the speed of sound arrives, the record will show that a large share of the credit justifiably belongs to military aviation.
—END

ANG F-51 scores direct hit during exercise at Gowen Field.

ANG Angles

Guard Gunners Shoot the Works

Air Guardsmen held their 'biggest and best' gunnery meet at Boise, Idaho, this year

FOR THE second time in three years the gunnery champion of the Air National Guard is Capt. Milton R. Graham, full-time operations officer for the 194th Fighter Squadron at Hayward, Calif. Graham, who won the title at the first meet in 1951 at Eglin AFB, outshot the cream of ANG gunnery experts this year at Boise, Idaho, in the Guard's biggest and best event to date.

The meet attracted twenty-one teams representing fighter wings stateside and one team each from Puerto Rico and Hawaii. This third nationwide affair was outstanding in many respects, but two head the list. It was completed without an accident—and without a single makeup mission, something no other gunnery meet has achieved.

The safety record is the more remarkable in view of the fact that the F-51s and F-80s flew some 810 hours in the five-day period, and utility aircraft added another 250—all under strict tactical operating conditions. Hq. USAF Flying Safety observers on hand attributed the record to the experience level of the pilots, many of whom have 2,000 fighter hours, and to the experience of the maintenance people, the majority of whom have been in the business for at least ten years. It was this experience that made the difference between missions completed on schedule and makeups. The fact that no aircraft was forced to abort by reason of mechanical trouble permitted the meet to conclude without a makeup.

To get back to the actual firing: Only seventeen points—the margin of a bomb missed on the final mission—separated Graham and Maj. Bruno Grabowski of the 131st Fighter Squadron at Westfield, Mass., in the individual scoring race. Third was another Californian, Capt. Robert E. Drew of the 195th Squadron at Van Nuys. An aerodynamics engineer at Douglas Aircraft Co. in Santa Monica, Drew flies midget racers as a hobby and has competed in the Goodyear Trophy race at the National Air Races.

It is significant that Graham, Grabowski, who set an all-time scoring mark for students in 1951, and Drew are graduates of the USAF Gunnery School at Nellis AFB.

A mere fraction of a point separated Drew and Maj. James Edwards of the 192d Fighter Squadron at Reno, Nev. Edwards, a War II ace with eleven victories, flew 243 missions in that scrap, with the RAF and the 354th Group of the Ninth Air Force. He was among the leaders throughout the entire meet and, but for one bad high-altitude aerial mission, might have won. The operations officer of the 192d, Edwards did not fly for more than five years following his separation from service in 1945. He joined the Reno squadron eleven days before it went on active duty in February 1951 and spent the next twenty-one months as a fighter jockey in SAC and in TAC.

Graham and Edwards represented California's 144th Wing and their combined total of 856 points gave this organization its third straight team title. In fact, California finished one-two in the team event.

Drew and Capt. Willard G. Erfkamp also of Van Nuys, who represented Southern California's 146th Wing, fired a combined 779 points, good for runner-up spot. The finish duplicated last year's at Victorville, Calif., when the Golden State's teams wound up first and second.

Third place in team scoring went to the 126th Wing of Illinois, represented by Maj. Harold C. Norman and lanky Lt. George H. Mason of Peoria's 169th Squadron.

Record scoring was based on two aerial gunnery missions at 10,000 feet and four at 20,000 feet. There were three air-to-ground missions on a range built in the Idaho desert about fifty-five miles south of Boise. One combined low-angle bombing and rocketry, another dive bombing and panel gunnery, and the third low-angle bombing, rocketry, and panel gunnery.

In an operation involving more than 100 fighter aircraft and some 600 Air Guardsmen from all parts of the country, it is difficult to single out any individual for special mention. But, to a man, pilots agreed that the meet's success stemmed in large part from the efforts of two men, Capt. Ken Nordling of Boise's host 190th Squadron, and Maj. Albert R. Santos, of Hayward. Nordling, the project officer, monitored a schedule that required split-second timing. Santos ran the Saylor Creek ground gunnery range with the precision of a Prussian drill-master, clearing flights in and out with speed and safety.

There appears little question but that Gowen Field in Boise, one of the Air Guard's six permanent field training sites, will host the 1954 ANG gunnery exercise. Only next year it will have a new face. This year the famous War II Mustang rendered its swan song; next year the meet will have the look of jets.

° ° °

Notes on the back of a Form 175—Col. Joe Foss, Medal of Honor winner and first War II ace to equal Eddie Rickenbacker's War I total of twenty-five victories, is in line for a star. Foss, Air Guard Chief of Staff in South Dakota, and a new member of AFA's board of directors, has appeared before an Air Force examining board for Federal recognition as a brigadier general. Also nominated recently for one-star rank was Col. Lewis A. Curtis, commander of New York's 106th Wing. This was a pretty busy board. It was composed of Lt. Gen. Leon Johnson, CG of ConAC; Maj. Gen. William Hall, Air Force Reserve Affairs boss; and Maj. Gen. George G. Finch, Deputy for Guard affairs in ConAC. . . . It screened two BGs for promotion to major general—Brig. Gen. Errol H. Zistel of Ohio and Brig. Gen. Lawrence Ames of California . . . And two State Adjutants General appeared to switch their service from Army to Air Force and move from one-star to two-star rank. They are Brig. Gen. Guy N. Henninger of Nebraska, a veteran pilot; and Brig. Gen. James A. May, air-minded adjutant general of Nevada. Baltimore's 104th Squadron and Reno's 192d have a similar problem. Baltimore is trying to locate on huge, new Friendship International Airport in order to accept jets. And the 192d is hoping to get into Hubbard Field at Reno. Both are meeting with tough opposition.

By Capt. Edmund F. Hogan, ANG

Winning team: Capt. Milton R. Graham, left, who won individual scoring; and Maj. James W. Edwards, WW II ace.

IT TAKES MANY MINDS TO MAKE AN "ELECTRONIC BRAIN"

RAYTHEON AUTOMATIC DIGITAL COMPUTER developed for the Office of Naval Research and used at the Naval Air Missile Test Center, Point Magu, California.

Just trying to grasp the concept of a high speed digital computer staggers the imagination. Designing and building one is a job for a corps of highly trained specialists.

Few companies are equipped with the diversity of talent, the technical background or the production facilities necessary to venture into this extremely complex field. Raytheon is unique in having under its many roofs not only the kind of people but the products and production facilities required to bring analog and digital computers into practical being.

On its staff, Raytheon has many of the comparatively few scientists, mathematicians and engineering specialists capable of designing, building and applying electronic computers. Its many divisions contribute the special tubes, transistors, diodes, toroids, magnetic amplifiers, and other components used in great numbers in such equipment . . . and the broad experience in miniaturization, circuitry, packaging and other electronic techniques necessary to reduce a houseful of parts to practical proportions.

It goes without saying that "Excellence in Electronics" is a prime ingredient of all Raytheon products . . . radar, sonar, communications and other types of equipment of vital importance to the Armed Services.

RAYTHEON

Excellence in Electronics

RAYTHEON MANUFACTURING CO.

CONTRACTORS TO THE ARMED SERVICES

WALTHAM 54, MASSACHUSETTS

JET BLASTS

TOO MUCH RANK OR NOT ENOUGH?

If an NCO wants more responsibility he should either get an AF commission or transfer to another branch of the service

The article in your September issue by the anonymous master sergeant was excellent. Its ideas are undoubtedly worthwhile. The big BUT facing us is: what command responsibilities can accrue to NCOs in a service where combat personnel are bossed by plane commanders and everyone else does supporting work of a more-or-less technical nature?

Undoubtedly, specialist ratings inferior to NCO ranks would help the Air Force. But what is needed more would be a flying officer and command officer T/O wherein lucky gunners would not, by virtue of attrition, become so ranked as to force staff responsibilities. With so much rank commanding so few enlisted people, the highest ranked enlisted man fast fades into obscurity. I remember, from my ground force and Air Force experience, that an AF three starrer about equalled the ground forces colonel and likewise with the major and first lieutenant of aforementioned services. Super ranking in USAAF, caused by wholesale commissioning of flying personnel, led to a tacit agreement between EM and junior officers alike that real authority in the AF began with field grade and not below.

The command counterparts of AF and ground jobs begin with bomber commander and platoon commander. Sergeants take orders from plane commanders in the AF and give orders in the infantry. It's a bit preposterous to conceive the infantry non-com attacking Jane Russell Hill as a true equal of Master Sergeant Smith demanding more work out of the 999th Bomb Group Stat Control Unit. The former is a leader, the latter a responsible technician. The question of responsibility in military life depends on who outranks whom. And when you create fabulous T/Os for morale purposes, responsibility moves upstairs at a rapid pace.

I choose to think that AF gets a little better grade of man than the other services, true or not. For this reason it is obvious that AF doesn't comply with the usual ideas of how to run a military machine. Arbitrary command is somewhat lessened, in my experience, between ground and air forces. In short, a smart guy doesn't require a hit on the head to get the Big Picture. And so, NCOs have less muscle in our Air Force than in strict combat forces where everyone gets to shoot at the enemy. It's planned that way and seemed to work quite well during the Middle War.

It seems to me that the AF NCO should be an adviser, a link between enlisted ranks and commissioned, and achieve stripes through demonstration of ability. Anyone feeling need of more direct control of personnel should either aspire to commissioned responsibility in AF or seek a job in other services.

Obviously, since stripes are a basic part of every military organization, there would be a paralyzing resistance to adoption of any other form of insigne regardless of the responsibilities entailed. Imagine the morale problem if flying officers were to wear shoulder boards and stripes a la cadet days instead of the impressive bars and leaves and eagles were we to differentiate between responsibilities in the commissioned ranks. Who would guess how much the cadet quotas would drop on authorization of such an idea. Symbolism is the heart of the military organization. Tampering with it spells trouble. Why else the green tabs for ground forces in the field and black jump boots for AF flight personnel? Behind this lies the issuance of fruit salad to high commanders who just do the job their rank demands. It equals the vice president's bonus in the business world and is accepted as just.

Before giving serious thought to the command responsibilities of our Air Force NCO we had much better decide whether quickly trained flight personnel, so necessary to do the REAL Air Force job of flying planes, are qualified *per se* to make the big decisions because they are awarded rank for performance.

Edward J. Carlin, Jr.
Philadelphia, Penna.

Reserve Record

Although the importance of maintaining a well trained Reserve has been recognized by the Defense Department, the Reserve forces program has not as yet received public sanction. The reason for this lack of public approval is due partially to an almost complete failure on the part of the various military branches to adequately publish the facts about the benefits of the Reserve program to the nation's defense.

This lack of public understanding of the mission of the Reserve forces has resulted in a weakened Reserve morale. Thousands of sincere Reservists throughout the nation have been subjects of public curiosity, for the public does not understand the mission of the Reserve program, or the extent of the Reserve programs services to the nation.

Failure of Reserve units to adequately maintain personnel strength is due in part to this lack of public relations work. Indeed most citizens cannot identify by name the Reserve units in their vicinity. It is time for the Defense Department to publish the facts about the entire Reserve program; show its record in World Wars I and II, and in the Korean conflict. Such a program will increase the morale of the individual Reservists, and will assist the personnel procurement program.

James McKillop
Brooklyn, N. Y.

LET'S HAVE YOUR JET BLAST

In "Jet Blasts" you can sound off on any subject you want. Each month we'll pick the letter or letters we feel will interest our readers most and pay $10 for each one printed. Please keep letters under 500 words.—The Editors.

CAP Support

Something very dear to my heart, and something which I sincerely and deeply believe in, is being neglected by AFA. This "something" is CAP, the Civil Air Patrol. I am presently on active duty with the USAF as a lieutenant in Dayton, Ohio. While in Dayton I became associated with a local squadron and began taking part in their activities. It could readily be seen, however, that this "official auxiliary" of USAF was not getting the assistance and cooperation it needed to meet its mission. At that time there was only one active unit in the Dayton area, and only about thirty active cadets.

I made it a point to study, learn, and become a part of CAP after seeing the tremendous value it had in assisting youth to become air-minded.

Today, I have been appointed as acting Group Commander for Group Seven, the Dayton Group. By now we have six active squadrons in the area, one of which is Dayton-Gentile Squadron which has fifty cadets and is actually established on Gentile AF Depot. Group Headquarters have been established at Wright-Patterson AFB under the courtesy of Brig. Gen. C. Pratt Brown, commanding general of the base. Many AF officers instruct in the program, and USAF, locally anyway, is giving every support possible.

I have been able to sell the Aviation Education Program with the assistance and hard work of my staff and squadron members, to fourteen high schools in the area, and next year four local Dayton high schools will have courses, one year in length, and with full credit toward graduation, in Aviation Education, using Volume I, Book II of CAP as a text.

Our program for cadets has grown to over 300 from the thirty or forty of only a year ago. The interest in aviation is there. The air-mindedness is present; it is waiting to be developed. A new squadron was formed recently at South Dayton Airport, of nothing but fliers and plane owners. There are twenty-

(Continued on page 58)

tonight

This man could almost reach the moon tonight... for he stands at the brink of a new age in the conquest of space, and he knows this:

If we had to, we could get him there. Given time and urgent need, we could design, build and deliver the total solution to that problem.

An entirely new development in the aircraft industry now makes this possible. It is known as Systems Engineering... a science and a method of developing aircraft, guided missiles and electronic systems not as traditional flying vehicles but as fully coordinated solutions to operations problems.

Today, Martin Systems Engineering is already in full operation, tailoring airpower to tomorrow's needs. Most of the story is under wraps, but you should know this:

If our security requirements should demand the equivalent of an "Operations Moon," the principles of Martin Systems Engineering would be essential to the solution of that problem.

You will hear more about Martin!

Martin AIRCRAFT

THE GLENN L. MARTIN COMPANY
BALTIMORE • MARYLAND

three pilot-plane owners in this squadron who are devoting their time, planes, gas, and oil in the interest of aviation to assist training the cadets by giving orientation flights under supervision of CAP officers.

I make my plea as a USAF officer, as a CAP officer, as an AFA member, and as a citizen interested in the progress of the Air Age of America. Help CAP in every and any way possible, and do it now. The CAP is providing, through its own volunteer resources, a service to the United States that it is nowhere near getting proper credit for, or the proper amount of assistance to, accomplish.

