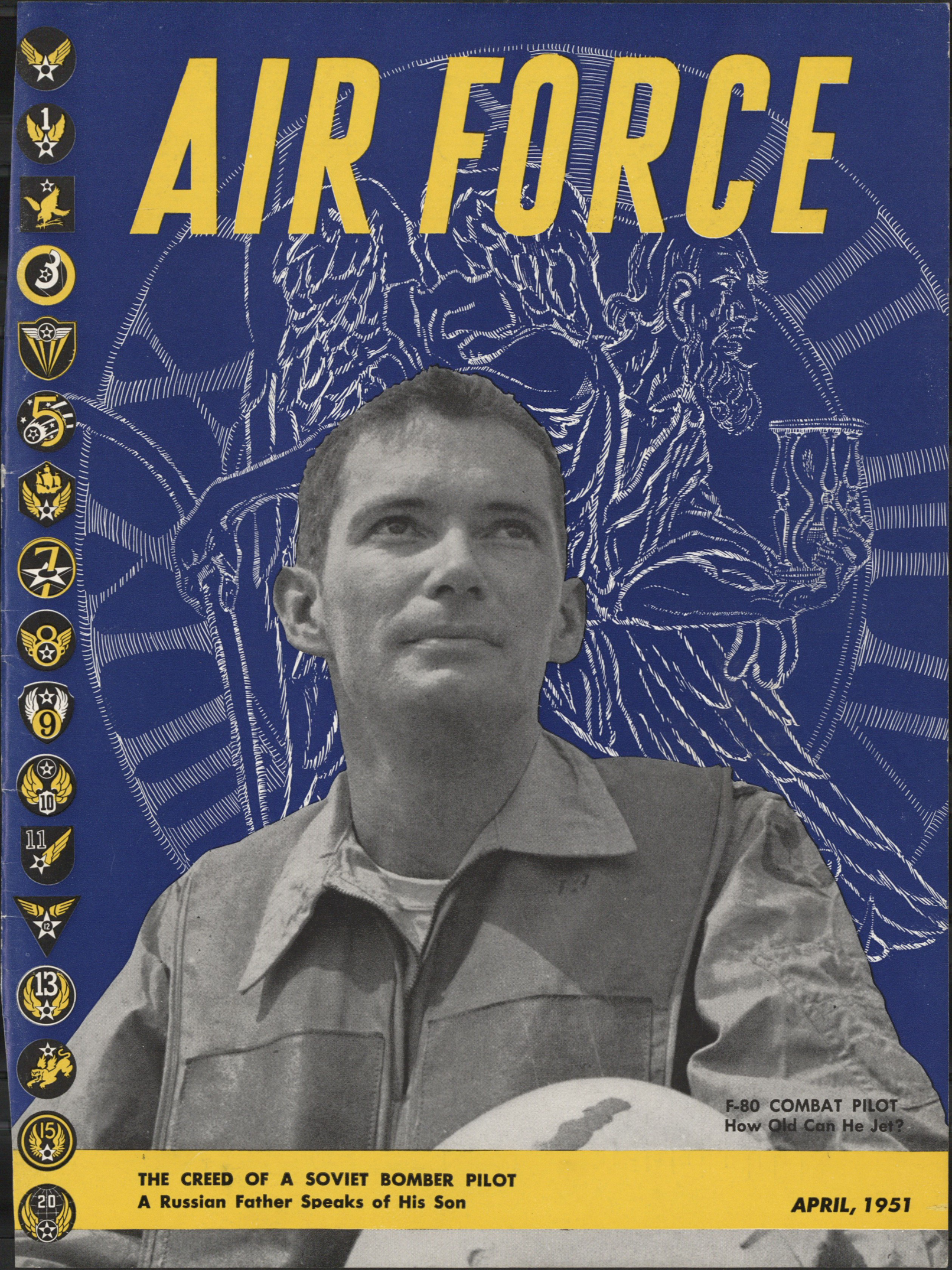
AIR FORCE



F-80 COMBAT PILOT
How Old Can He Jet?

THE CREED OF A SOVIET BOMBER PILOT
A Russian Father Speaks of His Son

APRIL, 1951

THE AIRCRAFT: North American YF-93A

THE ENGINE: Pratt & Whitney Aircraft J-48 Jet

FUEL METERING: Holley Turbine Control

HOLLEY Carburetor Co. DETROIT 4, MICHIGAN

For Half A Century—Original Equipment Manufacturers for the Automotive and Aircraft Industries

A-9

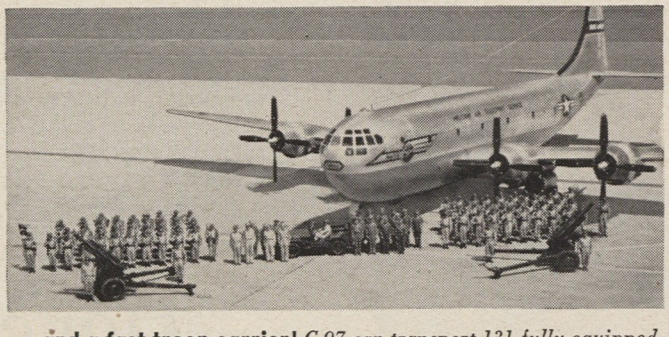
The "Big Hurry!"

It's a flying "gas station"! *With Boeing-designed boom, KC-97 refuels a Boeing B-50 Superfortress bomber in midair.*

...and a hospital ship! *Shown unloading wounded here, a MATS operated Stratofreighter can carry up to 107 casualties.*

...and a flying command post! *Stratofreighter serves as highly mobile, self-contained headquarters for Strategic Air Command.*

...and a heavy cargo carrier! *Stratofreighter can be loaded with 34 tons of freight from four trucks simultaneously.*



...and a fast troop carrier! *C-97 can transport 131 fully equipped combat troops with weapons anywhere they're needed.*

For the U. S. Air Force, the C-97 Boeing Stratofreighter carries almost anything, anywhere—fast!

This 14,000-horsepower teammate of the B-50, with twice the volume of a railroad boxcar, is fast, powerful, versatile. It set records for capacity and utility on the Berlin airlift. It is setting new speed and performance records over the Pacific in hospital ship duty and in transporting personnel and equipment. And now a new role — as flying tanker for aerial refueling of combat bombers — is revealed in the KC-97 version of the Stratofreighter. Conversion from tanker to transport — or the reverse — can be made in less than 24 hours.

With all three of its spacious cargo holds completely air and altitude conditioned, there is scarcely a limit to what the 375-mile-an-hour, twin-deck Stratofreighter can carry. And it can be loaded and unloaded quickly by virtue of self-contained ramps and hoists and specially designed cargo doors.

Designed by Boeing in co-operation with the Air Force, new-type C-97 Stratofreighters are now in quantity production. They will prove of inestimable value in America's defense program.

For the Air Force, Boeing builds the B-50 Superfortresses, B-47 Stratojets and C-97 Stratofreighters; and for the world's leading airlines Boeing has built fleets of the new twin-deck Stratocruisers.

BOEING

STRATOFREIGHTER

A hen should do so good!

Hens are notoriously inaccurate—they lay their eggs *anywhere*.

But not the high-flying B-36.

The world's largest bomber consistently drops its load on target—even when flying full-speed at better than 40,000 feet.

One important reason for this precision is a special adaptation of the Honeywell Autopilot. Coupled with the bombsight, the Autopilot corrects for the slightest deviations in pitch, roll and yaw axes—holds the B-36 rock-steady throughout its bombing run.

That's just one of the many special jobs which Honeywell *automatic controls* are performing for the aircraft industry. We expect to do many more in the years to come—because *automatic control* is such an important part of aviation progress. And *automatic control* is Honeywell's business.

Aeronautical Division
Minneapolis-Honeywell, Minneapolis 8, Minn.

MINNEAPOLIS
Honeywell
Aeronautical Controls

AIR FORCE

THE OFFICIAL JOURNAL OF THE AIR FORCE ASSOCIATION

APRIL, 1951 VOL. 34, No. 4

THIS IS AFA

The Air Force Association is an independent, non-military, airpower organization with no personal, political or commercial axes to grind; established and incorporated as a non-profit corporation February 4, 1946.

Active Members are men and women honorably discharged from military service who have been assigned or attached to the US Air Force or its predecessor services, or who are currently enrolled in the Air Force Reserve or Air National Guard. **Service Members** (non-voting, non-office holding) are men and women currently assigned or attached to the US Air Force. **Associates** (non-voting, non-office holding) are men and women not eligible for Active or Service Membership who have demonstrated an interest in furthering AFA's aims and purposes, or in proper development and maintenance of US airpower.

ITS OBJECTIVES

To preserve and foster the spirit of fellowship among former and present members of the Air Force, and to perpetuate the identity and group solidarity of wartime Air Force units large and small.

To assist in obtaining and maintaining adequate airpower for national security and world peace.

To keep AFA members and the public at large abreast of developments in the field of aviation, and to stimulate community interest in Air Force activities and installations.

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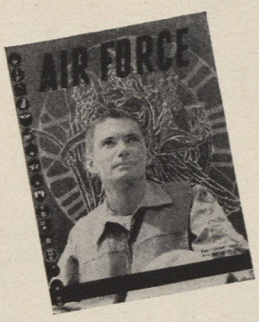

THE COVER

The F-80 jet pilot on the cover is Maj. William J. O'Donnell. When this picture was taken some months ago, Major O'Donnell was thirty years old and had just returned from leading a jet fighter strike against the harbor at Inchon. There's a rumor going around the Air Force that men over 30 are finished as combat fighter pilots. We don't think Major O'Donnell would agree.

READ "HOW OLD CAN YOU JET?" PAGE 32

AIR FORCE MAGAZINE is published monthly by The Air Force Association at McCall Street, Dayton 1, Ohio. **EDITORIAL OFFICE:** 1424 K St., N.W., Washington 5, D. C., Sterling 2305. Publisher assumes no responsibility for unsolicited material. **ADVERTISING OFFICES:** Main Office: 369 Lexington Avenue, New York 17, N. Y., Murray Hill 9-3817, Sanford A. Wolf, Advertising Manager. Western Area Advertising Manager: David Shawe, 3974 Wilshire Boulevard, Los Angeles 5, Calif., Dunkirk 3-8976. **MAILING:** Re-entered as second class matter, December 11, 1947, at the post office at Dayton, Ohio, under the Act of March 3, 1879. **SUBSCRIPTIONS:** Membership in the Air Force Association, $4.00 per year, $2.50 of which is for 1 year subscription to AIR FORCE. Subscription rate to non-members, $4.00. Single copy, 35 cents. **REGISTRATION:** Trade-mark registered by the Air Force Association.

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Teamwork...

Once Again Pratt & Whitney Teams with Other Industries to Increase Aircraft Engine Production

★ IN WORLD WAR II, Pratt & Whitney Aircraft pioneered the system of licensing the automotive industry to help increase the output of its aircraft engines. So successful was this system that Pratt & Whitney, with its licensees, produced half the total horsepower used to power Allied combat aircraft during World War II.

IN THE PRESENT EMERGENCY, Pratt & Whitney Aircraft again is first to share its hard-earned engine knowledge in the common interests of national defense.

LAST SEPTEMBER, Pratt & Whitney licensed the Ford Motor Company to build the Wasp Major engine, currently in use on the B-36, B-50 and other long range Air Force and Navy Aircraft.

IN DECEMBER, the Chrysler Corporation was brought in as a licensee to build the J-48 Turbo-Wasp, which powers some of the fastest Air Force and Navy jet fighters.

STILL OTHER licensing arrangements are in the planning stage.

UNDER THESE LICENSING AGREEMENTS, Pratt & Whitney Aircraft—at no profit to itself—is already placing its own engineering and production experience at the disposal of Ford, Chrysler and others. They, in turn, will put their extensive manufacturing know-how to work on the task of increasing still further the expanding production of these vitally-needed engines.

THIS IS A typically American example of teamwork between industry and the Armed Forces in the common interest of the nation.

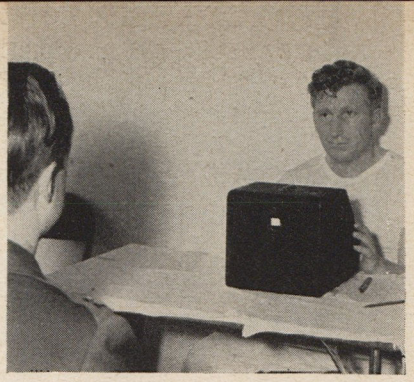
Pratt & Whitney Aircraft

PRATT & WHITNEY AIRCRAFT — DEPENDABLE ENGINES

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

THE BIG SWEAT

By H. L. Gilmore



The photometer's flickering light measures an airman's "freshness."

SAC crewmen sweat out a mission twice: The first sweat is the usual one from takeoff to landing and lasts as long as a mission—anywhere from 15 to 40 hours.

The second sweat is of considerably shorter duration and a much more pleasant one. It takes place in the steam section of SAC's brand new Scandinavian Room where Finnish baths and rubdowns are the order of the day. The old Air Force was never like that, but then, the longest missions in the old Air Force lasted only half as long as today's B-36 "profile" runs.

How to keep crews fresh for the exhausting maximum sustained effort they would be called on to maintain in the event of war and how to "measure" this freshness so that no man will be permitted to fly whose physical condition is such that he cannot operate with acceptable efficiency, has been one of SAC's major problems.

The Scandinavian room and the Krasno-Ivy (flicker) photometer, designed to solve these problems, have been developed as a part of a long range program for maintaining physical fitness standards, reducing nervous fatigue, and cutting down the length of time required for recuperation by flight personnel between operational flights, so making sustained effort practical.

The problem of reducing fatigue without sleep is principally one of bringing relaxation to an overtaxed body. Complete relaxation places the individual in a trance-like state akin to sleep. And during these periods of relaxation, the body energies are built up.

Upon arrival at the Scandinavian room, therefore the airman rests for 10 minutes before having his "flicker fusion threshold" measured by the Krasno-Ivy Flicker photometer. The airman sits five feet in front of the photometer looking into a small rectangular window. The photometer cubicle is in a quiet corner since full attention is necessary for an accurate reading.

The light flickers at a speed of 2700 to 2800 flashes per minute—the norm at which the untired eye sees it as steady. The operator, using the photometer interrupter, shows the light 200 to 300 flashes per minute. As the light appears to "flicker," or lose its steadiness, the airman says "now" or "flicker". Three identical readings provide the airman's "flicker fusion threshold" or baseline—his degree of fatigue.

After having his flicker fusion threshold measured, the airman goes through a process of physical exercise, Finn steam bath, shower, rubdown, then back to the flicker photometer for another reading. The SAC Scandinavian room treatment is designed to raise the patient's flicker fusion threshold upward toward the 2700-2800 norm.

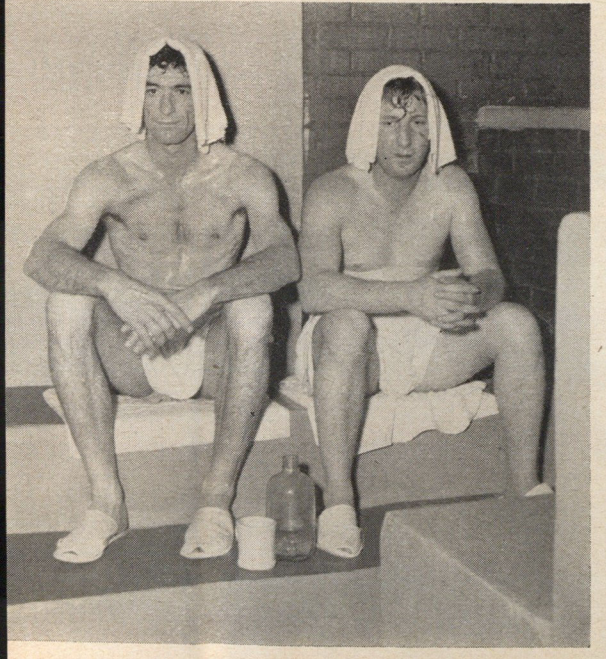
A typical Scandinavian room schedule includes 10 minutes of physical exercise designed to induce relaxation; 10 minutes in the steam room to remove toxins and impurities from the body; a shower, and 30 minutes for a complete body massage. Qualified instructors remain with the airman throughout the treatment, and handle as few patients as possible in order to give maximum individual attention, but the amount of time devoted to each phase of the treatment may be altered, on the advice of the instructor, for different individuals and different types of fatigue.

After some trial and error development, the present revitalizing system proved to be effective enough to warrant training a group of fourteen men from many SAC bases to establish similar rooms throughout the command, and as more experience with the flicker photometer is gained that, too will come into wider use.

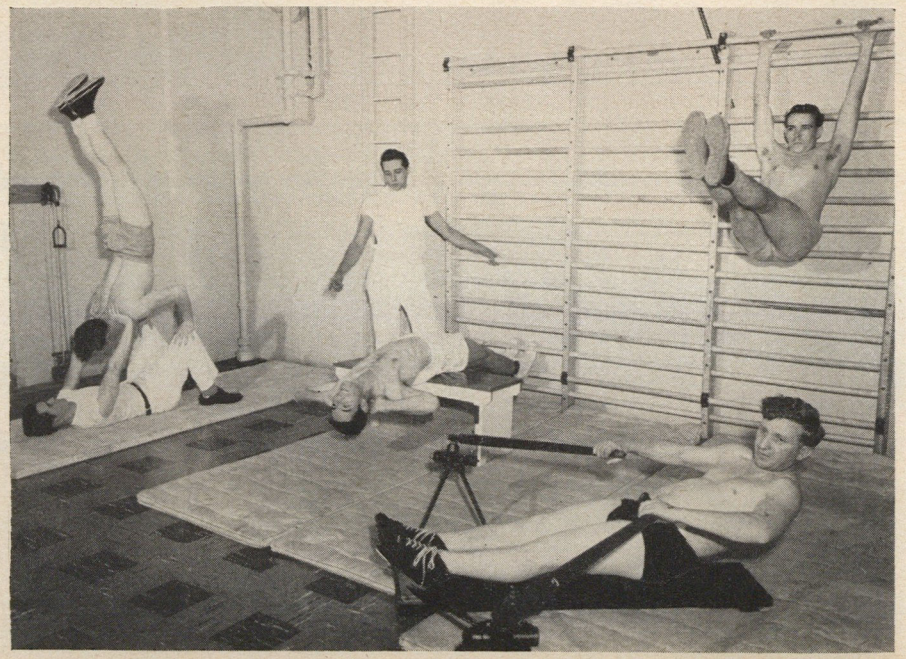
Phases of the Scandinavian Room treatment—such as the Finnish steam bath—have been used for centuries, but perhaps never before have showers, body building exercises, steam baths, massages and rubdowns been scientifically coordinated into a most effective tool for rejuvenating a tired man.

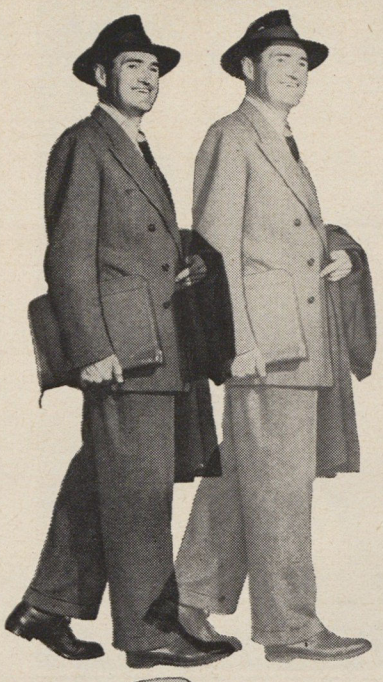
The Scandinavian room concept is the brain child of Lt. Gen. Curtis LeMay, SAC's Commanding General, and was first used to good effect during the days of the Berlin Airlift.

This recipe for boiled airmen calls for five minutes on the lower step, five in the middle and five on top.



In conjunction with the steam baths and the flicker-photometer tests, a course in physical reconditioning is on the regular curriculum of the Scandinavian rooms at SAC bases. Here is one method for beating fatigue without sleep.

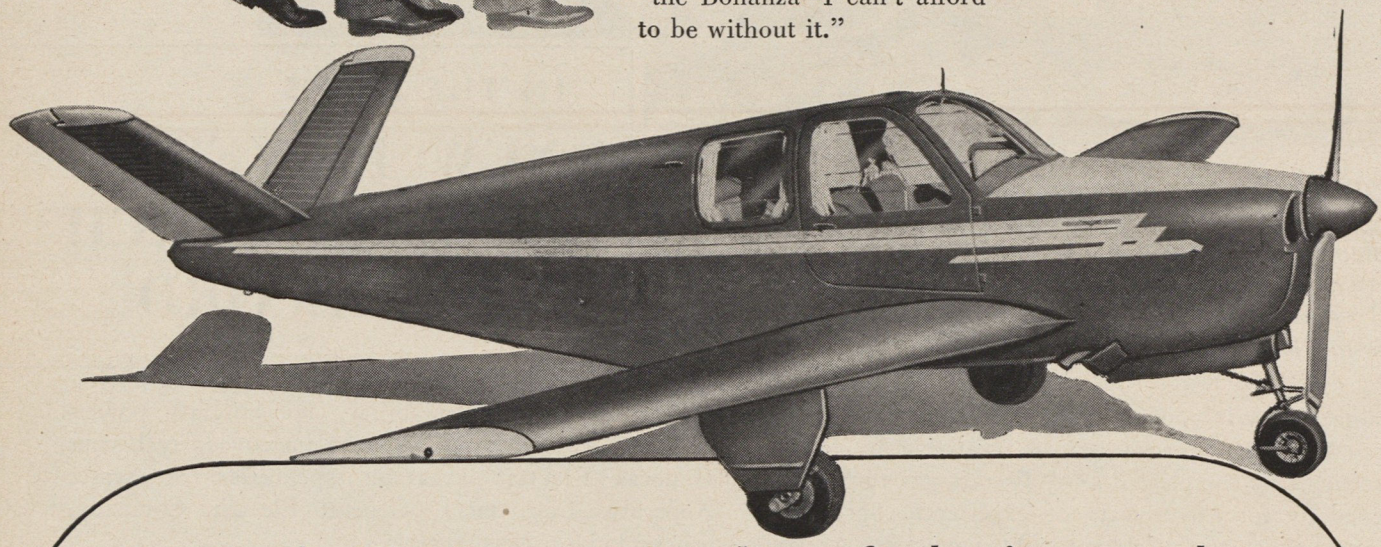




Laurence Arpin leads double life

It's a double *business* life, of course. Mr. Arpin operates a heavy-grading contracting firm on the West Coast, also sells a variety store product all over the U. S. "Managing *two* businesses is possible because of the extra working hours provided by my Bonanza," says Mr. Arpin. "This plane has *doubled* my earning ability.