1st Lt. Burt L. Bershon, USAF
Dayton, Ohio

Who Should Boss?

There has been previous discussion of the need for building greater prestige for observers, boasting of their skill and prowess, making a motion picture about them, glamorizing them in recruiting ads. The Air Force should never forget that its own requirements for observers are designed to select men with high intelligence and emotional stability; so it would follow that something more practical and sensible than propaganda-bait will be needed to bring in the caliber of manpower needed.

As one who became a navigator via the ex-pilot-trainee path and who left the Air Force in 1945 because there was no visible future, perhaps I can offer a few suggestions. The set-up which gives every enlisted technician a good chance at the top NCO ratings works differently for officers. The connection between rating and commissioned rank concerns only pilots. Although there is little real relationship between most office positions and flying an airplane, the Air Force has made all of its promotions within the echelon of commands contingent upon the pilot's rating. This means that no observer can expect to find a career in the Air Force beyond the few jobs related to his rating speciality.

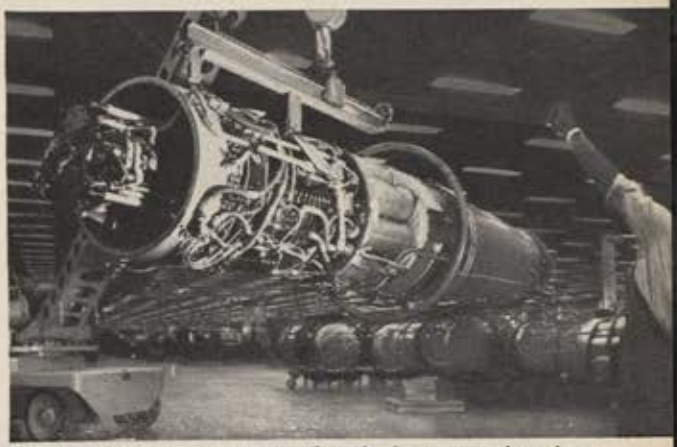
No man can be attracted to a position with no possibility of true advancement while there are openings in another field where the sky is the limit. During the war, a good percentage of the cadets training in navigation and bombardier schools had been eliminated from pilot training; they were enlisted by a picture of pilot's wings and then put where they were needed. Needless to say, the morale in the other schools did not begin to compare with that of pilot's schools.

The principal argument favoring the choice of pilots to fill command positions is that the Air Force has one mission—to fly! And every team must have a captain as well as teamwork in order to win! So the flyer should be the cap-

(Continued on page 61)

ONLY ONE-MAN INTERCEPTOR in operation today, North American F-86D is powered by G-E engine which requires minimum pilot attention.

AUTOMATIC CONTROL of the variable area nozzle (illustrated above) regulates exhaust velocity and temperature.



MOST POWERFUL of J47 family, afterburner version gives F-86D Sabre Jet extra power to climb quickly for interception.

Easy-to-operate G-E Jet Engine Lets Pilot Concentrate on Interception

Electronic "Brain" Permits Complete Engine Control with Single Lever

INSTANT BURSTS OF POWER plus simplicity of operation make G.E.'s J47 with afterburner an outstanding powerplant for high-altitude interception. Powering the North American F-86D, America's first one-man rocket-armed interceptor, the afterburner version of the J47 is equipped with automatic electronic controls. For *any* throttle setting, the controls maintain *optimum engine performance under varying flight conditions.* This allows the pilot to focus his attention on his main job—*seeking out enemy aircraft!*

"SENSORS" FEED INFORMATION pertaining to engine pressure and temperature, air temperature, fuel-flow, and other variables into an electronic "brain." The brain compares power needs with engine performance. Adjustments, if necessary, are then made *automatically* as the "brain" controls fuel-flow and variable area nozzle on the afterburner.

AUTOMATIC ENGINE CONTROL is supplemented by other features such as anti-icing provisions which are essential to high-altitude interception. These engineering accomplishments have been factored into the J47 by G.E.'s design, development, and manufacturing organization—an organization that is actively proving that *"Progress is General Electric's most important product." Section 230-13, General Electric Company, Schenectady 5, N. Y.*

You can put your confidence in—

GENERAL ELECTRIC

Leadership Demands Constant Achievement

Early Warning!

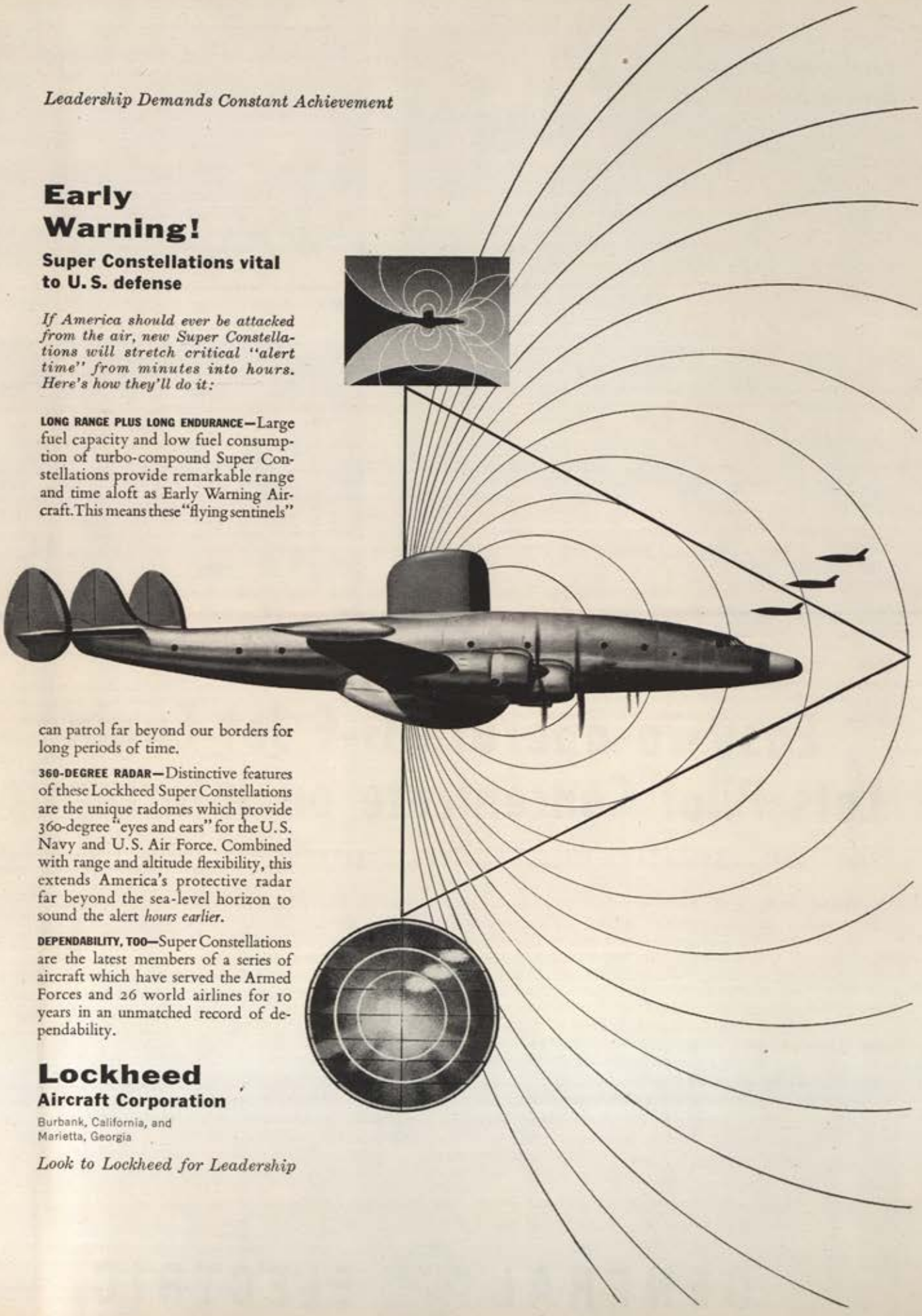
Super Constellations vital to U. S. defense

If America should ever be attacked from the air, new Super Constellations will stretch critical "alert time" from minutes into hours. Here's how they'll do it:

LONG RANGE PLUS LONG ENDURANCE—Large fuel capacity and low fuel consumption of turbo-compound Super Constellations provide remarkable range and time aloft as Early Warning Aircraft. This means these "flying sentinels" can patrol far beyond our borders for long periods of time.

360-DEGREE RADAR—Distinctive features of these Lockheed Super Constellations are the unique radomes which provide 360-degree "eyes and ears" for the U. S. Navy and U. S. Air Force. Combined with range and altitude flexibility, this extends America's protective radar far beyond the sea-level horizon to sound the alert *hours earlier.*

DEPENDABILITY, TOO—Super Constellations are the latest members of a series of aircraft which have served the Armed Forces and 26 world airlines for 10 years in an unmatched record of dependability.



Lockheed
Aircraft Corporation
Burbank, California, and
Marietta, Georgia

Look to Lockheed for Leadership

tain! *But*, when we went from the "Lone Eagle" flyer to the team, we forgot that any member of the team can become its captain. Now that the job of flying has been divided even further, the idea that the man at the wheel must be the captain gets less logical. Who is the boss of a railroad train? The conductor, the engineer, or the dispatcher? And which of these sacred positions leads to the job of superintendent? Which of the junior officers of a ship has the inside track to becoming the ship's captain? Or the admiral of the task force?

Please do not bother to tell me how difficult it would be to change the system of this hierarchy. I know how well pilots like to have an observer tell them what to do. I can still recall having a pilot change speed and altitude after getting my ETA and then complaining because my figures were wrong. I know about the wing leader who ordered his navigator to open the bomb bay doors, causing the bombardier to pick up the wrong IP and hit a worthless target not more than thirty miles from the real target. The idea, however, of offering the possibility of command and staff positions according to merit and administrative ability of the officer instead of his rating can be considered by top level brass in evaluating and in revamping personnel procedures. The only way to obtain the high caliber personnel desired for observer training is to provide adequate incentive and *then* advertise the fact.

Elwood M. Jones, Jr.
Capt., USAF Res.
Banning, Calif.

Reduction in Force

Weeding out an officer corps is like weeding a very costly garden. It can't be done quickly; it must be done selectively. The experiences of post-WW II tell us what harm the hasty, heavy hand can do. To set fire to the garden will undoubtedly eliminate the weeds, but it sure plays hell with the rest of the ranch. To confront a batch of men with immediate dismissal is to set a rampaging grass fire that cannot fail to leave a blasted scar that will not heal for years to come—when memories grow dim.

Let's revive the old flight officer rank. A little tinkering to modernize it would be necessary before it could be put out for road test. The pay structure, for example, would have to be rerigged. The F/O category, it will be recalled, was distinguished by two grades, Junior and Senior, and identified by a Warrant Officer bar which substituted a blue background for the more familiar brown.

Most AF-ROTC graduates want only to perform their minimum active duty obligations and not one day more. I have never heard one declare his intention to seek a career in the AF.

Flight officer rank might very well be the solution to a very sticky problem—how to take 'em in for their active duty time and *not* "fire" any officers at the same time. To press a commission on a man whose prime motivation is to "get done and out," is to erect a ramshackle officer structure bound to collapse from sheer inertia and poverty of input.

Under the F/O plan all AF-ROTC graduates entering the AF for their two-year tours would be designated F/O Junior Grade and would serve at that grade for a minimum of one year. Completion of certain requirements would make them eligible for the rank of F/O Senior Grade during their second year. Finally, at the end of two years they would be eligible for their gold bars—provided they earned it according to established criteria.

Pay would be, in the case of F/O (JG), at the rate allotted to technical sergeant but with allowances of a second lieutenant. F/O (SG) would be paid master sergeant wages and second lieutenant allowances. In both grades the F/O would be entitled to the full measure of courtesies, privileges and responsibilities of a commissioned officer.

In the Junior Grade, F/Os would be restricted to company grade duties only; Senior Grade F/Os could be used at the discretion of the group or wing commander. In effect, the F/O would be an apprentice officer undergoing post-graduate training and at the same time empowered by law and regulation to exercise command and leadership. By placing the F/O ranks before the actual commission, the gold bar would gain in value and prestige—and it would be lifted from its present comic opera status as some sort of kudo attached willy-nilly to the sheepskin.

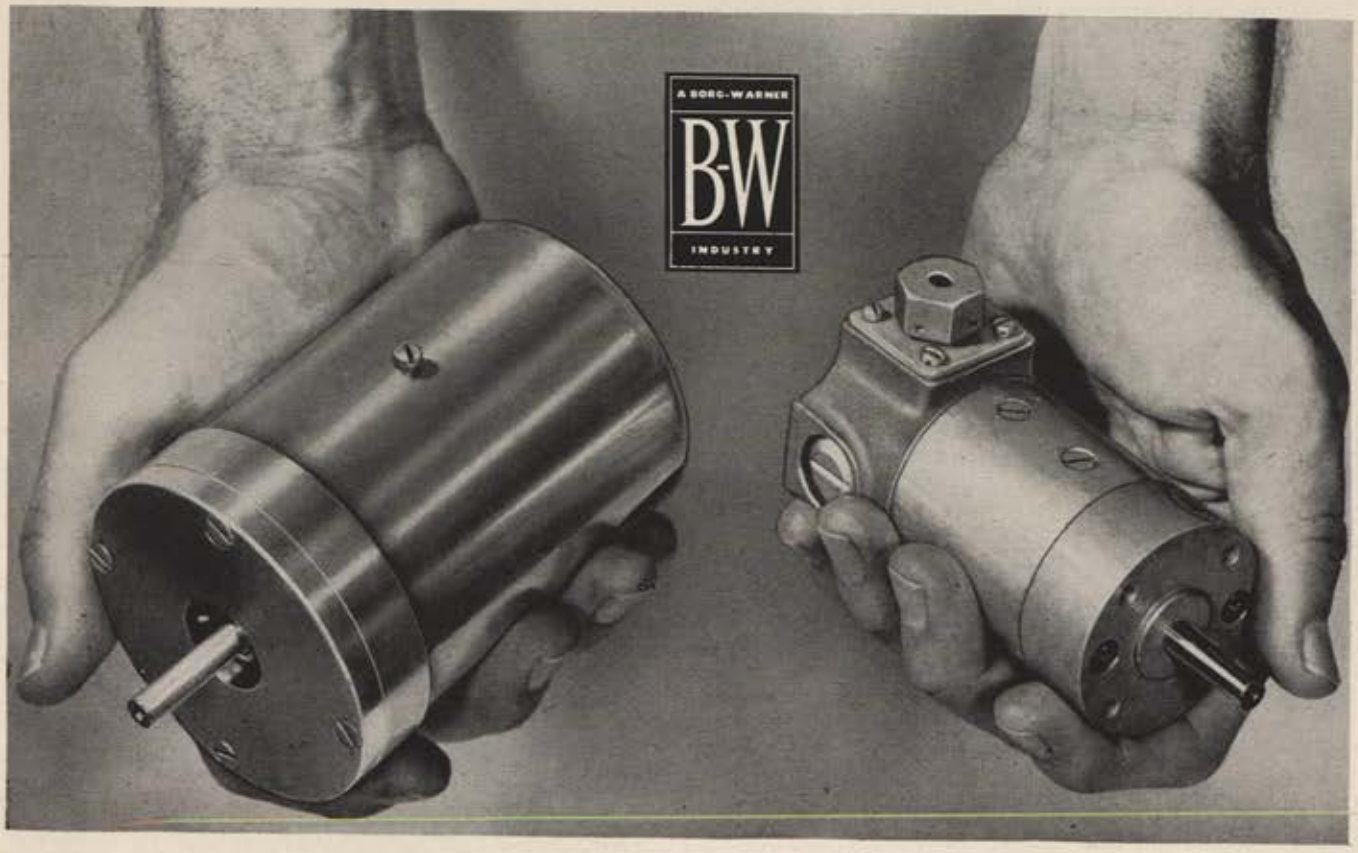
The use of the F/O system would allow most officers scheduled for reduction in force to remain on active duty, if they so desired. If additional trimming was required later, the F/O plan would allow for more selective elimination—it would allow the time necessary for a careful evaluation of the records of every officer earmarked for separation.

Returning to "poverty of input," what happens after the two bumper crops of almost 10,000 AF-ROTC graduates complete their two years of active duty and depart? Since the incoming class of juniors, fall term of 1953, was severely cut back, the output of graduates will naturally be smaller. Classroom attrition, for any number of reasons, will cut the end figure even more.

What must follow then is a great shortage of commissioned officers on active duty. A shrunken input and a demonstrated reluctance to accept Regular commissions or extended active duty will leave acres of officer T/O slots unmanned.

What then follows? Recall of Reserve officers! Here we go again!

M/Sgt. Frank J. Clifford
Philadelphia, Penna.



Compact, powerful, custom-built A.C. or D.C. motors for ELECTRONICS and ELECTRO-MECHANICS

Wherever you need electric motors for maximum power in minimum size, Pesco has the basic co-ordinated frame sizes and power elements you'll require.

For example—Pesco motors are now in use for: cooling (blowers for electronic equipment), tuning (radios and automatic finders), scanning antenna (civilian and military), antiaircraft radar fire control, as well as pump drives and mechanical actuators.

By using standardized parts in a series of six co-ordinated frame sizes, Pesco can provide you with electric motors for electronic applications with voltages from 6 to 120 volts D. C.; from 1/100 to 6 H. P. for operating speeds up to 15,000 R. P. M. Special, high-altitude design will operate from −65° to + 165° F.

Pesco high-frequency A.C. induction motors, squirrel-cage type, are built in a series of 5 co-ordinated frame sizes to meet horsepower requirements of .01 to 9.0, at 400 cycles per second.

Motors in these frame sizes can be built for *your* specific frequency, using standard parts to obtain the speed and power rating desired. Consult our Engineering Department concerning your requirements. Strictest confidence—and no obligation, of course!

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Weatherman's Instrument Speeds B-52's Flight Evaluation Tests

Flight characteristics of the B-52 are probed by a theodolite's telescopic camera-eye. Normally used to ascertain direction and velocity of winds aloft, this theodolite (left) is used by Boeing engineers running the Stratofortess' tests. Mounted on a hill overlooking the 10,000-foot Boeing Field runway, Seattle, Wash., the company-built instrument (cost, $30,000) films (right) B-52's take-off run, ascension and descension rates, and landing roll. Money saved in speeding up tests will more than pay theodolite's cost.

Powerhouse

Solar Aircraft Company is manufacturer of a bantamweight gas turbine engine—said to be world's smallest—which powers auxiliary generator units (left) on the AF's giant cargo and troop transports—C-124 Douglas Globemasters. Weighing less than 100 pounds and about the size of a two-foot cube, Solar's engine—the Mars—delivers fifty horsepower for the generator sets that kick out fourteen kilowatts of direct current. On the ground the generators supply auxiliary and emergency power to operate cargo doors, hoists, and other ground accessories. They also provide necessary power to permit preflighting of aircraft's electrical equipment without starting engines. In flight the auxiliary generators, or putt-putts, are used whenever engine-driven generators are not producing sufficient power—as in landing approaches and in taxiing, when engines are throttled back—or in case of malfunction or loss of an engine.

F-100—Super Sabre

North American has showed the newest in its Sabre series, the F-100 Super Sabre. Vital statistics: length, 45 ft.; height, 14 ft.; wing-span, 36 ft., with 45-degree sweep; service ceiling, above 50,000 ft.; combat radius, 500 mi., and powerplant, P&W J-57 and afterburner.

YH-16's Test-Flown

Piasecki's king-sized YH-16 helicopter made its initial flight this fall. The YH-16—Transporter—is powered by two Pratt & Whitney engines (1,650-hp. each) driving tandem rotors eighty-two feet in diameter. Each engine can drive both rotors, and one can sustain YH-16's forward flight. Its seventy-eight-foot fuselage holds forty fully-equipped soldiers (see cut), thirty-two litter cases, or three jeeps. A ramp in rear speeds loading. The Transporter's over-all length is 134 feet, height twenty-five feet, and weight, more than 30,000 pounds. The YH-16 will carry a three-man crew—pilot, co-pilot, and flight engineer or navigator.

Rotary-Mounted

Now in operation at several key Air Force bases are Turntable Ground Control Approach, GCA, sets like the one shown (right). They're a development of ARDC's Rome Air Development Center, Rome, N. Y., in conjunction with Craig Machine, Inc., Danvers, Mass. Each consists of the radar's control shack mounted on a steel ring supported by rollers. A push-button control rotates the ring through 340 degrees. On installation the GCA set is calibrated to align itself automatically with the runway being used. This obviates the necessity, as formerly, of having more than one radar set, or shifting the shack from runway to runway depending on the wind's direction. Rotation is accomplished in three and one-half minutes compared to more than a half-hour previously consumed by shifting GCA sites. The rotating GCA's cost is but a fraction of the cost of additional sets, vaults, and underground circuits which would otherwise be required to give equivalent radar coverage. In addition to providing multiple runway coverage, the GCA can now be used to provide bi-directional (left and right) coverage of the runway, simultaneous monitoring of parallel runways to facilitate double take-offs and landings, and it speeds directing straight-in approaches of aircraft that have to make emergency landings.

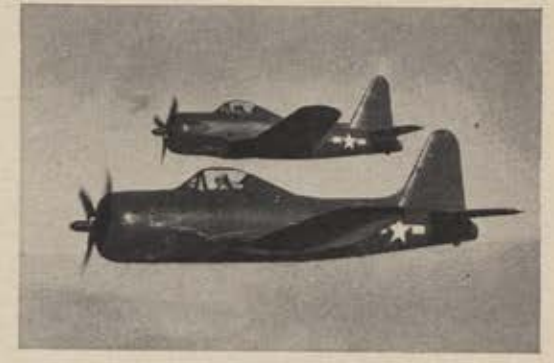
Twin-jet F-89s for Alaskan Defense

An encouraging note from the North is the news that piston-powered fighters no longer guard our arctic approaches. They're being replaced in Alaska by the Northrop F-89 Scorpion, twin-jet, all-weather, fighter-interceptor with an approximate range of 2,000 miles. The 600-mph, two-man, semi-automatic interceptors are being assigned to the Alaskan Air Command. They'll replace an F-82 squadron, last AF unit equipped with North American's Twin Mustangs, and one of USAF's last units using propeller-driven engines. Two obvious reasons make the F-89 ideal for arctic flying: twin Allison J-35 turbojet engines. And two not so obvious: its deicing system (see "Technique," Aug. 1953) and its highly intricate electronics gear. A Scorpion's radar brain searches, finds, and "locks" on an enemy aircraft, and then calculates range and windage for its six 20mm-cannon sting. Later to be assigned to the AAC will be F-89Ds. They're all-rocket-armed versions of the F-89s, and the USAF's heaviest armed fighter aircraft. From its two wingtip pods, an F-89D is able to launch 104 FFARS—2.75 folding fin air-to-air rockets. They can be fired either in separate clusters or in one gigantic barrage. One can knock down the largest bomber.

SAN DIEGO home of many aviation firsts CELEBRATES PROGRESS 50th ANNIVERSARY OF POWERED FLIGHT SECURITY

31 YEARS OF RYAN PIONEERING MAKE U. S. PLANES FLY FASTER, FARTHER, LONGER

RYAN FLYING COMPANY, 1926



RYAN FR-1 FIREBALLS, 1944

Few people realize that today's great manufacturing facility at Ryan's modern San Diego factory grew from a 20 by 40-foot shop that housed Ryan in the early 1920's.

The almost incredible growth of the Ryan organization, and the important role it has played in helping to create a great new industry for 31 of the 50 years since the Wright Brothers first flew, exemplifies the success possible under America's system of free enterprise.

Consistently a leader in aeronautical progress, Ryan continues to offer the military services and its commercial customers products of demonstrated quality and performance. This ability plus Ryan's *seasoned management, vision, enthusiasm, ingenuity, perserverance,* and *thrift* have been responsible for the company's steady, healthy growth.

RYAN FACTORY AND HOME OFFICE TODAY

Today, Ryan's plant covers three-quarters of a million square feet of production area and 40 acres, and is staffed by more than 4,500 skilled aeronautical workers whose spirit and loyalty is extraordinary. It is this combination of skill, modern equipment and enthusiasm teamed with Ryan's versatile aviation experience that gives Ryan the edge in solving today's aircraft problems.

RYAN FIREBEE

Specialized, ingenious and *versatile,* Ryan is still contributing aviation "firsts" for it plans to continue to help build an even more "wonder-filled" air age in the years to come.

RYAN AERONAUTICAL COMPANY

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RYAN

★ SPECIALIZED
★ INGENIOUS
★ VERSATILE

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Jet and Rocket Engines and Components
Exhaust Systems for Aircraft
Electronics Equipment
Ceramics for "Hot Parts"
Weapons Systems Design and Management
Aircraft and Power Plant Research
Metallurgical Engineering
Thin-Wall Ducting
Firebee Pilotless Jet Planes

Pioneers in Each ★ Leaders in All

One Blue Suit... 40,000 BROWN ONES

The lone Air Force officer assigned to Fort Knox, Ky., has his problems teaching AF doctrine to Armor officers

By Lt. Col. Howard T. Wright

AIR FORCE assignments are strange and wonderful things. It was early summer, 1952. I had just finished the Field Officer Course at the Air Command and Staff School. I "knew" I was going to Headquarters, Air Defense Command at Ent AFB, Colo. While my classmates worried about assignments, I, with a slightly superior air, I'm afraid, made my plans.

Then—out came the orders. I was transferred to the 3894th School Group, at Maxwell. "School" Group! The last thing I wanted to be was a school teacher, and with no disrespect to Maxwell Field or the sovereign state of Alabama, I would have, by choice, picked a different location. But, there were more shocks to come. My duty station was Fort Knox, Ky., as Senior Air Force Representative at the Armored School. I found out that I was also the "Junior" AF representative. In fact, I would be the only Air Force officer in the whole place.

What were my duties? Speak a little, liaison a little, and represent a little. Specifically what? I was told to go up and find out. I loaded the baggage and my flabbergasted wife into the little red car, and off we drove for the Home of Armor.

Almost everyone was scrupulously polite, at first. But, as the one blue suit among 40,000 brown ones, I couldn't help feeling like the model in the Maidenform advertisements. And the lack of information about the Air Force, plus the disagreement with accepted Air Force doctrine and procedures, shook me. Then I began to realize that I knew as little about Armor as they did about Air. The first inklings of the tremendous importance and scope of this education job began to peep through the mental clouds.

The pendulum immediately swung too far in the other direction. I became overly conciliatory. After all, there was only one of me, and my job was to get along with these Army types, so I could educate them. This didn't work too well either, and finally came to a showdown one morning, on the subject of a lecture on tactical air. An Armor officer was telling me exactly what I could and could not teach, regardless of Air Force doctrine, when the pendulum violently reversed itself. I made my point. The general subject matter would be specified by the Army, and I would teach it according to Air Force doctrine. The perspective stabilized, and everyone became happier.

So I found myself on a platform at Fort Knox, lecturing on the Air Force. I don't mind facing an audience, but the range of subjects is tremendous. Too many of us are so specialized that knowledge of other parts of the Air Force is nebulous, to say the least. If some of my fighter or Air Defense friends could hear me glibly discussing cargo aircraft, aerial supply, SAC, tac recce, principles of Air Force organization, and tac air, their jaws might drop a little. Mine did, I know.

And, this range of Air Force knowledge is by no means limited to the lectures. *You* can read about, say a B-29 forced down in Japan, or Europe, or Afghanistan, and think nothing more of it. Not I. I have to explain why it went down. I got questions on Pathfinder units (I had no idea what they were—but I found out), guided missiles, delta wings, ram jets, how to become a pilot, whether jets are any good, if MATS will give an Army chap a ride, and so on ad infinitum. All deserving of answers, and all showing a healthy interest in the Air Force. But, my answers *have to be right*, since, at Fort Knox, I speak with the authority of General Twining himself, and my answers are the Bible.