"Now, after three years of ownership, I realize that not only can I afford the Bonanza—I can't afford to be without it."



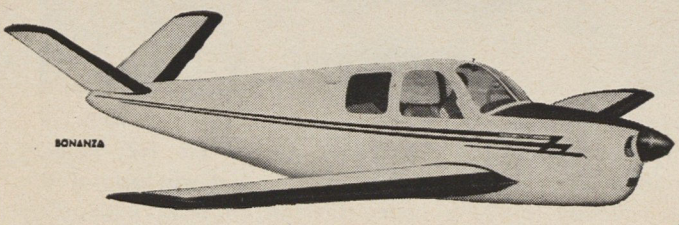
How the C35 Bonanza has been *further* improved:

Higher performance levels. Take-off rating of 205 hp at 2,600 rpm, plus new Beechcraft metal propeller, improves short-field performance, gives the C35 Beechcraft Bonanza a rate of climb of 1,100 feet per minute.

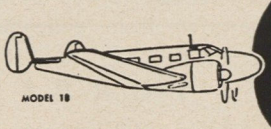
Lower operating costs. Now you get 19.9 miles per gallon of fuel. Because there's less engine strain, there's less engine wear and fewer engine repairs. All-metal construction means ruggedness and extra safety.

Comfort, safety, style! Two-position rear seat with headrests. New Beechcraft-designed Hi-Strength safety harness, unmatched for comfort, protection, ease of movement. New all-over paint design now standard.

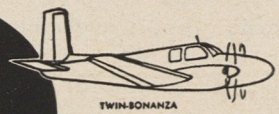
Want *more* reasons for Beechcraft superiority? Contact your Beechcraft distributor, or write Beech Aircraft Corporation, Wichita, Kansas, U.S.A.



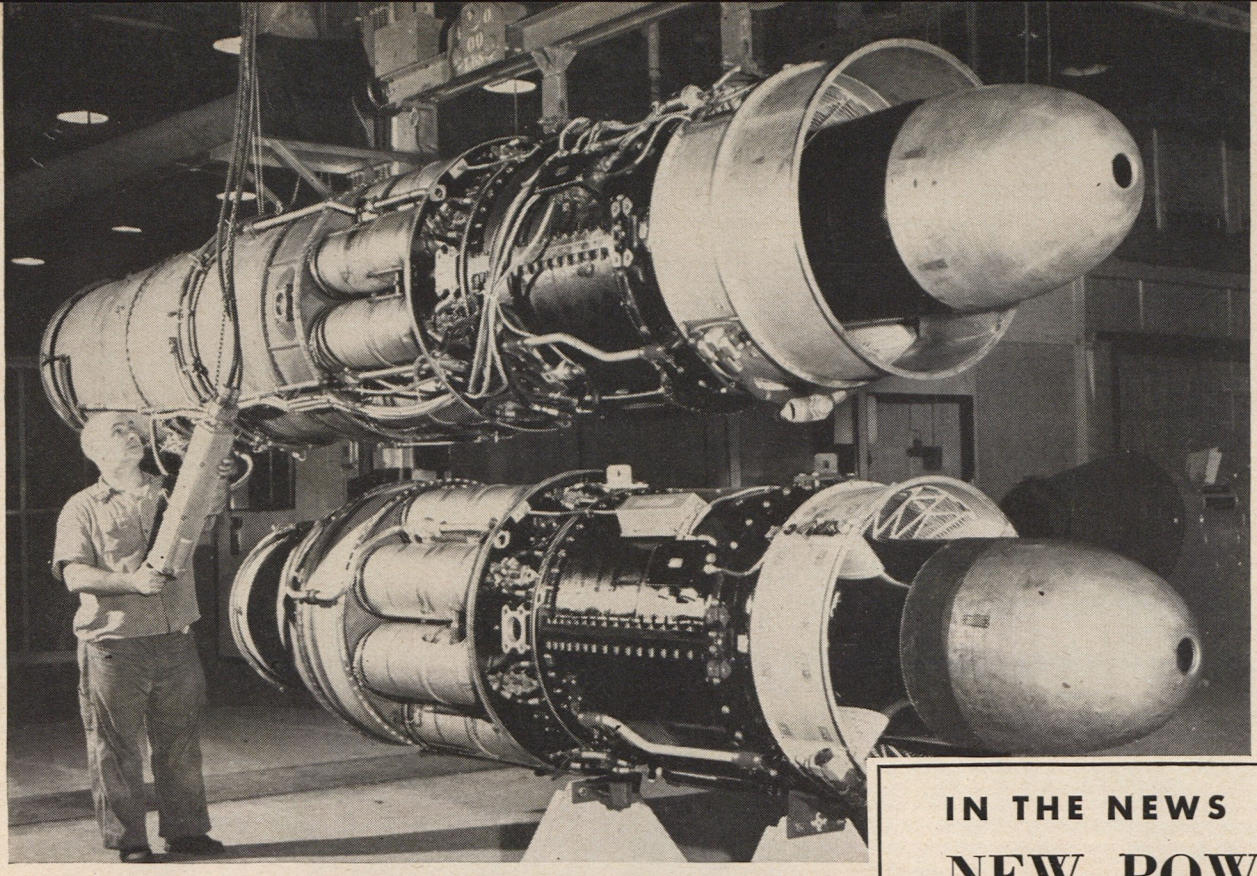
Higher top speed, 190 mph
Higher cruising speed, 175 mph
Longer range, 775 miles
Better fuel economy, 19.9 mpg



Beechcraft



BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

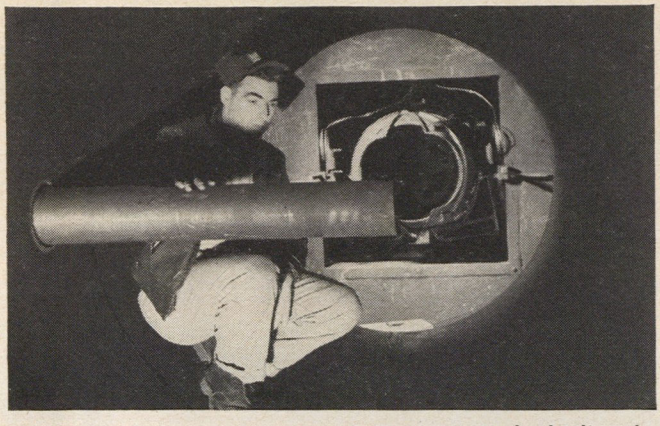


J47-17 reheat engine (upper), one of new engines now in production at G-E's Lynn, Mass. plant, features integrated electronic fuel and jet nozzle system for completely automatic control of engine and afterburner. New fuel system is designed for operation at 50,000 feet; opposite polarity ignition allows starts at that altitude.

IN THE NEWS

NEW POWER
NEW RESEARCH
NEW RECORD

Designed to suit your specific needs, turbojets, turboprops and turbosuperchargers are available at General Electric. This complete line of aircraft gas turbines is backed by forty-five years of experience. Specialists in every phase of aircraft gas turbine work assure you of quality and dependability. For aircraft powerplants that are constantly being improved, call your General Electric aviation specialist or write Apparatus Department, General Electric Company, Schenectady 5, New York.



Water-cooled periscope lets G-E engineers look directly into hot exhaust gases in jet tail pipes. Study of these burning gases is invaluable in the improvement of aircraft gas turbines. Research tools such as this are constantly being developed at G-E to give you better power.

World endurance record was set at Selfridge AFB by this North American F-86 powered by G-E J47. Plane landed every two hours for refueling but was operated continuously for 23½ hours. Civilian on wing is representative from widespread G-E service organization.

AIRCRAFT GAS TURBINES

GENERAL ELECTRIC

210-21

AIRPOWER IN THE NEWS

VOL. 34, NO. 4 WASHINGTON, D. C. APRIL, 1951

MORTALITY RATE of American soldiers has been reduced from four and one-half deaths per 100 injured men who reached aid stations during World War II to two men per 100 so far during the Korean War, Maj. Gen. H. G. Armstrong, USAF Surgeon General, reported in a recent issue of Boeing Magazine.

AN INCREASE in the flow of AF personnel to the Far East is planned by USAF in order to resume rotation of FEAF personnel to the U. S. in May '51.

SECOND PHASE of a projected $34,500,000 building expansion program involving a $15,000,000 allocation for trainee housing, got under way at Lackland AF Base late last month. . . Spence Field, Georgia, World War II training base, will soon be opened as USAF civilian training school. . . Contracts to train USAF personnel have been awarded to seven more civilian technical training schools. . . Maj. Gen. Kenneth P. McNaughton has been relieved as USAF training chief to take a newly created job as Special Assistant to Deputy Chief of Staff for Personnel to handle contracts with civilian technical schools.

JOINT ARMY-USAF MANEUVERS involving 110,000 soldiers and airmen are scheduled during the months of June and July. Largest maneuver, Southern Pine, will be held in North Carolina and the other, Timber Line, will take place in Colorado. . . A joint Army-Air instruction team, nicknamed "Jagit", is touring USAF military installations through the country to educate greatest possible number of soldiers and airmen in air-ground support.

ONE OF LARGEST AIRCRAFT OVERHAUL CONTRACTS ever let -- $19,220,000 for decocooning and reconditioning of an unspecified number of B-29s -- has been awarded by the AF to Grand Central Aircraft Co.

PRODUCTION OF THE BRITISH CANBERRA BOMBER has been approved by AF with contract going to Glenn L. Martin Co., of Baltimore for an undisclosed number. . . USAF has authorized Boeing Airplane Co. to put its newly-designed Boeing B-52 heavy bomber into production. . . Curtis-Wright R-3350 compound engine will be installed in new model of AF's Fairchild C-119 "Packet". . . USAF's Republic F-84 jet fighter has completed first flight powered by British-designed "Sapphire" turbojet engine.

USAF'S BOEING B-47 STRATOJET, a six-jet medium bomber, has been successfully refueled in the air by a KC-97A tanker aircraft employing the Flying Boom air-to-air refueling system. . . Large number of Boeing B-50s now are equipped with aerial refueling facilities for use during routine operational flight, Boeing revealed last month.

A CANADIAN AIRCRAFT, the DeHavilland DHC 2 "Beaver", was judged winner in recent liaison aircraft evaluation conducted by USAF at Wright-Patterson AF Base, Ohio.

CENTRAL SOURCE FOR FLIGHT DATA, the "USAF Aeronautical Chart and Information Service", has been established by AF. The source is a redesignation of the USAF Aero Chart service and combines certain services formerly provided by MATS and AACS.

AF ACADEMY SITE SELECTION BOARD has selected seven sites that will receive fur-

Contined on page 10)

ther consideration as most suitable for proposed AF Academy, Sec'y Finletter stated recently. Sites are in Calif., Colo., Ind., N.C., and three in Tex. . . Dr. Dorothy Armstrong Elias, first woman physician to be commissioned in AF Medical Service, was sworn in on March 14 as a captain.

JIMMY DOOLITTLE will serve as special civilian consultant to AF C/S Gen. Vandenberg on research and development matters relative to the new R & D Command.

NEW TRAVEL AND TRANSPORTATION ALLOWANCES authorized in the Career Compensation Act of 1949 for uniformed personnel and their dependents became effective on April 1, 1951. Enlisted personnel now travel on same allowances as officers.