Most of us in the Air Force skim

(Continued on page 69)

NEW PROTECTIVE COATING CHEMICAL FOR ALUMINUM

ALODIZING

Alodizing with "Alodine,"* a new technique in the protective coating of aluminum, was made available for production-scale use in 1946. Since that time Alodizing has largely supplanted the more elaborate, costly and time-consuming anodic treatments in the aircraft and other industries.

Continuous and successful industrial use has clearly demonstrated the simplicity and economy of the Alodizing process as well as the effectiveness of the "Alodine" amorphous coatings, particularly as a base for paint. In fact, the paint-bond that Alodized aluminum provides has been found to be superior to that possible with chromic acid anodizing.

The corrosion-resistance of unpainted aluminum Alodized with "Alodine" Nos. 100 or 300 is excellent, easily meeting the requirements of Specification MIL-C-5541. However, a need for protection of unpainted aluminum, even better than that obtained with chromic acid anodizing, has long been recognized.

NEW IMPROVED "ALODINE" DEVELOPED By ACP RESEARCH CHEMISTS

Several years of intensive research have now led to a new type of "Alodine," designated as "Alodine" No. 1200. This new protective coating chemical forms an amorphous mixed metallic oxide coating of low dielectric resistance that provides unusually high corrosion-resistance for unpainted aluminum. In addition, it forms an excellent paint bond that approaches closely the high quality obtained with the earlier types of "Alodine."

After having been tested for conformance with Specification MIL-C-5541, "Alodine" No. 1200 is now about to go into production.

PROCESS DETAILS

"Alodine" No. 1200 is the only essential chemical needed to prepare the coating bath and the final rinse bath. One of its unique features is that it can be used in tanks in an immersion process, or, in a multi-stage power washer in a spray process, or, with a slight adjustment of pH, with brush or portable spray equipment in a manual process. This means that even where the simple production equipment is not available, or where touching up of damaged coatings previously Alodized or anodized is required, excellent protection and paint bonding can still be obtained with practically no equipment.

All three methods of application easily meet the requirements of Specification MIL-C-5541.

Process sequence for all three methods of application is the same as for other standard grades of "Alodine" such as Nos. 100, 300, and 600, viz.: 1. Pre-cleaning. 2. Rinsing. 3. Alodizing. 4. Rinsing. 5. Acidulated rinsing. 6. Drying.

Coating time in an immersion process ranges from 2 to 8 minutes and in a mechanized spray process is about 30 seconds. "Alodine" No. 1200 baths are operated at room temperatures (70° to 100°F.) and heating is required only if the bath has gotten cold after a "down" period.

RECOMMENDED USES FOR "ALODINE" No. 1200

"Alodine" No. 1200 is specifically recommended for coating wrought products that are not to be painted or are to be only partially painted; and for coating casting and forging alloys whether or not these are to be painted. "Alodine" Nos. 100 and 300 are still recommended for coating wrought products such as venetian blind slats, awnings, etc., that are invariably painted.

RESULTS OF TENSILE TESTS

This new "Alodine" not only retards visible corrosion and pitting, but as shown in the table below, the loss of ductility with "Alodine" No. 1200, both brush and dip, after 1000 hours salt spray was less than for chromic acid anodizing after 250 hours, and for "Alodine" No. 100 and a conventional chromate treatment after 168 hours exposure.

PROCESS	SALT SPRAY EXPOSURE	COMPLIANCE WITH TENSILE REQUIREMENTS OF MIL-C-5541
CHROMIC ACID ANODIZING	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	fails
	1000 hrs.	fails
BRUSH "ALODINE" No. 1200	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	passes
	1000 hrs.	passes
DIP "ALODINE" No. 1200	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	passes
	1000 hrs.	passes
DIP "ALODINE" No. 100	168 hrs.	passes
	250 hrs.	fails
	500 hrs.	fails
	1000 hrs.	fails
CONVENTIONAL CHROMATE TREATMENT	168 hrs.	passes
	250 hrs.	fails
	500 hrs.	fails
	1000 hrs.	fails

*"Alodine" Trade Mark Reg. U. S. Pat. Off.

CHEMICALS ACP PROCESSES

AMERICAN CHEMICAL PAINT COMPANY

General Offices: Ambler, Penna.

Detroit, Michigan **Niles, California** **Windsor, Ontario**

"Who made those, mister?"

"The same company, sonny. The one on the right is the first telephone Stromberg-Carlson ever made—'way back when your grand-daddy was no bigger than you. The one on the left is like the anniversary 'phone given to President Eisenhower. *That's* quite a story . . . "

Somewhere in the United States, this month, the 50-millionth telephone has been put into service. In celebration of this achievement, the telephone industry is presenting to President Eisenhower a special commemorative 'phone.

Who made those fifty million telephones?

Millions of them are the products of firms like Stromberg-Carlson, suppliers to the 5300 *independent* telephone companies which serve the urban and rural areas of the United States. Geographically, these independent telephone firms provide communication for two-thirds of our country!

Some of these companies serve as few as 25 subscribers; others over 200,000. But the loyalty and progressiveness of their service are not limited by size. Witness the fact that many of the smallest use Stromberg-Carlson XY Dial Systems, as modern as any in the largest metropolis.

We are proud to have been a pioneer and leader in this communication industry (for more than fifty years) and especially proud to be a major supplier to the independent telephone companies. Like thousands of other "small" businesses, they form the true backbone of American progress.

Commemorating
THE 50 MILLIONTH TELEPHONE

There is nothing finer than a

Stromberg-Carlson® Rochester 3, New York

through news articles on military developments, if we read them at all, unless the magic word "Air" appears. The same is true of Army personnel. It took awhile to realize this, though, and to tie both lecture and informal Air Force teaching to the Armor viewpoint. For example, all the Armor officers have heard of SAC, but they're not too interested. SAC is too high-level, too distant, too far from the battlefield, they think, and, even though most of them approve (some of their remarks might annoy General LeMay, to say the least), SAC's role in a future war is hard to sell, though it is being slowly realized and appreciated. On the other hand, take some of the electronic equipment SAC uses, put it in fighter-bombers, light-bombers, and medium-bombers, tie it in to possible close support missions, and you have their interest. Take the article on NATO in the August 1953 issue of AIR FORCE Magazine. The article is pro-Air Force and highly pro-Armor. I distributed copies to key Armor personnel at Fort Knox. Discussion was widespread, and Armor officers were calling and asking for additional copies of AIR FORCE.

There are controversial areas in Air Force-Army relationships, which present difficulties. Some are controversial only in terms of individuals, others involve classes of official policies of the Air Force and Army. What to do? You have to handle each in in its own special way. In the confused field of control over tactical close-support aircraft—not confused as far as the Air Force stand for centralized control is concerned—I tell my students that I am presenting the Air Force side of the argument. I show them how they, as ground commanders, benefit when arbitrary ground boundaries don't hamper operational employment of aircraft and thus fail to exploit the range, speed, and mobility inherent to aircraft. The Armored School and Center both approve. The authorities of both leave nothing to be desired in the way of cooperation.

What about the Army aviation, now with something like 2,400 aircraft? I used to take quite a kidding on this one. I've found it best to talk straight from the shoulder about the cost of duplication in money and personnel for procurement, training, supplies, and the placement of specialists. I also use the analogy of regiments. In other words, if we in the Air Force don't get *exactly* the support we want from the Army for the protection of our air bases, should we duplicate the men and materials needed for Armor, infantry, artillery, and support troops to fashion an Air Force Regiment, or do we sit down calmly and try to work out the differences?

Another so-called controversial point is jet aircraft. Some Army officers don't like them for close support. They say they prefer the propeller-driven type, that the jets go so fast that the pilots can't see anything on the ground or hit a target if they could see it, that they can't stay in the air longer than a few minutes, and many other things. It takes a long time to correct deep-seated impressions one at a time, since most of the Staff doesn't have time to attend routine tactical air lectures. And it is very important both to Armor and to the Air Force that such misconceptions be corrected. Usually the trouble can be traced to one source—lack of experience; i.e., lack of a jet ride. So, the 3894th School Group at Maxwell, the organization to which all Air Force Representa-

(Continued on following page)

So we got cooped up in the iron monster, too many people, too little space.

THE AUTHOR

A West Point grad (1940), Lt. Col. Howard T. Wright was with the 51st Fighter Group in the CBI in WW II. Since the war he's done mostly Aircraft Control and Warning work, including a two-year tour in the Far East, during part of which he ran FEAF's air defense school in Tokyo. He was CO of an AC&W Group at Orlando AFB before spending six months as liaison officer with a Navy Medical Research detachment in the Anglo-Egyptian Sudan. At Fort Knox, Ky., the AF population recently increased one-third when the Wrights' second child was born.

ONE BLUE SUIT—CONTINUED

tives at non-Air Force Schools are assigned, received among its voluminous and highly variegated mail a long letter from Fort Knox, requesting that a jet orientation ride be set up for eighty key Armor personnel at The Armored Center and the Armored School. It had never been done before, but that didn't stop the 3894th School Group and the Air University, bless their hearts. They sponsored the orientation rides to a fare-thee-well. USAF Headquarters approved, TAC and the 405th Fighter-Bomber Wing at Langley AFB got the job, and from the 27th through the 30th of July 1953, one C-47 a day took off from Fort Knox early in the morning, flying twenty Armor officers to Langley for TAC briefing and a simulated close support mission in a Lockheed T-33, and then back to Fort Knox the same day. The results were phenomenal.

As for me, I did more hangar flying after the ride, than I've done at any Air Force base. The jet's accuracy, its visibility, and its value as a military weapon, were firmly established. One high-ranking Armor officer told me that in the past he had spoken and written, both personally and officially, against jet aircraft for close support work, and that the jet ride had changed his views 180 degrees. My Armor Corps neighbor at Fort Knox saw all five of the tanks used as targets (the 405th Fighter-Bomber Wing did a magnificent job on the simulated mission), and told me that he wanted jets around next time he went into combat. One officer, seriously, asked me about jet pilot training. One of the Army aviators told me the 405th pilots did a wonderful job of formation flying, "closer than I'd want to taxi to another airplane."

However, the main results can be summed up, I believe, in a quote from the comment sheet of Maj. Jack Grill, Executive Officer of the Tactics Division, Command and Staff Department, The Armored School. Concerning the jet ride, he wrote: "Trips of this nature temper opinions when something goes wrong, and instead of the attitude of 'This is the last time I'll have anything to do with them,' it will be 'The next time *we* will do better.'"

So far, I've stressed the benefits accruing to the Air Force from our presence in the non-Air Force Service schools—the indoctrination of non-Air Force people in the doctrine, policies, procedures, tactics, organ-

(Continued on page 73)

U.S.A.F. F-84F jet fighter-bombers on patrol. Built by Republic Aviation, they're powered by Curtiss-Wright J-65's.

Two for us!

It's a good thing these needle-nosed Thunderjet fighter-bombers are on our side. They hustle along at better than 650 mph and pack a powerful punch.

Two Barium companies we'd like you to know better—Jacobs Aircraft Engine Co. and East Coast Aeronautics, Inc.—lend a helping hand in building this F-84F jet. East Coast supplies fuel system components, while Jacobs furnishes cylinder strut assemblies.

About your getting to know Jacobs and East Coast better: just as they've joined forces in supplying components for the Thunderjet, so they can provide you with engineering resources and production facilities for designing and making . . .

Precision gear assemblies (ferrous or nonferrous casings) . . . Hydraulic cylinder assemblies . . . Reciprocal engines and components . . . Small gas turbines and components . . . Ram jet and rocket assemblies . . . Helicopter assemblies, blades, transmissions and engines . . . Complete aircraft or assemblies in aluminum, magnesium and Fiberglas laminates.

Why not let these Barium firms show you what they can do for you? Barium Steel Corporation, 25 Broad St., New York 4, N. Y.

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NEW GAS TANK FILLER CAP ASSEMBLIES developed by East Coast are made in this area of plant at Pelham Manor, N.Y. Cap increases fuel capacity, improves wing aerodynamics on all jets.

TURRET LATHE DEPARTMENT of Jacobs Aircraft Engine Co., Pottstown, Pa., one of the finest equipped machine shops in the country for the production of precision gear and hydraulic assemblies.

BLUEPRINTING NEW JOBS for new materials at East Coast. Only 7 years old, this heads-up Barium company already rates as one of the top engineering outfits handling aluminum and magnesium.

Efficient Economical Camera Adapter

Now available on Lavoie Oscilloscope (Model LA-239C)

The popular Lavoie Oscilloscope LA-239C has had a new plus feature added: The ability to mount the Lavoie Camera Adapter quickly and without modification. The Camera Adapter may be readily installed by removing the bezel, and securing the Adapter with four knurled nuts supplied on the panel. Already widely used in the development of radar and guided missiles, this new feature makes the LA-239C Oscilloscope a more valuable tool than ever.

NOTE: When ordering the LA-239C Oscilloscope primarily for photographic use, a P-11 Screen CRT is recommended. Specify type of phosphor desired.

- **Long persistence trace (P-2 phosphor)**
- **medium persistence trace (P-1 phosphor)**
- **blue photographic trace (P-11 phosphor) available.**

CAMERA ADAPTER DATA: Calibrated illuminated scale—1/50, 1/25, 1/2, 1, 5 secs. at f2.8
32 pictures per roll @ 5 cents each—a saving of 50 cents per roll.

OSCILLOSCOPE DATA

Wider Bandwidth: Complex waves from 5 cycles to 15 megacycles. Sine waves from 3 cycles to 20 megacycles.

Extended Sweep Frequencies: Linear from 10 cycles to 20 megacycles internally synchronized. Triggered sweep, from a single impulse to irregular pulse-intervals up to as high as 6 megacycles.

Square Wave Response: Rise time 0.022 microseconds, only 5% droop on flat-topped pulses as long as 30,000 microseconds duration.

Greater Stability: Electronically regulated power supplies throughout to maintain accuracy and constant operation under varying line conditions or line surges. Surges on the line from which Model LA-239C is being powered can be displayed without distortion.

Higher Signal Sensitivity: Maximum sensitivity without Probe: 10.4 millivolts. With Probe: 100 millivolts. (Maximum signals, 125 V. Peak and 450 V. Peak respectively.)

Timing Markers: Interval: Markers of 0.2, 1, 5, 20, 100, 500 or 2,000 microseconds may be superimposed on the trace for the accurate measurement of the time base.

Voltage Calibration: Signal amplitude is referenced to a 1,000 cycle square wave (generated internally) the amplitude of which is controlled by a step-and-slide attenuator calibrated in peak volts. (A jack is provided to deliver 30 V. Peak for use in calibrating other instruments.)

Sweep Delay: Any portion of the sweep longer than a 5 microsecond section may be expanded by 10:1 for detailed study of that portion of the signal.

Power Source: 110 to 130 V. AC from 50 to 1,000 cycles. 295 Watts. (Fused at 4 amperes.)

Dimensions: In Bench Cabinets: 19½ in. wide, 15¼ in. high, 16¾ in. deep. In Rack Mounting (with cabinet removed to fit standard relay rack): 19½ in. wide, 14 in. high.

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izations, equipment, and future developments of the USAF. This all adds up to education in the capabilities and limitations of airpower. What about the other side of the picture? What does the Armor Corps gain from my presence at Fort Knox? The only answer, of course, is education again, a two-way education. For example, what are the best tactics for tanks to use in combat to cut damage and casualties from air attack? The Evaluation Staff of the Air War College wrote a detailed study of this subject, upon request, from the viewpoint of an attacking pilot.

As for my own education, after the first plunge into "Combat Commands," "Cross re-enforcements," "mobile defense," etc., and the tables of organizations, or what an RAF officer called "tragic little boxes," I began to appreciate a tank's capabilities and limitations.

Have you ever ridden in one? Well, I prefer pneumatic tires on a smooth highway, but they're scarce in combat. And firing the guns is an experience. In the face of a pointed question and a highly interested audience, I "volunteered" to take the gun firing course. It was a miserable morning when we assembled to be trucked out to the firing range, a cold, foggy, soot-laden, 5 o'clock morning. I bounced into the waiting shed cheerily, bundled to the chin, and announced that when fighter pilots stood alert, we got up "early," not in the middle of the day. The assembled Armor specimens grumped at me coldly.

"Wait," they said, "till you shoot."

So, I got all cooped up in an iron monster, with too many people in too little space, turrets moving and guns elevating, machinery grinding, as big a "Boom" as you've ever heard, and lots of smoke. This, plus the warning that the man handling the shells had better not drop one of them, and the expressive gesture that told what would happen if he did, helped make the occasion a memorial one. I got two targets with the 90mm gun, honest. Haven't fired it since, either, and don't intend to.

It's give and take in this kind of school teacher business, give and take in information, personalities, work, favors, and education. And underlying everything is the sober realization that this give and take, this education, is helping to shape our military policies, to give our country a more unified, educated, and efficient fighting force.—END

OMAHA NAMED FOR '54 CONVENTION

Arthur Storz will be chairman for the four-day meeting, August 19 through 22 at the headquarters city of SAC

Omaha, Neb., the "center of the US" and headquarters of the Strategic Air Command, has been selected as the site of AFA's 1954 Convention and Reunion, August 19-22.

George C. Kenney, president of the Association, made the announcement on a television broadcast October 25 in Omaha. The selection of Omaha was made by AFA's National Executive Committee after reviewing invitations from a number of interested cities.

Arthur C. Storz, Sr., Omaha brewery executive, was named by Kenney as Convention Chairman. An Air Force veteran, Storz organized the Ak-Sar-Ben Squadron of AFA in Omaha, and serves as chairman of the Armed Services Committee of the Omaha Chamber of Commerce.

If the reception given the site committee during its advance survey is any indication of Omaha's interest in AFA and its 1954 Convention, delegates and guests to the Convention can be assured of a highly successful and enjoyable meeting.

A group of distinguished Omaha citizens, headed by Storz, have pledged their all-out efforts to make AFA's 1954 Convention the best yet. Gen. Curtis E. LeMay, Commander of SAC, has assured AFA of SAC's full cooperation.

Omaha, in the geographic center of the nation, presents no travel problems to AFA members. The city boasts modern air, rail, and bus transportation facilities. Two downtown hotels, the Fontenelle and Paxton, will house the majority of delegates and guests. Nebraska celebrates its centennial year in 1954, and the fiesta spirit will prevail at the AFA Convention. Make your plans now to be in Omaha August 19.

At a dinner recently in Omaha's Blackstone Hotel, honoring AFA Director Carl A. Spaatz, the head table includes, from left, US Rep. Roman L. Hruska; Maj. Gen. Thomas S. Power of SAC; '54 Convention Chairman Arthur C. Storz; Spaatz; US Sen. Hugh A. Butler, and Maj. Gen. Lucas V. Beau of CAP.

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exceptional programming of events planned to commemorate the Fiftieth Anniversary of Powered Flight. The programs presented throughout the year have reflected great credit upon the Squadron officers and members. AFA salutes this outstanding unit.

A Busy Ninety Days

The first ninety days of AFA President Kenney's term of office have been busy ones and have taken him throughout the nation with appearances before AFA groups in Battle Creek, Mich.; Colorado Springs, Colo.; Omaha, Neb.; Asbury Park, N. J., and Westchester, N. Y.

His hard-hitting speeches at the New Jersey and Colorado Wing conventions resulted in newspaper editorials, while

(Continued on page 77)

At Lindbergh Field, Edward C. Kranch, left, California Group Commander, and Robert J. Kirby, right, San Diego Squadron Commander, chat with Capt. James S. Carson, F-86 pilot who recently addressed San Diego Squadron members.

Lt. Gen. Robert Harper, ATRC Cmdr., gives J. Chesley Stewart, St. Louis Sqdn. Cmdr., 184 new AFA member applications from ATRC, as Scott AFB Cmdr. Col. Carlyle Ferris and ATRC's Vice Cmdr., Maj. Gen. Glenn Barcus, look on.

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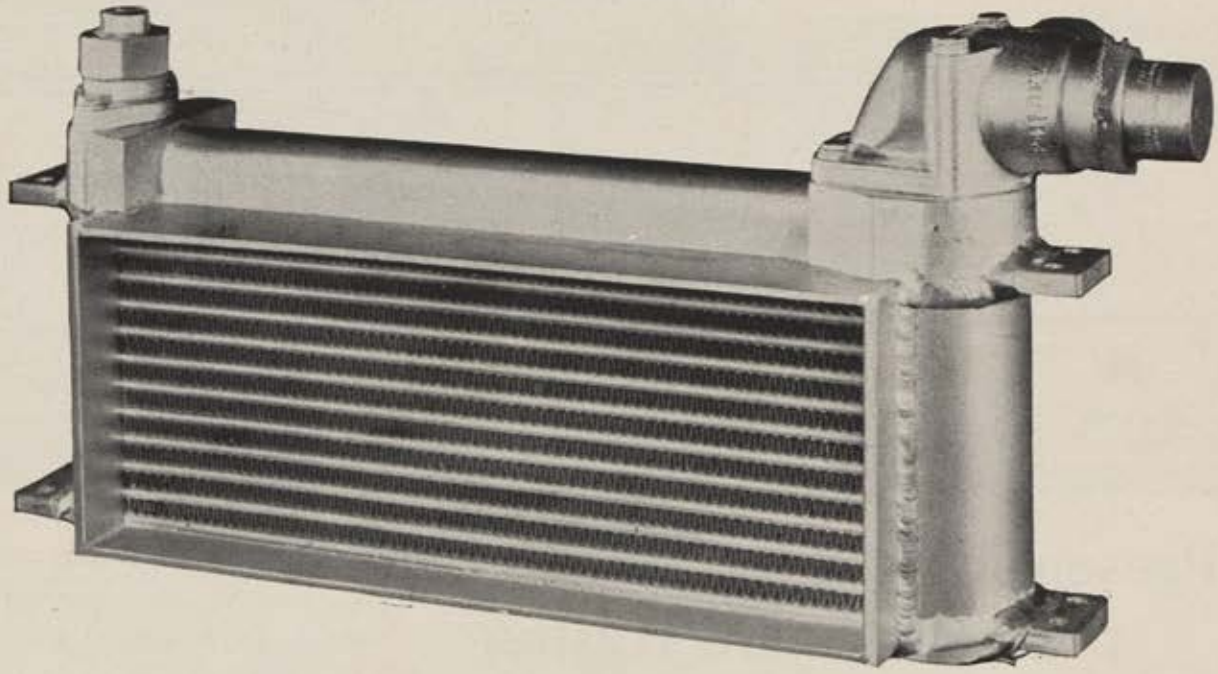
reliable

Harrison plate-type aviation oil coolers are light in weight, compact in design, ruggedly built and reliable in performance under all operating conditions. These aluminum oil coolers are capable of withstanding internal pressures up to 400 psi. A thermostatically controlled valve by-passes the oil during the warmup.



The Harrison oil cooler is used in a wide variety of applications—to cool lube oil for compressor and turbine bearings of turbojet and turboprop engines . . . to cool helicopter engine and gearbox lubrication oil . . . to cool hydraulic system fluids in commercial and military aircraft.

Manufacturers of airframes and aircraft engines are invited to write for detailed performance data and specifications.

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It's a completely new aircraft—TEMCO's Model 33 trainer, now undergoing evaluation by the U. S. Navy at Pensacola, Florida.

Initial design of the Plebe was begun last June 10. Seventy-five days later the new trainer made its first flight!

The Plebe is a two-place, low wing, tricycle landing gear trainer. Its bubble canopy gives both student and instructor unexcelled visibility. The new trainer has an exceptional rate of climb of 1350 feet per minute and plenty of power for training maneuvers with its 225-horsepower Continental military engine and full constant speed propeller.

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LaGuardia, N. Y., Squadron Commander Herb O. Fisher, left, presents the New York Wing's Plaque for Journalistic Effort for Airpower to George Carroll of the N. Y. "Journal American" atop a Port Authority heliport in New York.

his remarks in New Jersey were broadcast throughout the southern part of the state. He has also appeared on several national TV programs in behalf of AFA.

On his travels for the National Arthritis and Rheumatism Foundation, which General Kenney heads, he contacts local AFA leaders whenever he can and meets them informally to discuss local problems.

AFA's Executive Director, James H. Straubel, has also been on the go, and in a recent two-week trip to the West Coast attended a number of Squadron and Wing functions and talked with many AFA officers and leaders. His itinerary included Chicago, Omaha, Colorado Springs, San Diego, Los Angeles, and San Francisco.

Straubel reports good development of units over the country and was particularly pleased with the growing strength of the Auxiliary.

Kenney Seeks 'Best AF'

AFA President Kenney, addressing the Airpower Banquet of the Battle Creek, Mich., Squadron, called on AFA members to "educate" the nation's lawmakers on the potential of airpower. "You cannot win any modern war without the world's best Air Force," General Kenney said, "and, conversely, you cannot lose one if you have the best Air Force."

Banquet toastmaster was Morry Worshill, AFA Director. The banquet followed a day-long Airpower Symposium that brought together representatives of most of Michigan's Squadrons, visitors from Illinois and Ohio, plus such guests as Michigan's Governor G. Mennen Williams, State Civil Defense Director Lester Maintland, Brig. Gen. Claude H. Mitchell of AMC, and AFA Regional Vice President George Anderl.

Other honored guests included David Jamieson, of GE; J. Ray Mohlie, from Oliver Aviation Division, and AFA Directors Mary Gill Rice and Stanley M. McWhinney. Battle Creek Squadron Commander William R. Miller was chairman, assisted by Glenn Sanderson, Frank Ward, and Oscar Brady.

First Flight Chartered

Madison, Wis., claims the first AFA Flight chartered under the amended Constitution. President Kenney approved the Charter November 1. John B. Mueller, 4234 Lumley Road, Madison, was elected temporary Flight Commander, with Joseph P. O'Neill, Vice Commander, and Glenn V. Delabarre, Secretary-Treasurer.

John F. Whitmore, Wisconsin Wing Commander, a leader in the move to organize the Flight, is a charter member of the unit. Communities with fewer than twenty members or eligible prospects may organize flights. Other flights are being formed in California, Michigan, and New York.

Colorado Wing Ding

Colorado's second annual Wing Ding in Colorado Springs recently featured AFA President Kenney as the main speaker. He stressed the need for the world's "number one" air force. "In the next show," General Kenney declared, "there will be no winner-loser combination. Either we will survive or we will perish."

(Continued on following page)

Edward D. Becker, right, Pittsburgh "Sun Telegraph" publisher, accepts airpower plaque for his paper from Carl Long, Pennsylvania Wing Cmdr.

Among guests welcomed to the gathering by Wm. Thayer Tutt, Regional Vice President, were a number of Air Force generals, and AFA Executive Director, James H. Straubel, and Program Director, Ralph V. Whitener.

The Convention chairman was D. Warren Jewett, retiring Wing Commander. He is succeeded by James J. Reilly, 526 E. Fontanero, Colorado Springs. Other new Wing officers include James Hewett and Duane Gould, Vice Commanders; Crawford Scott, Secretary; Paul Potter, Treasurer; and R. E. Stallsmith, Charles Johnson, and John J. Mullen, Jr., Councilmen.

New Michigan Squadron

A new Squadron is shaping up in Flint, Mich., according to Robert F. Emerson of Lansing, Vice Commander of the Michigan Wing. Among the temporary officers appointed November 3 to serve until a Charter is granted were Edward R. Kanaby, G-2114 Nedra St., Flint, Commander; Jack L. Anderson, Vice Commander; Edythe Aldrich, Secretary, and William B. Sharpe, Treasurer.

In memoriam: William J. Schanken, member of AFA's Chicago Squadron, killed in an air crash at Albany, N. Y., Sept. 16, 1953.

Official AFA Banner

In a recent issue of Air Force, we incorrectly gave Chicago Squadron 41 credit for obtaining the first official AFA banner. Actually, two New York Squadrons—NYC #1 (WAC), and the Queens Squadron—have had official AFA flags since 1950, and the present New York Wing Commander, David Levison, was instrumental in designing the banner which later became the official Association flag.—End

Pin-pointed for its target...