MILITARY SEA TRANSPORTATION SERVICE carried 1,208,000 passengers, 12,000,000 measurement tons of cargo and 72,000,000 barrels of petroleum during period from March 1, 1950 to March 1, 1951, Navy has announced.

CONVAIR showed a net profit of $10,241,644 for fiscal year ended November 30, 1950, Floyd B. Odlum, chairman of the board, announced recently. . . Sales of the Lockheed Aircraft Corporation increased during 1950 to $173,331,000 for a 47.3 percent improvement over 1949, President Robert E. Gross announced in the company's 19th annual report. . . Cessna Aircraft Company of Wichita, Kansas has just completed a large expansion program at their three plants, resulting in an over-all addition of 47 percent more manufacturing space. . . Packard Motor Car Company has been selected to build GE's J-47 turbojet engine for USAF. J-47 powers the North American F-86 Sabre fighter which holds the official world speed record, and the Boeing B-47, the world's fastest bomber.

WORLD WAR II VETS now in active military service, attending school under GI Bill during their spare time, will be able to resume courses after July 25, 1951 training cut-off date, if they are forced to interrupt their studies because of military duties or transfers. Vets taking GI Bill correspondence course while in service or otherwise may not, after the cut-off date, switch to classroom training, regardless of whether it's in same or any other field of study. Similar post-deadline procedure apply to vets who started GI Bill studies as civilians, then interrupted to return to military or naval service. They also may resume training within reasonable period following their release from service -- should they return to civilian life after July 25, 1951 and before July 25, 1956, wind-up date of program. . . Vice Admiral Joel T. Boone, MC U.S. Navy, retired has taken oath of office as Chief medical director of VA.

ESTIMATED COST OF PREPARING NEW YORK AGAINST ENEMY ATTACK is $350,000,000 according to a recent report by the city's CD director Arthur Wallander and Robert Moses. Civil Defense News reports that both emergency and long-range requirements of the city's CD program are included.

COL. EARLY E. W. DUNCAN, USAF, has been named to post of Deputy National Commander, Civil Air Patrol.

MAY 19 is Armed Forces Day.

Opportunities for ELECTRONICS ENGINEERS

The advance of electronic research and development, especially in the last five years, has been so rapid that a great demand for engineers and technicians has been created. This is especially true at the Martin Company . . . one of the country's leaders in airborne electronic research since before V-J Day . . . with such developments as control systems for guided missiles like the KDM-1 Plover target; the Viking high-altitude research rocket; fire control systems for turrets and much other advanced work still classified under military security.

Martin needs engineers with experience in research and development of radar, television, pulse and display circuits . . . and, in the electro-mechanical field, experienced engineers in armament, servo-mechanisms, electrical work, rocket propulsion and special weapons or systems design.

The Martin Company would like to have a resume of the background of anyone having experience in electro-mechanics or electronics. Such information should be sent to the Employment Manager, The Glenn L. Martin Company, Baltimore 3, Maryland.

Martin Ads Tell Air Power Story

Reaching millions of informed, alert American magazine readers, Martin advertisements like this highlight air power's important role in our country's preparedness program.

Survey after survey has demonstrated that their story-style appearance attracts an extremely high readership and a worthy audience for the facts on this vital question.

MODERN AERIAL WEAPONS *depend on electronic experts' little black boxes —circuits, tubes and gadgets that help man overcome his physical limitations in his constant conquest of the Air.*

They're putting wings on little black boxes

Many of our new winged weapons are pilotless. But even in today's piloted aircraft, man can't see far enough, can't move fast enough, can't live unaided at the temperatures and pressures he must endure. He needs the assistance of mechanical and electronic senses, muscles and nerves. That's why today's aerial weapons engineering demands a teaming of specialists in skills unheard of a decade ago.

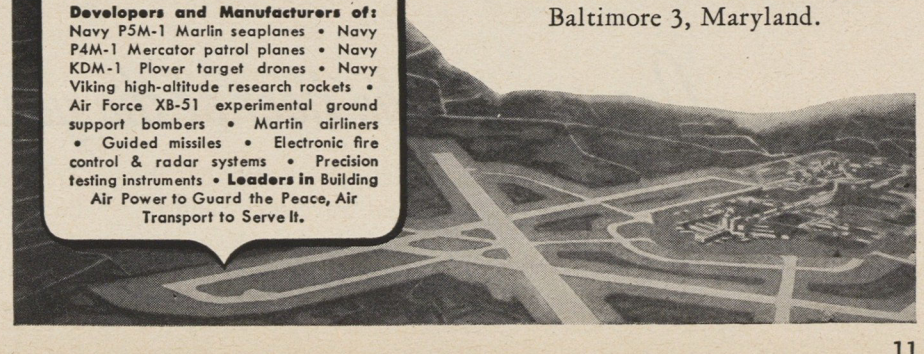
Here at Martin, we call it *systems engineering*. Airframe and power plant, electronic flight and navigational controls and military armament—all are represented on a Martin engineering team that is designing aircraft as integrated airborne systems.

A Navy Viking high-altitude research rocket, missiles and target drones soaring into the blue. An Air Force XB-51 jet-powered ground support bomber roaring down in a simulated strafing run. A Navy P5M-1 Marlin being readied for sub-hunting duty. A dependable Martin Airliner gaining precious time for vacationist and businessman. All these are products of Martin *systems engineering*—part of a new trend in aeronautical designing that is putting wings on little black boxes —to help man overcome his physical limitations—to help him guard the peace and enjoy it.

THE GLENN L. MARTIN CO.,
Baltimore 3, Maryland.

Martin
AIRCRAFT
Builders of Dependable Aircraft Since 1909

Developers and Manufacturers of: Navy P5M-1 Marlin seaplanes • Navy P4M-1 Mercator patrol planes • Navy KDM-1 Plover target drones • Navy Viking high-altitude research rockets • Air Force XB-51 experimental ground support bombers • Martin airliners • Guided missiles • Electronic fire control & radar systems • Precision testing instruments • **Leaders in** Building Air Power to Guard the Peace, Air Transport to Serve It.



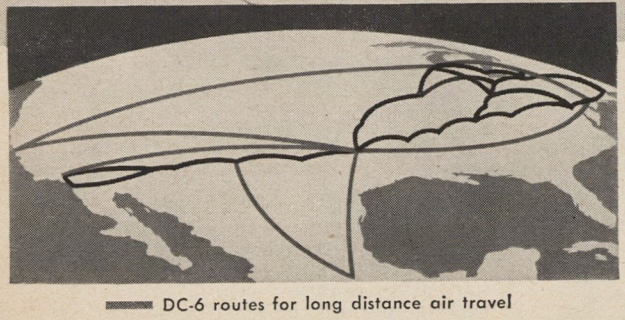
IN 1951 AMERICAN *sets the pace with*

Once again – the fleet of the year is the Flagship Fleet!

To SUCH famous Flagships as the DC-6 – the favorite of transcontinental travelers – and the popular inter-city Convair – American now adds the DC-6B Flagship, even larger, faster, and more luxurious than the DC-6 itself.

This year, as always, American is first with the finest in air transportation. Such leadership, apparent in personnel as well as equipment, explains why *American Airlines carries more passengers than any other airline in the world.*

the new DC-6B FLAGSHIP!



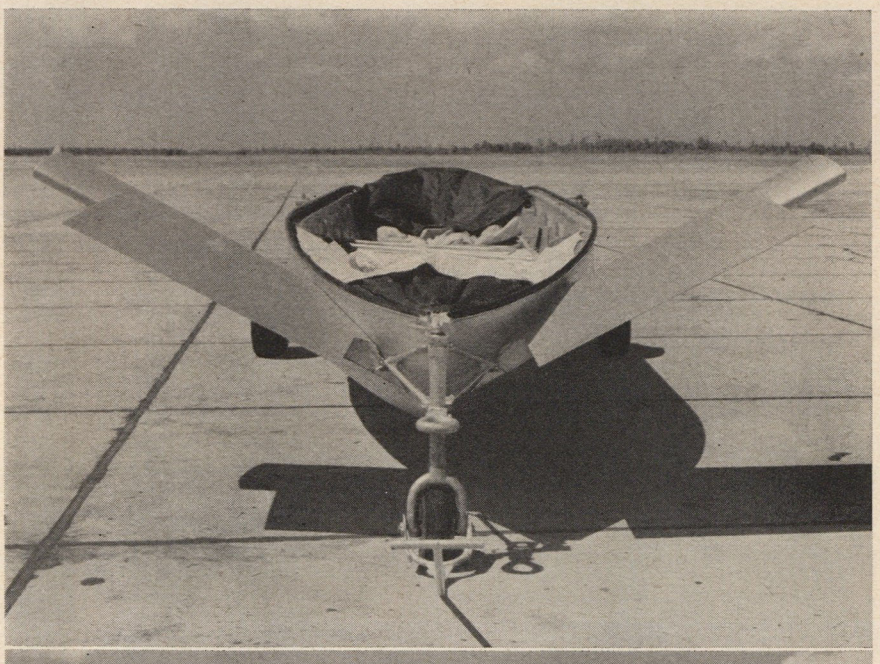
DC-6 routes for long distance air travel
Convair routes for short distance air travel

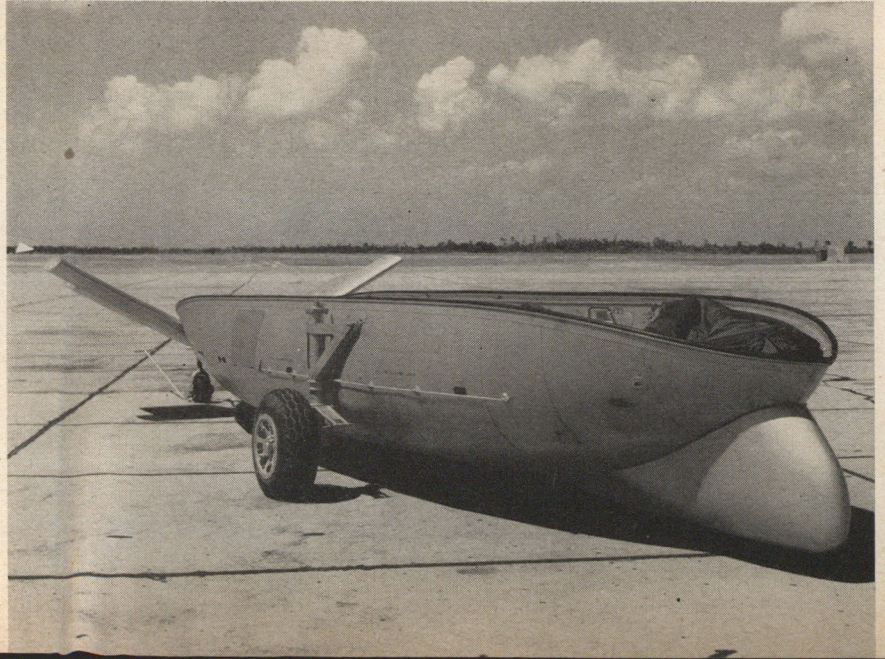
AMERICAN AIRLINES INC.

AMERICA'S LEADING AIRLINE

With the new radio control, the pilot need not make a "direct hit" on the survivors. It is only necessary that he drop the boat nearby. Exact placement can be handled by the radio operator. Parachute is jettisoned by explosives.

PUSH BUTTON RESCUE





Air-sea rescue operations will be greatly facilitated by a new remote control rescue boat operated from the mother ship. A radio operator in a SB-29 can now bring the rescue craft directly to the survivors, hold it steady while they board, and set the boat going on its proper rescue course.