Increasing air speeds and higher level flight pose ever tougher problems for bombing accuracy. Finer and faster target pin-pointing requires bombing mechanisms of extraordinary precision and almost instantaneous action—yet they must function flawlessly under the most rigorous conditions. Not only engineering ingenuity but precision manufacture—to ultra-fine tolerances—is essential. Such are the skills that Arma provides in close collaboration with our Armed Forces in designing, developing and producing the complex instruments that strengthen our defensive striking power. *Arma Corporation, Brooklyn, N. Y.; Mineola, N. Y.; Subsidiary of American Bosch Corporation.*

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MOBILIZATION NEWS

BY JAKE CULPEPPER

A PROGRAM — USAF has announced another "revitalized" AF Reserve program based on twenty-two of twenty-three recommendations made by the Johnson Committee (See "About the Reserve," Oct. '53 issue). To head the program, which calls for 176,000 participating members in five years, AF picked Maj. Gen. William E. Hall and elevated his title from Special Assistant to Assistant Chief of Staff for Reserve Forces. A new shop was also set up in Office of Director of Public Information, OSAF, to coordinate Reserve information activities. Reservist Lt. Col. John O. Gray is Reserve PIO. Though many of the Johnson Committee's points are yet to be put in motion and some are still under study, AF officials have pledged to put "real muscle" into this program that "must and will work."

NOMENCLATURE — Air Reserve Center is the catch-all title selected for the merged activities of the Reserve districts and specialist training centers. Such titles as Flying Training Centers, Combat Training Centers, Support Training Centers, and VARTs will be taboo under the new overhaul.

STRENGTH — As the first step in boosting the number of participating members from the approximate 16,000 officers and airmen at present time to the five-year figure, AF adopted a plan to allow no-prior-service men to fill the Reserve slots. The first batch, soon to be taken in, will consist of 17,000 seventeen-year-olds who will be given a chance to enlist in the Regular AF should they receive a draft notice.

COMMISSIONS — A plan is in the mill which would allow the long-ignored inactive Reserve airmen a chance at obtaining Reserve commissions.

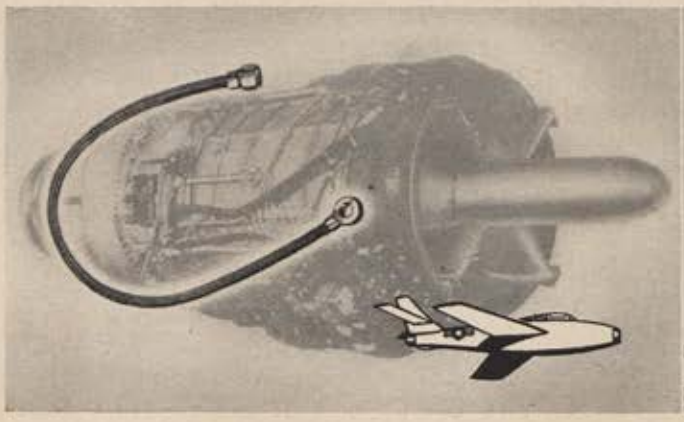
UNITS — The Johnson Committee recommended that the structure of twenty-seven National Guard Wings and thirty Reserve Wings should be maintained. Certain Reserve flying wings are to be organized on a detached basis, and three Reserve flying squadrons will be activated as integral units of three wings of Tactical Air Command on an experimental basis.

CONSTRUCTION — Of the twenty-three locations now being used by the AF Reserve, only twelve have been approved as long-range training sites, thus preventing the AF from securing funds for construction. Next to the manning problem, this is the biggest headache inherited by General Hall.

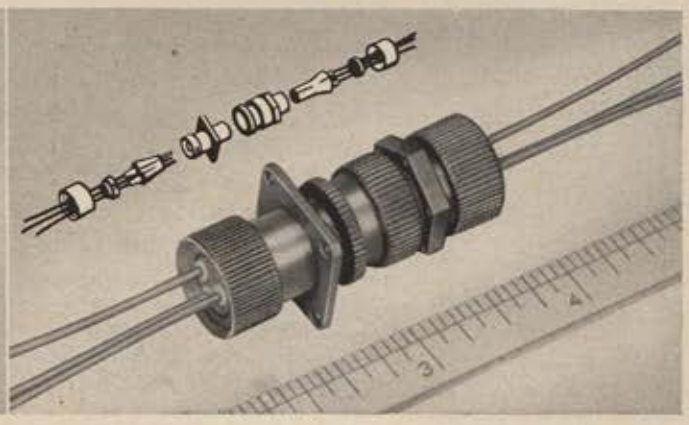
OTHER HIGHLIGHTS of the Johnson Committee recommendations accepted by AF are: that permanent party organization now watching over AF Reserve flying wings (Training Centers) be absorbed into the organization of the wings served; that present integrated budget method for support of AF Reserve be continued; that increase to at least twenty-four paid drills for mobilization assignees be sought in next AF budget; that definite policies be set up concerning availability for training and recall of Reservists in critical industry; that establishment of a code of ethics concerning attitude of employers toward Reservist employees be considered; that ConAC and its numbered air forces continue to be AF's field agencies responsible for Reserve program; and that AF-ROTC be left under Air University's control.

INDEFINITE APPOINTMENTS — AF Reserve officers who failed to request indefinite appointments in the Reserve under Armed Forces Reserve Act of '52 are getting another chance to reconsider. Those whose five-year appointments in AF Reserve expire after April 1, 1953, are eligible for reappointment. Applications may be submitted (through channels) any time prior to 120 days before his expiration date.

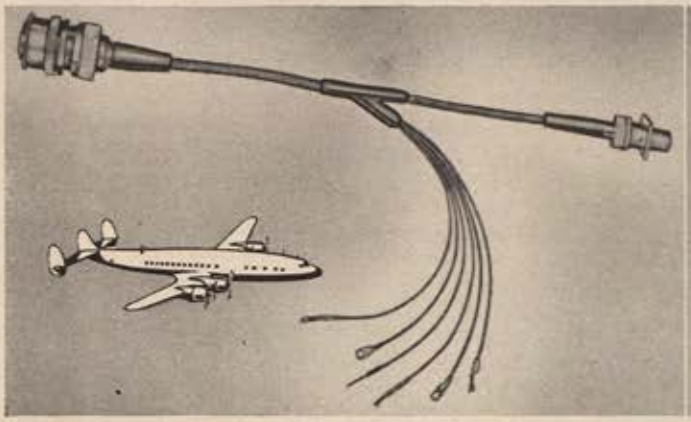
Four design ideas you can use right now...



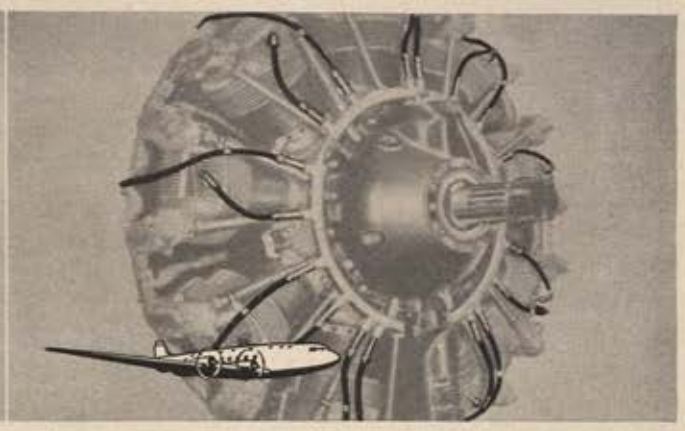
DEPENDABLE FUEL FEEDING. Fuel for the J65 Turbojet Engine is injected to the burners through Titeflex® flexible metal hose. Tough, lightweight Titeflex—tested for temperatures from —70°F. to +600°F. and for pressures up to 500 psi—reliably conveys fuel to engine nozzles; withstands vibration and rough use; is excellent for complex configurations.



FAILURE-FREE INSTRUMENTATION. Designed primarily for instrumentation service at high altitudes, lightweight Titeflex 07 Connectors are pressure-tight and resistant to moisture and corrosion. Plug and receptacle, mated, weigh only 3/5 of an ounce! Special sizes, meeting AN Specifications, can be made with 2 or 3 pins and AE threads—and adapted to your design.



CUSTOM WIRING SYSTEMS. Titeflex specializes in designing and building special "packaged" wiring systems and component assemblies for today's complex aviation and guided missile installations. These may be jacketed with protective silicone or other compounds—and Titeflex Special Connectors used as integral parts solve complex wiring problems.



RADIO SHIELDING. Titeflex Harness for reciprocating engines is our specialty. Titeflex makes a wide range of standard ignition harnesses meeting rigid aviation specifications—can also supply component parts, such as serviceable leads for military and commercial aircraft. Titeflex application on Wright R 1820 Engine includes harness and leads.

FROM DESIGN TO FINISHED PRODUCTS, Titeflex is especially well qualified to help you with all problems of special metal hose, wiring and connections. Take advantage of the long experience of Titeflex engineers in developing high temperature fuel lines, in designing and fabricating harness and wiring systems. Write us now about your application; our nearest representative will be glad to call and help you. Or send for our *new 48-page Metal Hose Catalog* No. 200.

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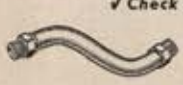

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TECH TALK

By Everett E. Dodd

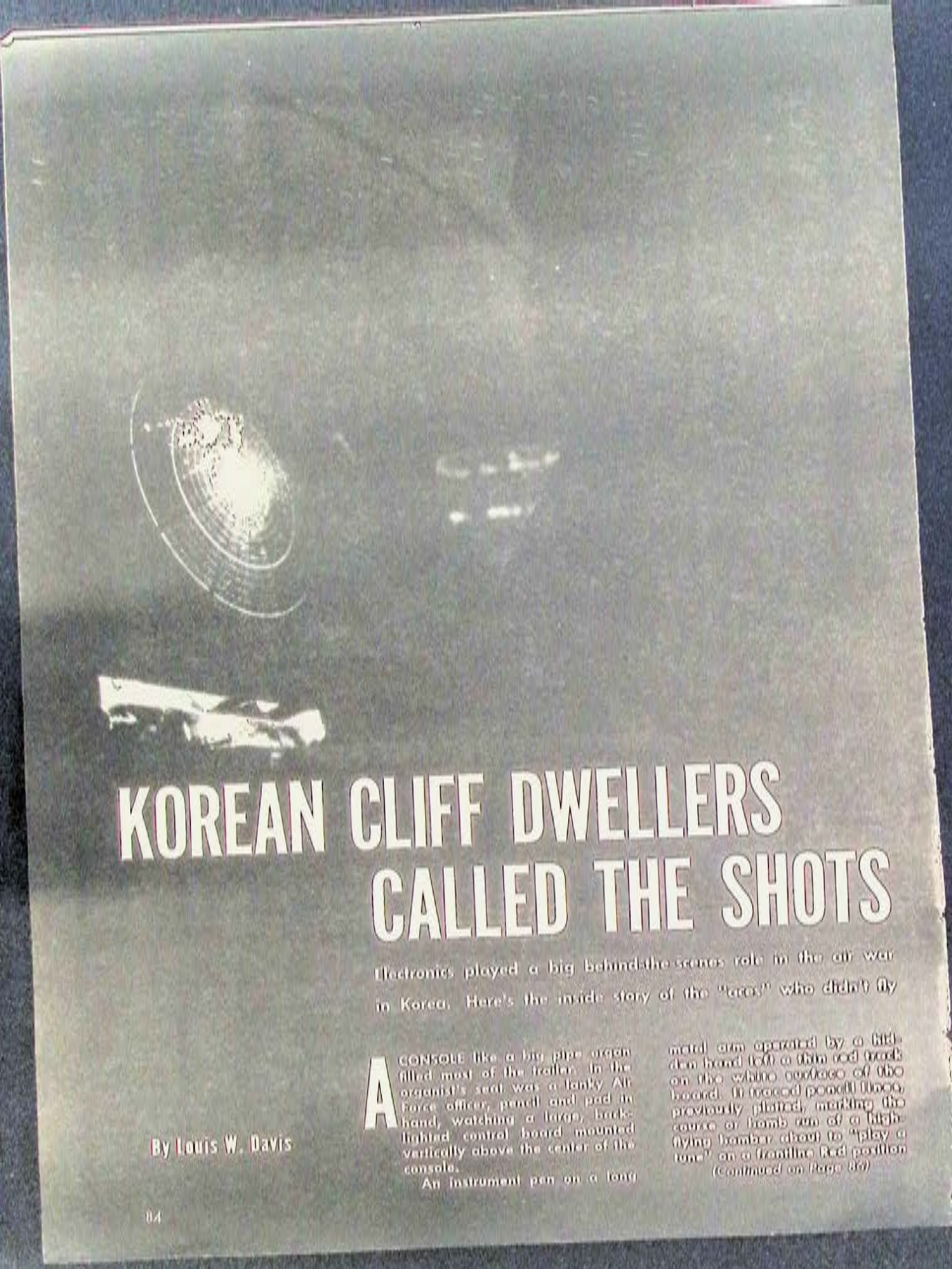
Space ships of the future will have to carry along a supply of air so that the ship's air-conditioning system will have something to condition. Since they'll fly outside the atmosphere, oxygen must be carried along for consumption. But after awhile, human beings would asphyxiate themselves by their own exhalations of carbon dioxide. Air conditioners will handle this contamination. In the absence of gravity, there'll be no convection of air. To generate artificial circulation will be a problem for air-conditioning engineers. What, experts are asked, about possible air leaks? A person would die before the leak was discovered. The problem, they candidly admit, is unsolved.

A high-temperature-resistant material, Fleur-Y-Jet, for lining combustion chambers and one which, it is said, will withstand temperatures well above 5,500 degrees F. is now available to the Air Force. It's been subjected to the heat of a hydrogen-fluorine torch (7,000 degrees F.) without melting or softening. It's strong, extremely hard, and has a high degree of adherence to other metals or plastics. This latter quality will make it extremely valuable, as lighter metals can be coated to withstand high temperatures, thus saving on weight in aircraft-engine production. A plastic, for example, that volatizes at 300 degrees F. was coated with Fleur-Y-Jet and withstood 2,800 degrees F. for one hour without damage.