Radio control action starts as soon as the 30-foot, all-metal, 15-man boat hits the water and its 100-foot drop parachute is jettisoned by an explosive charge. The released chute carries with it an anchor to hold the craft steady.

The radio operator's first signal is keyed to release the descent stabilizing fins and rudder guard, open the engine's air vents, and crank the motor. At fast idle the sea anchor lets go and the operator speeds the engine and moves the boat into position for taking on passengers. Correct course is then set by the remote control operator and maintained with only slight variations by a gyro compass in the boat.

The boat is equipped with duplicate controls and a manual override so that survivors can take over control of the boat. In addition to rations and survival equipment, the A-3 carries enough gasoline for 800 miles, and more could be supplied by air, if necessary, because the boat's pre-set course is known.

The system was developed by AMC's Equipment Laboratory and is being built by the Westinghouse Electric Corporation. The transmitter portion has already been fitted into all SB-29s and all A-3 lifeboats are due to get the receiving end of the installation by early next year.

Stabilizing fins hold the A-3 air-sea rescue boat steady during its descent. Once down, the boat's engine is started by remote control. Manual override permits the survivors to take over control once they get aboard.

MEN WITH SKILLS

GET AIR FORCE RATINGS!

Radio repairmen are among hundreds of kinds of skilled specialists . . . men who will keep your United States Air Force on top . . . needed now by your Air Force.

Men with training as former specialists in any service . . . or non-veterans with special skills . . . are needed to support America's growing air power. Radio, radar, maintenance, weather, armament, camera repair, and many other technical skills are wanted.

For your skill, your Air Force offers better pay and opportunities than ever before . . . in a great Air Force that you will be proud to serve, with a rewarding sense of a job well done in your nation's defense.

Find out where you fit. Visit your nearest U. S. Army and U. S. Air Force Recruiting Station now . . . get details of these new Air Force offers:

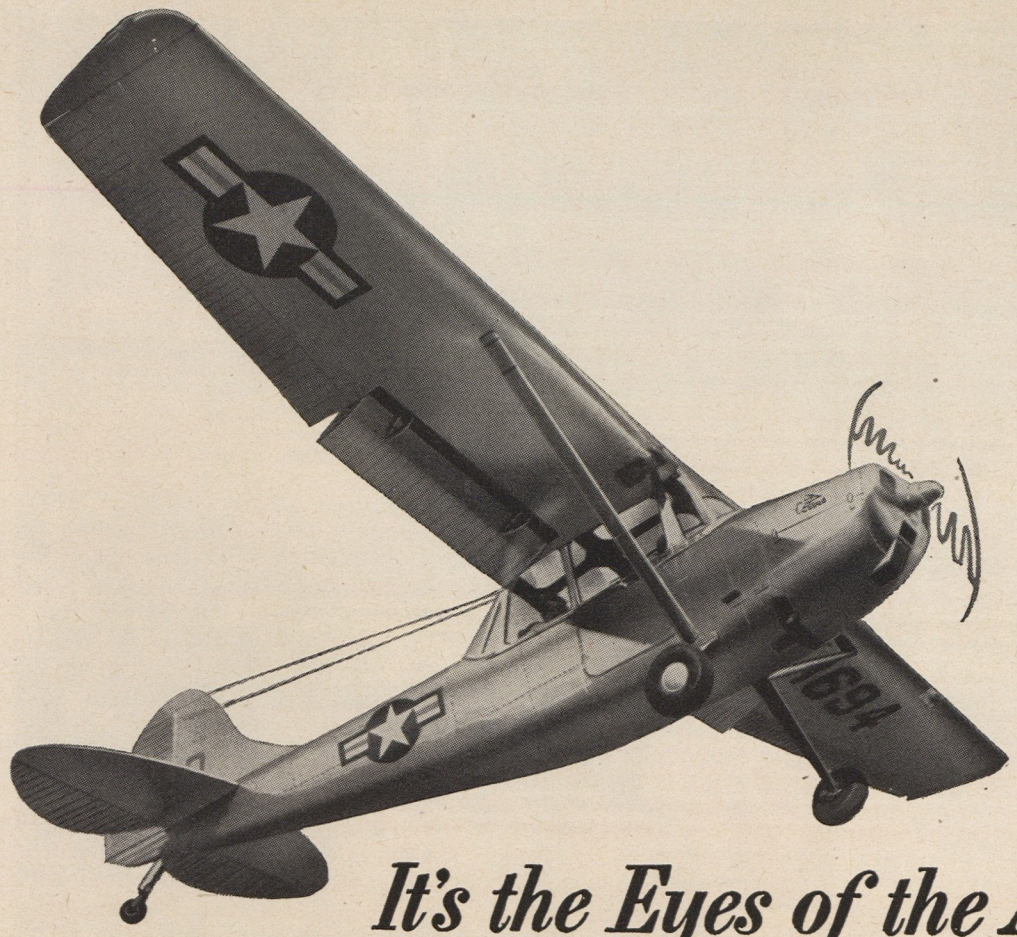
VETERANS: You can now enlist, if qualified, in your old grade *or better*, skip basic training, and be assigned initially to a nearby Air Force Base.

NON-VETERANS: You can enlist for basic training . . . and get a rating to match any critically needed technical skill or training you have.

RECRUITING
U.S. ARMY
U.S. AIR FORCE

U. S. AIR FORCE

Get on Top . . . Stay on Top . . . with the U. S. Air Force!



It's the Eyes of the ARMY

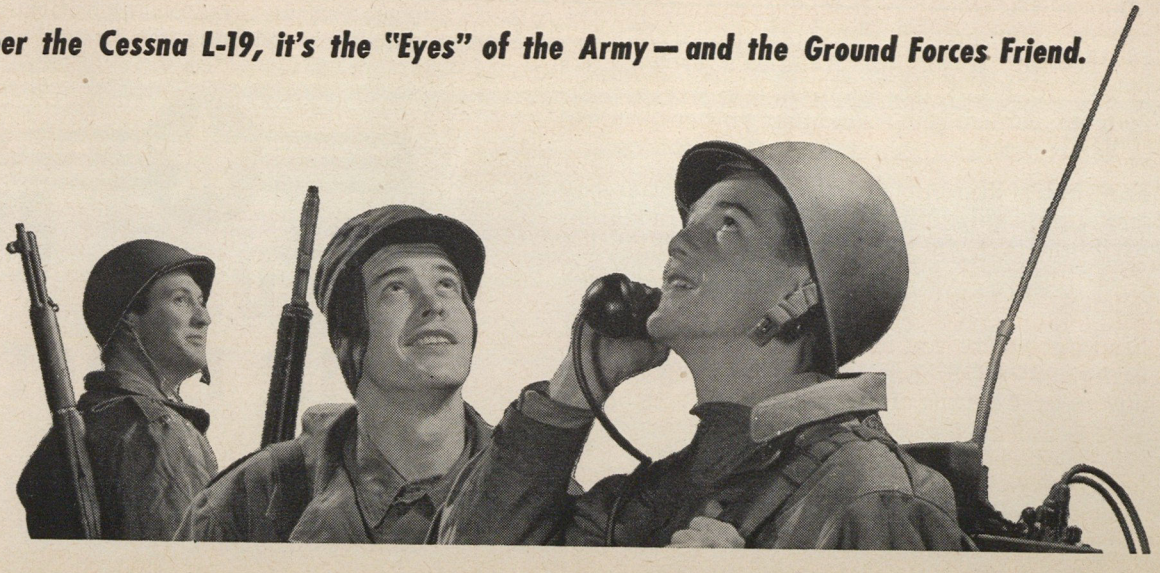
it's a Cessna L-19!

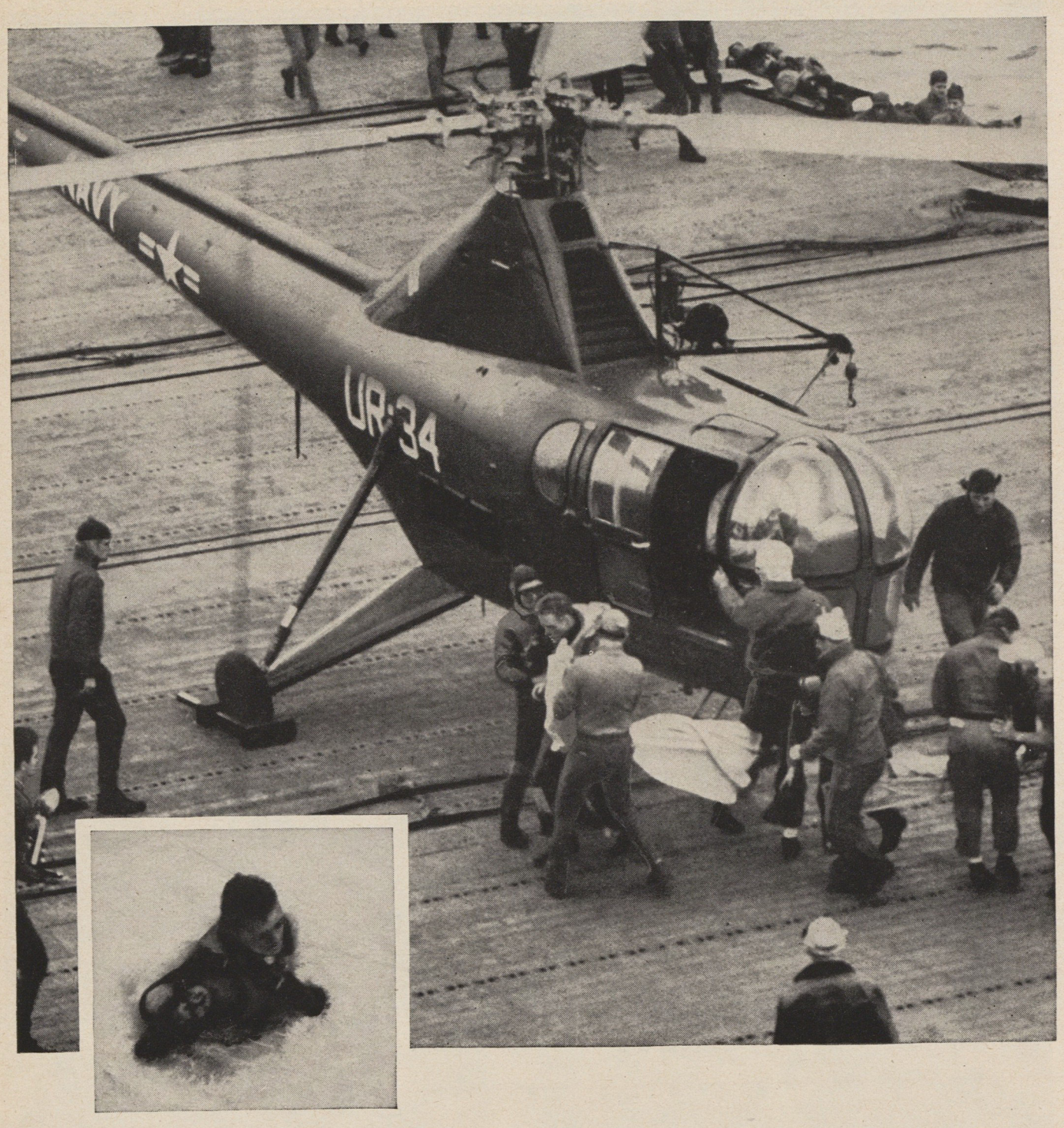
"Enemy force in regimental strength vicinity Hill 81. Tank Column heading North from Church at Grid Coordinate 0175-3255." An on-the-spot report is radioed from the Army L-19—and ground force commanders take immediate action.