Airport approaches to Los Angeles are sometimes masked by the city's famous smogs. That's why, if you're planning an air excursion to L. A., you'll need a guide. And the Pacific Airmotive Corporation will give you one free of charge. It's the "Flyers' Guide to Greater Los Angeles," just released by PAC. In it, heaviest smog concentrations are outlined in red, plus flight plan procedures, airport facilities, and radio-range information. It's a handy item, but you must be in a "friendly" plane.

When North American's Super Sabre—F-100—had its wringing-out recently at Palmdale, Calif., a portent of the future became a little more audible. In screaming dives from less than 15,000 feet, the plane split the air and rent the silence with sonic booms that shattered plate-glass windows, ruptured construction timbers, and frightened children and adults alike. What of the future when nearly all planes will be supersonic? Will life be one constant din of thunderclaps? Only, so the experts say, if the sonic booms are below 20,000 feet. Tending to refract, they'll curve skyward before reaching the earth, they say. That may be an answer. But as one British aircraft maker said, it might be better for scientists to invent a sound faster than aircraft.

The secrets of the USAF's F-102, Convair's supersonic, all-weather, delta-wing fighter-interceptor were out in the open—out in the open expanse of Edwards AFB, Calif. And there they were being well kept. Only thing the Air Force or the F-102's manufacturer would say was that it flew. No performance data. Convair was permitted to say its F-102 incorporated "significant improvements." And it was revealed that the single-seat fighter will have a fire-control system built by Hughes. Like the F-100 (see page 63), the F-102 can attain supersonic speeds in level flight (its Mach rating is higher than the F-100's). And like the Super Sabre it is powered with a Pratt & Whitney J-57 engine, plus afterburner. Of the "significant improvements"? The most that can be said was told in Air Force *Magazine (December '52), nearly a year before the F-102 flew. Then it was said that the plane was an "inhabited missile" with the pilot being a "flesh-and-blood monitor" for the electronic equipment that takes him to and from a target "he very likely will not have seen."*



KOREAN CLIFF DWELLERS CALLED THE SHOTS

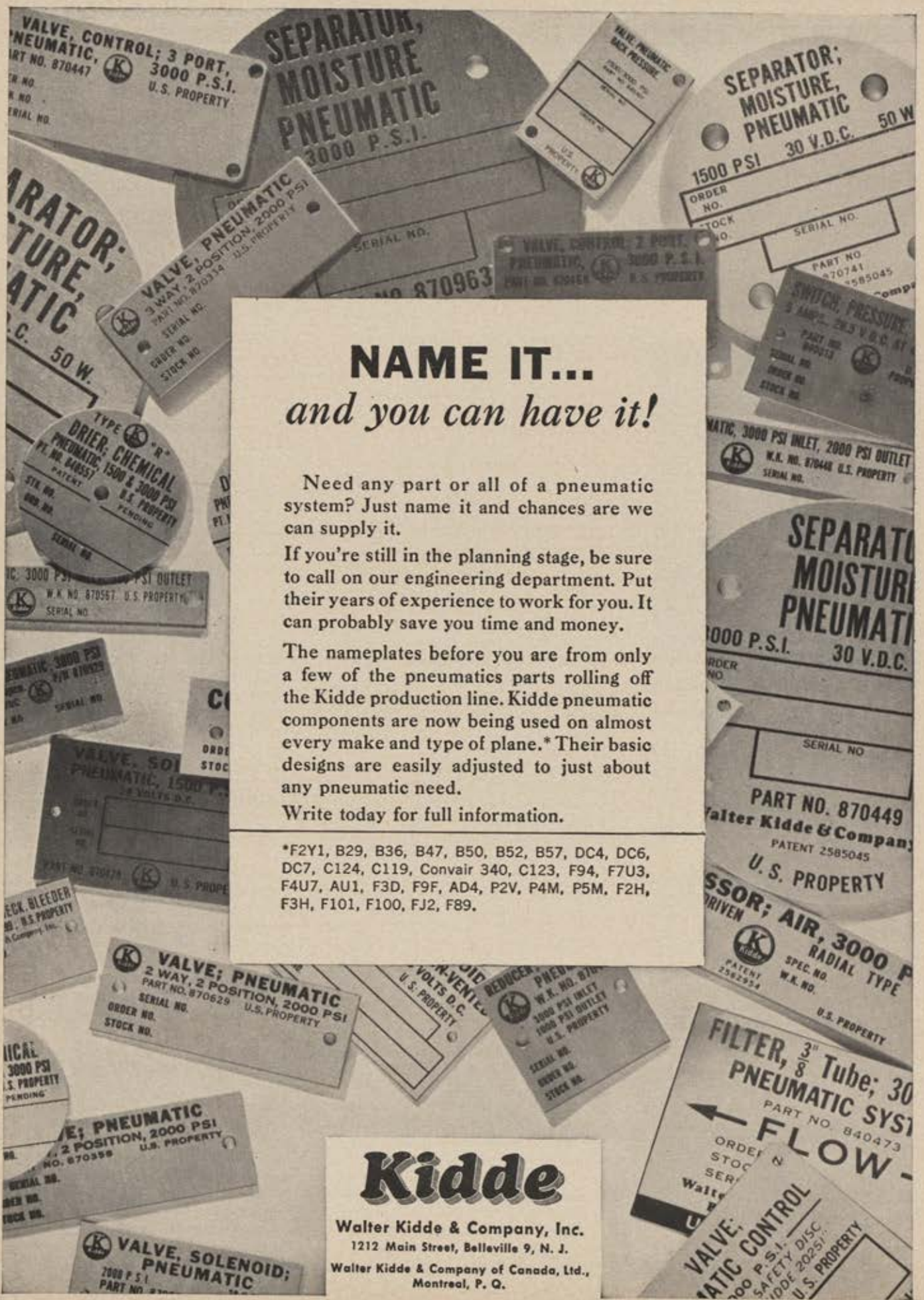
Electronics played a big behind-the-scenes role in the air war in Korea. Here's the inside story of the "brass" who didn't fly

By Louis W. Davis

A CONSOLE like a big pipe organ filled most of the trailer. In the organist's seat was a lanky Air Force officer, pencil and pad in hand, watching a large, back-lighted control board mounted vertically above the center of the console.

An instrument pen on a long metal arm operated by a hidden hand left a thin red track on the white surface of the board. It traced pencil lines, previously plotted, marking the course of bomb run of a high-flying bomber about to "play a tune" on a familiar Red position

(Continued on Page 69)



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*F2Y1, B29, B36, B47, B50, B52, B57, DC4, DC6, DC7, C124, C119, Convair 340, C123, F94, F7U3, F4U7, AU1, F3D, F9F, AD4, P2V, P4M, P5M, F2H, F3H, F101, F100, FJ2, F89.

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just 800 yards north of entrenched friendly forces.

In this case, the radar controller was the "organist" and would call the tune. His attention never wavered. All action was concentrated on the creeping plotting pen which responded to electronic fingers reaching out from the trailer for miles to measure and record the precise movement of the plane.

The bomber was an Okinawa-based Boeing B-29 Superfort, flying

The plotting board—full-time job.

above 20,000 feet, out of sight and out of hearing. The crew may not have known tonight's target before leaving home base some four and a half to five hours before. With radar direction from the ground it was not necessary.

Lt. William H. Gill, Washington, D. C., was the USAF officer controller on duty at the console. He checked and re-checked all calculations as he monitored the 29's progress on the base leg. Airmen stood by to double check his figures and to furnish data on drop speeds, trajectory of bombs, outside air temperature, headings, etc. He, not the B-29 bombardier, would give the signal to toggle the Fort's forty 500-pound fragmentation bombs.

Distance closed fast. The red track approached the first penciled line tangential to the bomber's course. It marked the northern boundary of friendly troops. At this point, Gill called for bomb bay doors to be opened.

The B-29 complied.

Outside the mobile trailer, the night was blacker than a Communist heart. Boiling clouds of solid overcast sailed by just a few feet above the trailer's antenna saucer. Still locked onto the B-29, the saucer began to pan slowly downward toward Red-held Sniper's Ridge.

Only seconds remained. The pen trailed across No-Man's-Land and approached the "Ready" plot, about five seconds to the Drop Point. Gill tensed as the pen made contact. Slowly he gave the count to the bomber pilot:

"Five . . . Four . . . Three . . . Two . . . One . . . BOMBS AWAY!"

Ripping off his earphones, he said, "Let's watch this."

He doused the lights, and opened a side window. It afforded an unobstructed view of the front lines across the width of Kumwha Valley. Lights of friendly vehicles bobbed along the winding Korean roads without fear of enemy air attack.

You could see miles in each direction. Tracers painted brilliant red trails in the sky. Reflections from exploding artillery shells danced up and down the ridges. One whole section of No-Man's-Land was bathed in the blue-white light of giant US searchlights.

Gill checked his wrist watch and estimated the drop time of the 20,000 pounds of explosives to be about twenty seconds. He said the target was on the reverse slope of Sniper's Ridge, at the foot of 3,900-foot Papa-San Hill.

Then it came. A series of blasts bathed the front in orange light as smoke billowed skyward. The underside of clouds seemed to catch fire as fragments from forty bombs ripped through the night. Silhouettes of dark, ragged ridges between the station and the blast enabled Gill to estimate the point of impact.

The former fighter pilot said, "That's close enough for me—should've singed their thick skulls a little." He looked at his watch. "Well, I guess I'd better get ready for the next one. It's a B-26—he'll be calling in about three minutes. This goes on all night, every night, you know—in the daytime, too, when the weather socks in or when we have to hit targets on the front line."

From Gill's Tadpole station to all corners of South Korea and many islands in the Japan Sea and the Yellow Sea, USAF tactical air control facilities probed with radar and radio to give UN air forces all-weather capability and to aid maximum combat effectiveness.

Fifth Air Force's 502d Tactical Air Control Group numbered more than 3,000 men. They had two big jobs. First and foremost, an offensive service, which gave around the clock flexibility and direction to interceptor, fighter-bomber, bomber, and all-weather fighter operations; secondly, defensive or early warning functions in case of enemy air attacks plus coordinated communications and direction-finding assistance during rescue operations.

About the 502d, Gen. Otto P. Weyland, commander, Far East Air Force, said:

"You can't fight an air war without being able to direct planes to and from their targets. This service, which is essentially electronic and the heart of any tactical air operation, raised its control potential by more than one hundred percent during the last year of the war (1952-1953)."

He explained that this was achieved in spite of the fact that most available electronic equipment (especially radar) was of World War II vintage. He said, "Our men just developed better ways of using it."

Col. Ernest White, jet fighter pilot and commanding officer of the 502d, explained that the change in the application of tactical control from a ground controlled interception function to that of an offensive weapon, was largely responsible for the high rating his organization received from Lt. Gen. Glenn O. Barcus, 5th AF's commanding general, during the last year of the war. He added:

"When you remember that we had no tactical control organization at all in the Far East when the Reds attacked and only one in the United States, then you'll agree with me that the Five-O-Deuce has come a long way."

A typical station was the one called Mongoose, 120 miles north of the battle line and eight miles off the mainland, on Cho-Do Island in the Yellow Sea.

A special mission force set up Mongoose last winter. It was operated around the clock until after the truce when USAF had to move it south of the truce line. It was a typical Tactical Air Direction Center (TADC) of the 502d. It used radar research equipment and air-to-air, air-to-ground, UHF and VHF radio systems to control and track friendly aircraft operating in the Yalu area as well as fighter-bomber and night intruder planes hitting at

(Continued on page 89)

Delta-C&S Air Lines

GENERAL OFFICES — MUNICIPAL AIRPORT · ATLANTA, GEORGIA

August 24, 1953

Vickers Incorporated
1400 Oakman Boulevard
Detroit 32, Michigan

Attention: Mr. F. T. Harrington, Vice President

Dear Mr. Harrington:

It was interesting to note that both Delta and C & S while still separate companies had specified Vickers pumps, motors, motorpumps, accumulators, valves etc., for the hydraulic systems of new Convair 340 aircraft. Vickers hydraulic accessories were already in service on the DC-6s and Constellations. This simplified integration of our flight equipment at the time of the merger.

Working separately, Delta and C & S arrived at the same reasons for specifying Vickers Hydraulic Accessories. We wanted accessories which would have outstanding reliability, high overhaul periods, low overhaul costs, interchangeability between aircraft and minimum parts stock requirements. We also wanted the attention of service personnel when necessary, ready parts availability for normal overhaul and repairs plus indications of continuing product improvement. As a merged company (the fifth largest U.S. Airline), we still feel that Vickers and their Hydraulic Accessories meet our requirements.