That's the "eyes" of the Army, the Cessna L-19 at work. It's a highly specialized, elevated observation tower, in constant radio communication with supporting ground troops—keeps commanders informed of up-to-the-minute developments.

Designed by Cessna engineers, to suit exacting Army requirements, the L-19 is built specifically to do a tough job. All-metal construction makes it ruggedly durable. Excellent visability in all directions, low noise levels and amazing slow-flight characteristics make it ideal for observation reconnaissance work. And—its safety spring steel landing gear, high lift flaps and great reserve power let it land or take off from small, rough, front line fields.

Remember the Cessna L-19, it's the "Eyes" of the Army — and the Ground Forces Friend.





Down but not out! U.S. Navy jet fighter pilot (inset) is dazed as he floats in the icy waters off Korea after crash landing near the carrier LEYTE. Moments later, the carrier's Sikorsky helicopter plucked him from the sea and deposited him on the carrier's flight deck—damp and shaken, but otherwise unhurt. Sikorsky has pioneered in air-sea rescue work since 1947, and developed the technique of using power hoists to bring "ditched" pilots aboard. Today, more efficient than destroyers as plane guards, Sikorsky helicopters are based on all the flattops of the fleet. Destroyers are thereby released for other duties. Through January 15, more than fifty Navy carrier pilots had been rescued by these "life guards of the air."

This is another of many military uses being found for these rugged Sikorsky helicopters. The versatile performance of this dependable craft points to an even greater military potential, as well as countless civilian uses.

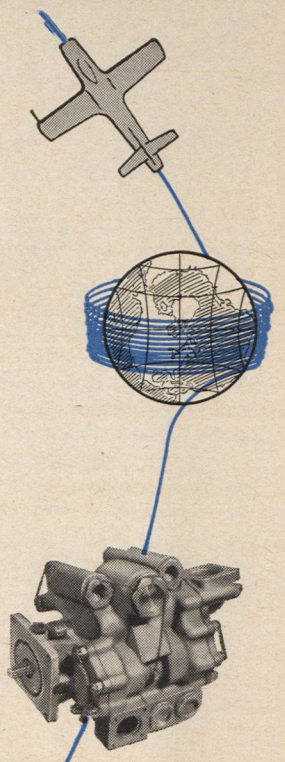
SIKORSKY AIRCRAFT

BRIDGEPORT, CONNECTICUT

ONE OF THE FOUR DIVISIONS OF UNITED AIRCRAFT CORPORATION

Performance Points to Pesco First!

12 times around the world . . . non-stop



That's a tough trip for any piece of equipment . . . particularly for a fuel pump that must operate continuously, with only gasoline for lubrication, and under varying conditions of altitude, temperature and sudden pressure changes.

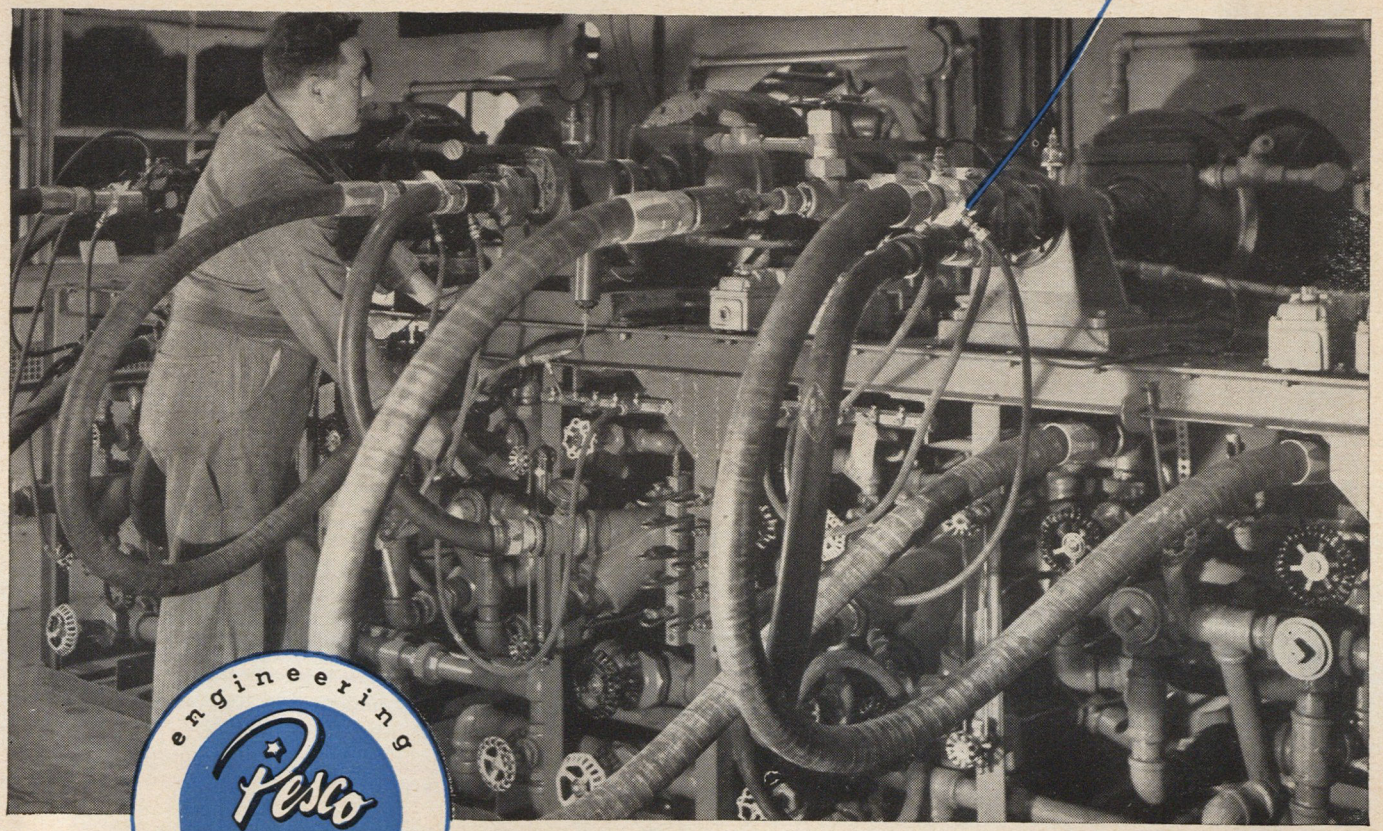
But that's exactly the kind of "flight" Pesco fuel pumps take on our endurance test bench "plane". Every conceivable operating condition is simulated on the 500-hour, continuous test run at speeds equivalent to 600 miles per hour or better.

This is just one of the many tests to which Pesco engineers subject our fuel pumps to make certain they will not fail when human lives are depending on them.

This kind of constant research and testing has enabled Pesco engineers to develop aircraft equipment and accessories so good that they have long been accepted as standard for both military and commercial planes.

Pesco research methods and precision manufacturing can produce products for you that will help your aircraft . . . reciprocating or jet . . . to operate more efficiently, more safely, over a longer period of time. Why not get the full story? Write today.

This plumber's nightmare is Pesco's endurance test bench for aircraft fuel pumps. Two 50-hp. and three variable-speed drives, with separate controls for each, and separate 165-gallon fuel tanks that can be pressurized or evacuated as desired, make it possible to simulate any kind of flight condition.



engineering Pesco production

PRODUCTS DIVISION

BORG-WARNER CORPORATION

24700 NORTH MILES ROAD BEDFORD, OHIO

AIR MAIL

Look Ma, No Pitch

Gentlemen: The maze of dials, switches, etc., in the Air Force recruiting picture, Page 19, Air Force Magazine for February, may look intriguing and inviting to prospective throttle pushers, flight engineers, etc., but if the story below this picture is indicative of true facts, certainly do not relish the engineer's position relative to this particular flight. In this instance, the engineer awaits the pilot's signal to return the props to high-pitch for takeoff after the engine

run-up. Looks to me as though the props were already in high pitch and that he should be waiting to return the props to low pitch. It wasn't too long ago that Low Pitch-High RPM and High Pitch-Low RPM were synonymous and I'll be damned if I ever saw even the four engine jobs take off in high-pitch. Seems to me one would need an extremely long runway and even then I would much prefer to witness a take-off in high pitch from the grand stand. Furthermore, if the dials as indicated are accurate, this B-29 is apt to have engine failure for the fuel pressure on all four engines reads zero as does the cylinder head temperature, oil temp., etc. It is probable the above may be classified as of a high technical nature, but it would appear the Air Force could have accomplished as much with a more accurate photograph of flight training under actual flight conditions.

William H. Thurber
Barrington, R. I.

• *Thurber is a keen observer. The engines of the B-29 in the picture are not running, and the engineer, whose hand is on the mixture control, is awaiting instructions from the pilot prior to starting of engines. When the error was called to the attention of USAF Headquarters, several operations officers stated that Thurber was just the man they were looking for.*

Hodges and Quesada

Gentlemen: Reference to March issue of Air Force Magazine, page 39, mention is made, quote Patch and Quesada end quote. I was under the impression that General Quesada with his famed Ninth Tactical Air Command furnished support for General Hodges' First Army. I also thought General Patch came up from southern France with his Army and was supported by a different air command.

John Fields
Decatur, Illinois

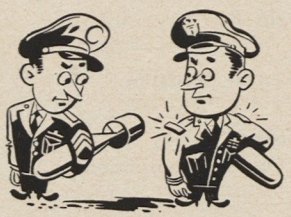
• *Reader Fields' impressions are correct, our "Patch and Quesada" statement wrong. General Pete Quesada commanded the air units in support of General Hodges' First Army. General Patch's Seventh Army made its drive through southern France and was supported by air units under the command of General Saville.*

Horsesense

Gentlemen: I read with considerable interest the most illuminating articles relating to the atomic bomb which you published in your November 1950 issue. I have yet to see any publication issued in this country and related to the subject give so much commonsense and all-important factual "know-how" to this vital matter, and it is because of this that I write you for permission to reproduce in our own "Royal Air Force Review" these articles in their entirety or, at least, excerpts from them; also the illustrations accompanying them.

Sqdn. Leader P. G. Hering
Editor, Royal Air Force Review
London, England

• *Permission granted.*



Bombs Away

Gentlemen: In order to settle a question between two of my officers, will you kindly send me the percentage of enlisted bombardiers and the percentage of officer bombardiers in the Eighth Air Force during World War II.

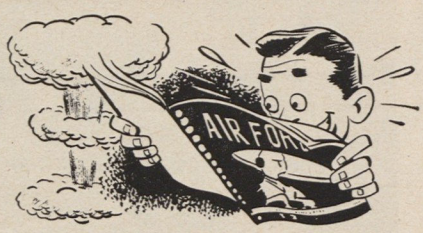
Colonel C. W. Davies
APO 74

• *USAF Flying Status Branch states that such a comparison of percentages is impossible, since enlisted bombardiers in World War II were non-rated and no MOS was authorized for them—thus these men appear under other MOSs on Stat Control records.*

Laurels

Gentlemen: The National War College is considering for required reading in a two-week course beginning April 23, 1951 the following article: "What Kind of Air Support Does the Army Want?", an exclusive Air Force Magazine interview with Gen. Mark W. Clark, published in Air Force, December, 1950, pages 24, 25 and 52. Your advice is therefore solicited with regard to securing 165 copies of the item.

F. E. Fitzgerald
Librarian, National War College
Washington, D. C.



Gentlemen: Your article on Survival in the January issue of Air Force Magazine is tops. If there is ever an atomic attack, a lot of people will owe their well being to you. Keep up the good work.

William Lee Rice
Baltimore, Maryland

Gentlemen: Must dedicate one paragraph to praise for the wonderful publication Air Force Magazine is putting out each month—crammed full of interesting facts, late news, views and opinions. I've been passing it around to others in the office (not formerly air-conscious but your book is converting them) and lastly to my dad who is a railroader with the New York Central. He reads them from cover to cover and then passes on to other railroad workers. So—the magazine gets a good work out.

Ray Halloran
Cincinnati, Ohio

Gentlemen: I believe Air Force Magazine is one of the outstanding publications on the market today.

Harold Wilson
Parkersburg, W. Va.

Gentlemen: The May 1947 issue of Air Force Magazine included an article entitled "Quit Your Stalling." I would like a copy of this article for use as a reference for my senior thesis, which is about angle of attack indicators.

Harry McCartey
California State Polytech College
San Luis Obispo, California

Don't Miss Out-
CONVENTION TIME WILL SOON BE HERE

Plans are proceeding rapidly for AFA's "fifth anniversary convention" which promises to be one of the greatest we have ever held.

It's California this year and we've set the date to fit nicely into your vacation plans—August 24, 25 and 26.

Convention headquarters will be at the world famous Ambassador Hotel on Wilshire Boulevard's well known "Miracle Mile."

As at other AFA conventions, you can count on a full, well-rounded schedule of events. On the lighter side, we have what will undoubtedly turn out to be the greatest Wing-Ding we have ever had since the unforgettable 1948 event at Madison Square Garden in New York. This year's Wing Ding will be held in the fabulous Hollywood Bowl.

Twenty thousand people are expected to jam this great natural amphitheater and the Hollywood stars themselves will provide the entertainment.

The serious side of the convention will not be forgotten. AFA officials realize that uncertain world conditions may cause some of us to drop out at the last moment. But it is just conditions such as these which make the need for a national Air Force meeting greater than ever. The importance of this meeting will be reflected in the airpower forums and discussions already scheduled.

MEET YOUR FRIENDS IN CALIFORNIA THIS SUMMER

air is the first priority of modern warfare. Air superiority, as a prerequisite to all military action on land or sea is inherent in the operational doctrine of all our armed forces.

Yet, if she so desires, Russia can command the air over Europe and Asia.

Though we have known and lived with this cold fact since the end of World War II, it becomes a startling revelation when we see it before us in cold print. Let us consider what it means. Let us think back to May 10, 1940, when Hitler began his *blitzkrieg* of the Low Countries and France. The Allies had 155 ground divisions in the field at that time, well trained and well prepared—for the wrong kind of war. Hitler did the job with far less ground strength (it is reported that 90 percent of the German fighting was accomplished by ten Panzer and five motorized divisions) but he also had command of the air. German superiority in tanks played a major role in the campaign, and this gave new emphasis to tank warfare. Out of World War II came the military axiom that "the only answer to a tank is another tank." And yet, as was reported in the last issue of this magazine, fully 75 percent of all enemy tanks destroyed in Korea have been destroyed from the air. We must proceed cautiously with these axioms from World War II.

It should become known by one and all that the ground divisions the free world hopes to muster by the end of 1952 in Western Europe, if called upon to fight, must do their fighting without the protection that comes through command of the air. Let us consider what this might mean.

In Korea where we enjoy air superiority—at Russia's discretion, of course—our casualties number some 60,000 against hundreds of thousands of enemy casualties. And we now know that 47 percent of these enemy casualties have been attributed directly to airpower. Thus, in a situation where air superiority is not ours, we must be prepared to think of the enemy's casualty rate in Korea as our casualty rate in Western Europe, and perhaps magnified somewhat. We must consider whether the countries of Europe, already torn by the ravages of a recent war, are capable of accepting such casualties. And we must consider whether the mothers of America are prepared to accept them.

Our 95 group program actually adds up to an Air Force of 50 modern groups. It would be outnumbered by a disastrous margin, even at the end of next year, in an air battle over Western Europe

In the hands of Russia, command of the air leaves Europe naked and paralyzed, no matter how many ground divisions the free nations may be able to put in the field.

In the hands of the free world, command of the air becomes, not only war-tested insurance that ground action has a fair chance to succeed, but also an added deterrent to Russian aggression (since realistic Russia knows it cannot win without air superiority).

Yet, command of the air over Europe and Asia has been lost to the free world since the end of the last war, and will continue to be lost to it for some time to come. If there is a surer way to national suicide, in a world threatened by international bandits, I have yet to hear about it.

This is a good time to explain—as it seems so necessary to do when discussing airpower these days—that airpower's priority position in modern warfare in no way implies that airpower can do the job alone. The American Navy, now the most powerful in the world, must be kept the most powerful in order to fulfill its important mission in any war with Russia; and the Navy can contribute to the air superiority mission, particularly in the Pacific theater. The American Army, it should go without saying, is equally vital. Let there be no mistake on these points. But we must see the three services in their proper perspective. In a war with Russia there is not, for example, the remotest chance that our ground forces can defeat the Russian Army by coming to full grips with all its divisions. The Russian Army must be strangled by the bombing of the industries behind the troops, the industries supplying them with the weapons of war. Our own ground forces, outside of some local attacks to secure specific positions, must be considered as a supporting force holding the air bases from which we pound the life out of the heart of the Russian military machine. Any other concept is, to my mind, dangerously unrealistic. War with Russia, should it come, will be decided by airpower supported by surface forces, and not by surface forces supported by airpower. We must recognize this relationship before it is forced upon us by the hard facts of combat.

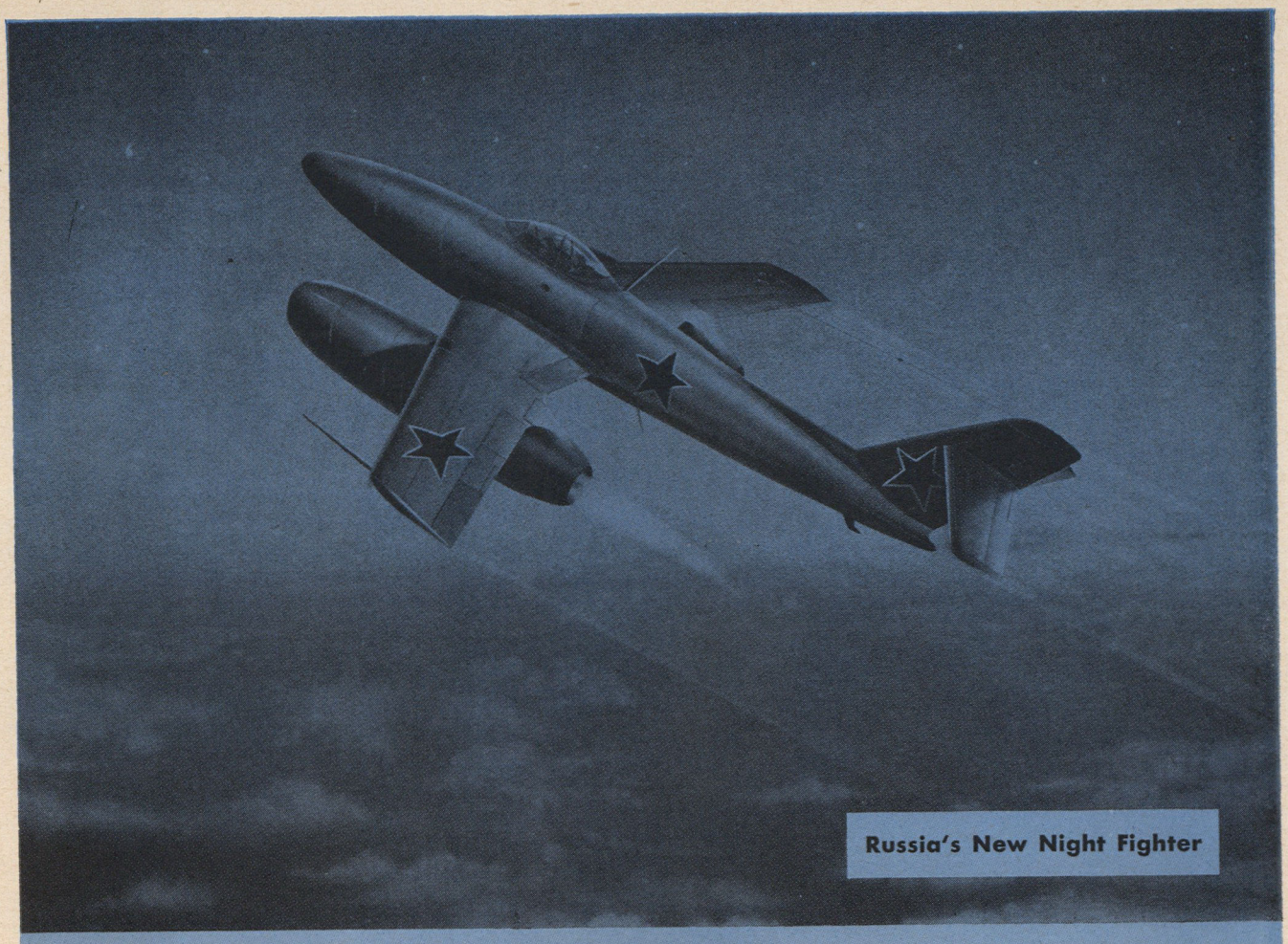
The battle for command of the air begins, not over the battlefield, but in the White House, in Congress, in the press, on the drawing boards and on the production lines. In these spheres of military activity (and in a democracy they are all of that) we are certainly losing the air battle to Russia.

We are losing the air battle, first, because our thinking is muddled with regard to the basic requirements, the true goals, in this battle. There is, for example, a dangerous tendency in this country to approach the question of air support for ground troops in terms of the number of ground troops to be supported. We hear, even among Air Force people, that we can provide the necessary support aviation only after we have determined how many ground divisions we will have to support. This is the type of thinking apparently being applied to the military buildup for Western Europe. Establish the ground strength available, so this reasoning goes, then slap an air umbrella of protective aircraft over the heads of the troops as they check in on the continent—much as you issue them dungarees and mess kits—and you have created the "unified" air-ground team.

This may be the way to get the team, but it is hardly the way to keep it alive.

The air support of our ground troops, in Western Europe, in Asia and anywhere else in the world, does not begin with the air umbrella over the battlefield. It begins at the source of trouble, the enemy's homeland, and with our only conceivable threat to that source—our strategic airpower. And simultaneously it begins with the battle that will determine, in the long run, the personal fate and military contribution of both the airmen in a B-36 over Mos-

(Continued on page 51)



Russia's New Night Fighter

"The engineering battle is raging..."

The battle for air superority, as it is waged on the engineering front, takes its priorities from operational experience, and for a number of years, as re-emphasized in Korea the night fighter has received top priority billing.

Russia's bid for night fighter superiority reportedly centers in a plane not generally covered in published appraisals of the Soviet Air Force. It is, according to reliable private sources on the continent, the La-15B, a twin-jet aircraft of German ancestry developed from the old ME-262 design, and adapted from the Soviet's La-15 long range, two-place jet fighter.