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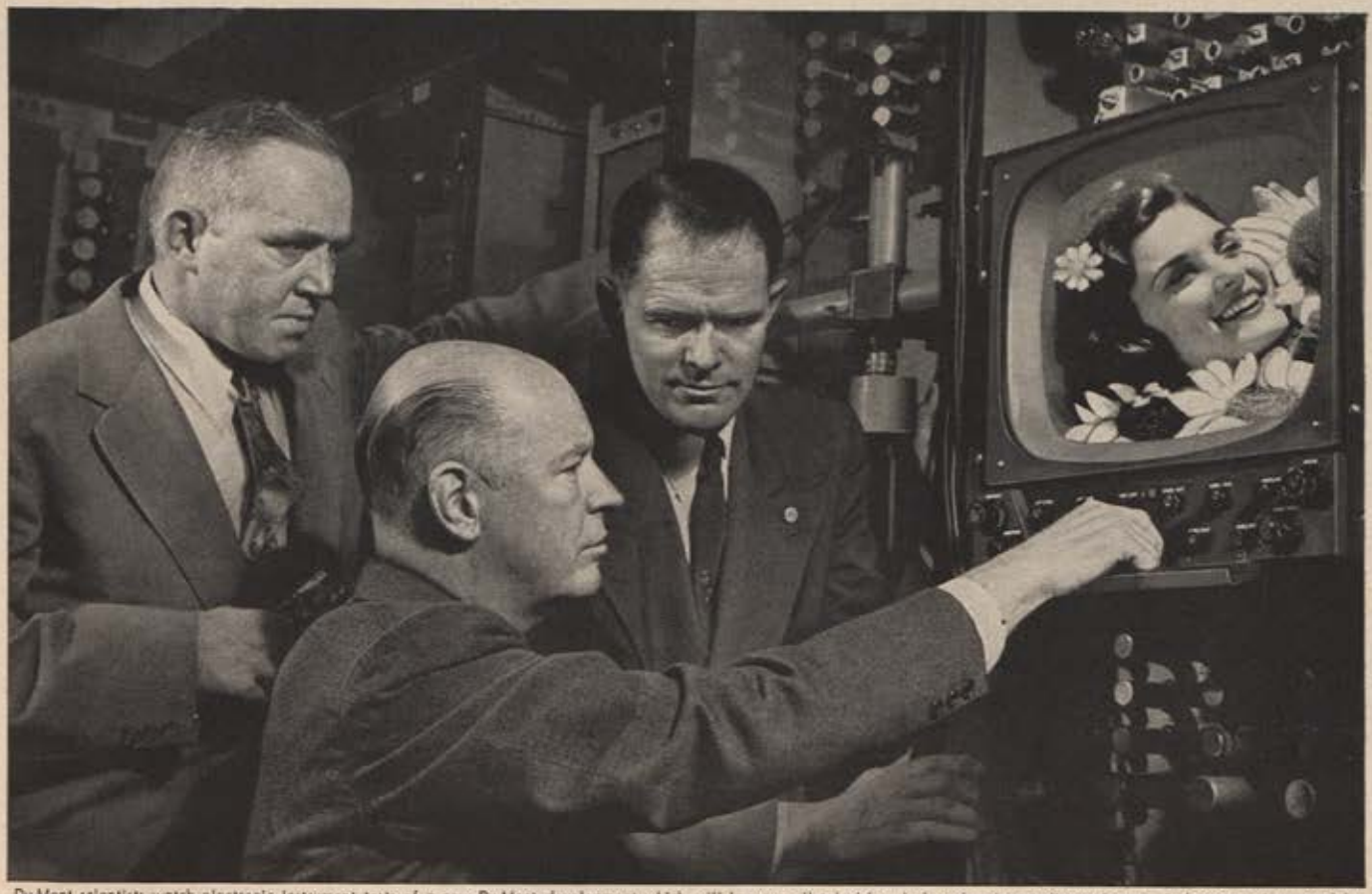
C. H. Dolson
Vice President, Operations



Du Mont scientists watch electronic instrument tests of a new Du Mont development which will improve all television, in broadcasting studio equipment, in home receivers, and in industry. Shown watching Du Mont Television Network are Dr. Allen B. Du Mont, President (center), Dr. Thomas T. Goldsmith, Jr., Director of Research (right), and Stanley Koch, Head of Du Mont Tube Development Laboratory. Picture on screen from an Eastman Kodachrome Slide.

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Thank his will toward public service, too. For, at a time when any television set could find a ready market, Du Mont science and research continued to lead and inspire the industry to ever-greater achievements.

For instance, the first big-picture tubes came from the Du Mont Laboratories—years ahead of others. The first automatic full-width Selfocus* tubes by Du Mont were the greatest single advance since the first sets were sold.

And the Du Mont development of economical cameras, station equipment and transmitters—all planned for thrifty "growth without obsolescence"—has encouraged new television stations around the world.

Today Du Mont research and development are more productive than ever before. Outstanding Du Mont scientists—specialists in every branch of television and allied electronics—concentrate their varied skills and knowledge to benefit every Du Mont product and service.

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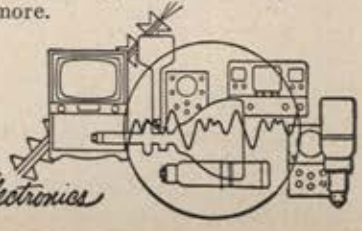

*Trade Mark

Allen B. Du Mont Laboratories, Inc., 750 Bloomfield Avenue, Clifton, New Jersey

those targets north of the bomb line.

Mongoose also monitored several VHF channels and one emergency channel. In addition to voice, VHF direction finders provided friendly planes with directional bearings in case of emergencies or when radar traffic was too heavy to carry all of the load.

Men at Mongoose were occasionally shelled by Red mainland-based artillery. Once or twice there was minor damage and casualties. Fifth Air Force mounted air cover at all times against sneak raids.

Beyond Mongoose's prime mission of giving tactical air control and direction, it was the core of our Yalu air rescue system for the scores of pilots who bailed out over the frigid Yellow Sea. Helicopters, Grumman SA-16s, and Air-ResCap (usually fighters or fighter-bombers) orbited over the area whenever daylight interception missions were laid on.

In the MIG-killing department, Mongoose controllers showed just as much pride and interest as they did in helping to retrieve a jet pilot from the water.

First Lt. William G. Rohm of Van Nuys, Cal., a B-24 crewman during World War II, had more than two years' experience in control work in Korea. He worked as a controller at Mongoose for seven and a half months and played an important part in many kills made in the Yalu area.

Rohm said, "Every time we vectored friendly fighters into a hassle that got a MIG, we'd celebrate. Sometimes pilots flew up to thank us and to see what a scope-happy controller looked like. Often they'd ask for the same men to work with them every time they flew up to the Yalu."

Lieutenant Rohm participated in one of the first night kills made by the Lockheed F-94s of the 319th all-weather interceptor squadron, when they started flying combat missions last January.

It was the night of January 30th. The moon was full and the night air was crystal clear. Rohm huddled over his radar scope because "this kind of weather was for Red raiders." He picked up a blip around Angu and, after tracking it for a minute or two, found its course pointed for Pyongyang.

An F-94 had just reported in at a point south of Mongoose on its way north to sweep the Yalu. Rohm diverted the night fighter and vectored it toward the bogey. By now there were more blips in the hostile cluster. They were moving at LA-9 speed, and between 500 and 1,000 feet altitude. Rohm, using pre-established code words, directed the 94 on an interception letdown over the water and positioned the jet behind one of the Red prop planes. As the 94 closed in, its own radar made contact and the pilot, Capt. Ben Fithian, reported the enemy visible at one mile. As the jet fired, Rohm watched the LA-9 blip fade from the scope. A moment later the F-94 pilot announced jubilantly "Splash One."

THE AUTHOR

Lou Davis, an old hand at aviation writing, dug up this story in Korea last February while a correspondent for ARDC's Air Weapons Study project. The picture on pages 84 and 86 are his too. Formerly with Fairchild and Republic, he's now Advertising and Public Relations Director for Air Associates, Inc.

The other LA-9s headed for Mongoose and revenge. Fithian's plane was short of ammo and turned homeward, but two companion F-94s closed in to chase the enemy craft back to Manchuria.

"After that," said Rohm, "we broke out a can of pineapple juice, and my name was ceremoniously inscribed on the honor roll with other Mongoose radar aces."

Col. Ernie White's theory was this: "We may be cliff dwellers but we can be Tigers, too. We're important even though we don't shoot guns."

To promote this spirit, controllers paid overnight visits to interceptor and fighter-bomber wings—and combat personnel returned the calls at Cho-Do. Through this exchange system, understanding of each other's capability helped develop teamwork and technique while some of that Tiger spirit rubbed off.

Sometimes Mongoose control was so good that our own fighter-interceptor pilots complained. One Sabrejet pilot came back from a Yalu sweep in a very unhappy frame of mind:

"I was on a MIG's tail. I didn't know where I was. Didn't care. But I wanted that MIG. Then that blasted controller at Cho-Do breaks in. 'Squawking Red Leader, you're on the fence (meaning the Yalu). Uncle won't like. Be a good boy now and come back.'

"Even a fighter pilot can't have privacy any more. Everybody's getting into the act."

Our radar equipment in Korea was neither modern nor adequate. It developed holes and range limitations under certain conditions which made the job a "guessing game" for the most alert controllers. Through chatter with men in the Sabres, downright deduction, a full knowledge of their own limitations, and the right amount of ingenuity and teamwork, gaping holes were covered. "Educated guessing" made up for mechanical shortcomings.

Individual incidents make good listening, but it was the everyday, routine tactical control operation of stations like Mongoose, which made it possible for Fifth Air Force to mount as many as 2,400 combat sorties in one twenty-four hour period; to shuttle night flying bombers and fighters to and from North Korean targets regularly and safely, good weather or bad.

It was like running a railroad but tougher, and more fun. Trains have tracks, automatic signals to warn engineers, and pre-established fix schedules. Aerial tracks are invisible. They overlap and schedules are never fixed. Planes are only numbers and call signs. Controllers never see them fly by and seldom hear them.

As one Korean cliff dweller put it, a radar controller should have gotten flight pay for helping night flying B-26s, F-94s, B-29s, and F-84s. He said, "A lot of them wouldn't make a move without position checks and hearings from our radar stations."

Or take the April morning when Capt. Clarence Bell, ex-pilot, Van Horn, Tex., was working the early morning shift at TADC station "Wildfire."

Just before daybreak, when fighter-bombers were heading out for first light strikes, Bell heard a shaky, mumbling voice of a pilot asking for directions. At first he thought it was a kid on his first mission, a little nervous and "clanked-up." But it was Thunderjet pilot Lt. Richard L. Spaulding, Iona, Mich., who was on his thirty-ninth mission.

When Spaulding's Thunderjet developed a faulty oxygen regulator, he began to black out and his fighter-bomber bucked all over the sky. Bell watched the crazy flight pattern on his scope and fought hard to "get

(Continued on page 91)

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through" to Spaulding, urging him to reduce power and let down to lower altitudes. After seventy long minutes, Bell got Spaulding to drop his bombs over enemy lines and coaxed the guy to lower altitude near a forward air base, where he was barely able to land before collapsing from exposure.

Said Spaulding, after recovery, "I'm alive today because a scope watcher knew what he was doing—in my book, Captain Bell is an ace any day."

Many controllers were experienced pilots. Some got radar assignments before leaving the States. Others were given the "happy" news after they arrived in Korea, ready for the MIG hunt, only to find they were declared surplus. Reassignment officers said they were "fortunate in receiving such choice duty."

Naturally, some disgruntled tempers flared and their attitudes were, understandably, bad. But once they got into the thick of it, they did a good job.

Lt. Norman Green, Philadelphia, who was training for controller duty, flew twenty missions with the 4th Fighter-Interceptor Wing before he was assigned temporarily to a TADC station. In fact, on one mission, his plane was damaged by MIG fire. After many attempts to make home base—and through the aid of radar—he was finally plucked out of the Yellow Sea by an SA-16.

Most 502d equipment was not only weary but scarce. Back-up equipment was not to be had, so mechanics and maintenance officers had to make the best of what they did have.

Men of the 502d employed ingenuity, talent, and "even miracles" to keep equipment running. They wound their own armatures, fought moisture during the rainy seasons, and dust and wind in dry weather.

In some cases, maintenance men needed eight hours a week for preventive maintenance but instead got continuous operation.

During rough Korean winters TADC and TADP posts were often snow or ice bound. Many stations had to be supplied through air drops. Spring thaws made muddy mountain roads dangerous and often impassable. Wind and storm played havoc with antennas and living quarters. Occasionally, roving bands of guerrillas used isolated radar posts for target practice.

Here are some points TAC men

(Continued on page 92)

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CLIFF DWELLERS—CONTINUED

want to make sure you remember:

Close support bombing in Korea was primarily by ground control, using radar equipment.

When you hear a fighter pilot tell about tangling with a flock of MIGs, remember that radar may have led him to them.

When a fighter-bomber pilot talks about letting down through the overcast to bomb a target, ask if radar led him through the soup and positioned him for the bomb run. This was the case during one F-84 raid on Toksan Dam when radar vectored the jets through the overcast to the break-out point and the start of the bomb runs, at 8,000 feet altitude.

When a jet fighter-bomber struck a target its pilot couldn't see, you can be sure the bombs were toggled at the direction of an experienced controller, like Lt. Bill Gill, who ran the mission from a mountain top TADP station beneath the overcast.

When you hear a Korean veteran describe his rescue from behind enemy lines, try to visualize how radar scopemen and radio operators guided the retriever plane to him.

When a B-26 pilot tells of weather flying on nearly every night mission in Korea, ask him how radar and radio helped make his missions just a little safer.

How do these men behind the scopes feel about their work?

Lieutenant Gill's answer is typical.

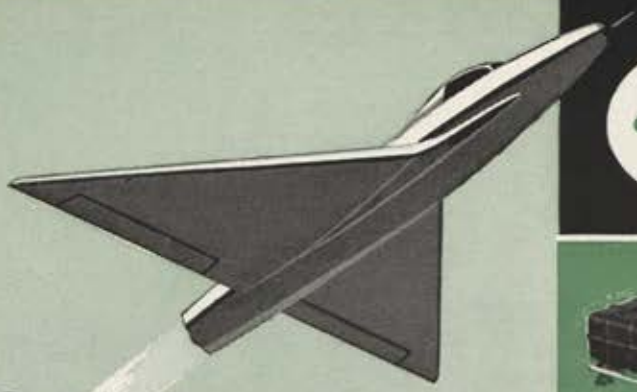
"Next to flying, I like doing this. It's just as hard on the nervous system—if we hit, that's expected, but if we miss, we catch hell.

"But it's one mountain top after another. I can't say it's a good life for a family man."

Under Korean truce terms, the UN air forces lost a vital advantage when they were forced to move all tactical control stations south of the truce line. The early warning capability at Cho-Do Island, was one example.

Now the Reds are free to rebuild North Korean fields and are stocking them with MIGs. Monitoring MIG movements is now tough, and many experts believe that surprise attacks against our own front-line forces would be almost impossible to detect beforehand and in time to mount effective interception.

This one sure fact remains, however. Should the shooting start again in Korea or should there be other MIG Alleys to sweep, cliff-dwelling scope watchers must be there to call the shots.—END



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