The new type (shown in the artist's conception above) early last year was reportedly in the advanced test stage and we can assume it is being pushed toward production. It is said to have sub-sonic type 35-degrees swept-back wings and tail, and to be powered by new type chelomoy axial-flow engines rated at 4,000 pounds of static thrust. In size, power, performance and general characteristics it is reported to resemble most closely the McDonald F-88 Voodoo, and can be assumed to be capable of highly advanced speeds for night fighter types.

It might well be concluded that Russia's interest in developing a hot night fighter stems to a great degree from concern over the possibility of B-36 visits at night and the big bomber's relative invulnerability against present fighters, especially after dark. Certainly, the development of the La-15B is no accident. Russia's matériel may not always be the best, but her high command has a habit of placing it where it will do the most good. For that reason alone, this new high performance night fighter may be of major significance in any all-out battle for command of the air.

attack, the deficiencies in fighter aircraft, the lack of air superiority—and their meaning in modern warfare.

If Stalin and Russia need current evidence of the plight of ground troops when air superiority is lacking, they are finding it in their Korean experience. The hundreds of thousands of Communist dead in this campaign are grim testimony to the fallacy of launching a surface attack without adequate air cover. Certainly, had Stalin not had every reason to believe that the United States would not retaliate against aggression in Korea, he would hardly have become a party to this aggression. While he now permits Russia's satellite forces to be slaughtered in Korea without air protection, we can be sure he will never allow such a situation to prevail whenever his own well-trained troops might be involved. The Korean experience, it is safe to assume, has stimulated Russia's interest in air superiority to new heights.

The Russians are realists. Are we? Is the free world approaching the threat to its very existence with equal realism? In the answer lies the hope for the future of western civilization.

I must report, on the basis of the evidence available, that unless we call a halt to the present trend, shift our gears and take off in another direction, that hope is thin indeed.

In the United States, arsenal of democracy and leader of the free world, we are looking backward and groundward in our military thinking. We are more sentimental than practical in our allocation of manpower for defense, inconsistent and lagging in our scheduling of military and related equipment. We seem reluctant to profit by the military truths gained from hard won experience in World War II, and blind to the military truths emerging from the Korean campaign. In our approach to the mission in Western Europe we may be betraying not only the youths we would draft for those battlefields but also the war-scarred people of Europe who once again live under the gun.

It is high time we face some facts and live up to them.

We must recognize, first of all, the so-called "great debate" over American divisions for Europe for what it really is—more a diplomatic than a military argument. We must settle the issue with dispatch—provide the minimum divisions required to give the Western powers the courage to build up their own strength—and meanwhile get on with other matters more vital in the long run to the people of Western Europe as well as to ourselves. And we must get on with them quickly, for time is running out.

There is no questioning the fact that the free world must be unified, virtually at all cost, to prevent and if necessary to combat further Russian aggression, and if this demands four more American divisions, or whatever number General Eisenhower deems necessary, on the continent, it may well be a worthy investment. But we must not delude ourselves for a moment that these ground divisions, even if magnified in number many times, will give the powers in the Kremlin a single sleepless night.

Wall of flesh strategy is not the answer to our problems or to the problems of Western Europe. It is, in my opinion, the sure way to disaster. And yet, it is the prevailing philosophy in Washington today.

While our leaders are sapping their time and energy over how many ground divisions to send to Europe, over the minimum age of our new draftees and similar problems, the only deterrent we have to Russian aggression, the only real preventive to all-out war in the world today, goes wanting for lack of adequate attention.

We have created a mental bomb shelter in the belief that our superiority in atomic weapons is the full measure of this deterrent force. It appears easy to forget that a superior atomic stockpile is useless without superior atomic bombers and without a superior air defense to help protect both the stockpile and the bombers. If we remember at all, we take final refuge in the B-36, seemingly unaware of the few B-36s we have on hand and equally unaware of their weakness in sustaining power. We seem undisturbed by the fact that Russia has the motive and the capability for producing intercontinental bombers more modern than those we are now operating, and can be counted on to produce them.

The strengthening and modernization of our own intercontinental bomber fleet must be our first military priority—come what may. Against the military requirement, we are proceeding far too slowly.

While we pursue the wall of flesh philosophy, we are losing the first and crucial battle in any possible war with Russia—the battle for command of the air.

All our responsible military commanders know that command of the

(Continued on page 26)

Wide World Photo

The author of this article, shown above, as he testified recently on the troops-for-Europe issue before a joint Senate committee, was the top wartime American Air Commander in the ETO, the first Chief of Staff of the US Air Force and, in the words of General Eisenhower, "the world's greatest air strategist."

"...EVEN THE BRAVEST TROOPS ARE HELPLESS IF THEY LACK AIR PROTECTION."

Joseph Stalin

The Airpower Odds Against the Free World

We are losing the battle for command of the air and protection of our troops in Europe. We are losing it in Washington. The result may spell disaster

By Gen. Carl A. Spaatz, U. S. A. F. Ret.
CHAIRMAN OF THE BOARD, AIR FORCE ASSOCIATION

"THE Germans were able to concentrate in this area great reserves of aviation, and in this way managed to secure superiority in the air in the ratio of two to one. We have not enough fighters for protection of our forces from the air. Even the bravest troops are helpless if they lack air protection."

In these words, written October 5, 1942, Marshal Stalin commented to Winston Churchill on the Battle of Stalingrad then in progress.

It has often been said that the Russians will never forget Stalingrad. It hasn't been said often enough that Stalin and Russia will never forget, as a result of Stalingrad, the helplessness of ground troops under air

AIR FORCE
APRIL, 1951

THE BELLY ...an army travels on!

This historic quote takes on new meaning in the Air Age.

For in the belly of the rugged Fairchild C-119 transport, the air and ground armed forces can move with a mobility not believed possible yesterday.

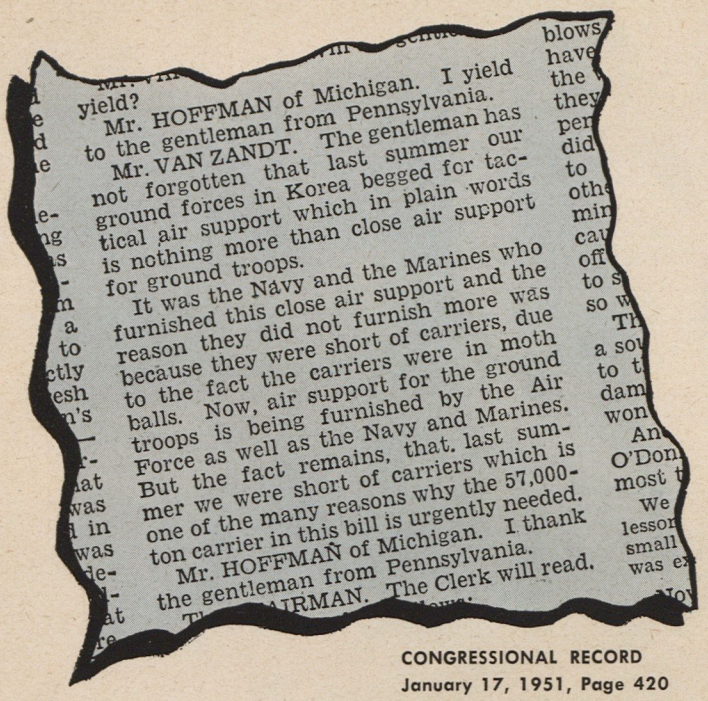
Successor to the famous C-82, the C-119 is a more versatile and powerful Packet, designed to land, unload fully assembled vehicles and heavy machinery—load up again and take off in a matter of minutes, demonstrating the flexible ground handling needed in an airhead.

The highest skills of engineering and manufacture insure the continued growth and effectiveness of this mode of travel...for those entrusted with our national defense.

ENGINE AND AIRPLANE CORPORATION
FAIRCHILD *Aircraft Division*
HAGERSTOWN, MARYLAND

Other Divisions: Fairchild Engine Division, Guided Missiles Division, Al-Fin Division, and Stratos Division, Farmingdale, N.Y.

A CONGRESSMAN REPLIES . . .



yield?

Mr. HOFFMAN of Michigan. I yield to the gentleman from Pennsylvania.

Mr. VAN ZANDT. The gentleman has not forgotten that last summer our ground forces in Korea begged for tactical air support which in plain words is nothing more than close air support for ground troops.

It was the Navy and the Marines who furnished this close air support and the reason they did not furnish more was because they were short of carriers, due to the fact the carriers were in moth balls. Now, air support for the ground troops is being furnished by the Air Force as well as the Navy and Marines. But the fact remains, that last summer we were short of carriers which is one of the many reasons why the 57,000-ton carrier in this bill is urgently needed.

Mr. HOFFMAN of Michigan. I thank the gentleman from Pennsylvania.

The Clerk will read.

CONGRESSIONAL RECORD
January 17, 1951, Page 420

Feb. 14, 1951

Mr. James H. Straubel, Editor
Air Force Magazine
1424 K Street, N.W.
Washington, D.C.

My Dear Sir:

In the February 1951 issue of the Air Force Magazine you published an article titled—"A Congressman Speaks"—in which you quote me referring to Page 420 of the January 17, 1951, issue of the Congressional Record.

I regret very much that you did not continue to quote my entire statement which included the following language—"Now, air support for the ground troops is being furnished by the Air Force as well as the Navy and the Marines. But the fact remains that last summer we were short of carriers, which is one of the many reasons why the 57,000-ton carrier in this bill is urgently needed . . ."

For your information, my entire statement represents a general one as well as an interpretation of the conditions that existed in Korea early in the campaign and was based on information furnished the House Committee on the Armed Services, of which I am a member, during briefing periods by spokesmen for the Department of Defense.

It is interesting to note that the Commanding Officer of the Continental Air Command issued General Order No. 88 on November 20, 1950, re-establishing the Tactical Air Command effective December 1, 1950. The fact that such action was taken supports the information given us regarding the lack of tactical air support.

I want to assure you that in my remarks I had no intention of criticizing the Air Force or any other branch of the Armed Forces. If there is any criticism, it should be directed at the present Administration who failed to carry out the directives of Congress incident to establishing an adequate national defense among which was the failure to spend some 860 million dollars provided by Congress to establish the 70 Group Air Force.

I think the Armed Forces as a whole are doing a fine job and I certainly want it understood that I am not criticizing any branch of the service in commenting on the need for the new 57,000-ton carrier.

I shall appreciate your kindness in giving this letter the same prominence in the Air Force Magazine that was accorded your article regarding my remarks in Congress.

With best wishes, I am

Sincerely,

JAMES E. VAN ZANDT.

AND IN ACKNOWLEDGMENT . . .

March 19, 1951

The Honorable James E. Van Zandt
Armed Services Committee
House of Representatives
Washington, D. C.

My Dear Congressman:

In acknowledging your letter of February 14, may I assure you that it will be given the same prominence in AIR FORCE that was given "A Congressman Speaks" in the February issue.

Since you have taken exception on this point, I wish to express my regrets that we did not publish at that time your complete statement before the House of Representatives on January 17, 1951, as documented on page 420 of the Congressional Record of that date. The complete statement will be published with your letter in the April issue of AIR FORCE; and to further clarify the record, we feel called upon to publish these comments on the same page of that issue.

I must report, however, that it seemed to me at the time, as it does now, that the unpublished portion of your statement, as quoted in your letter, hardly alters the implication made regarding the Air Force in Korea.

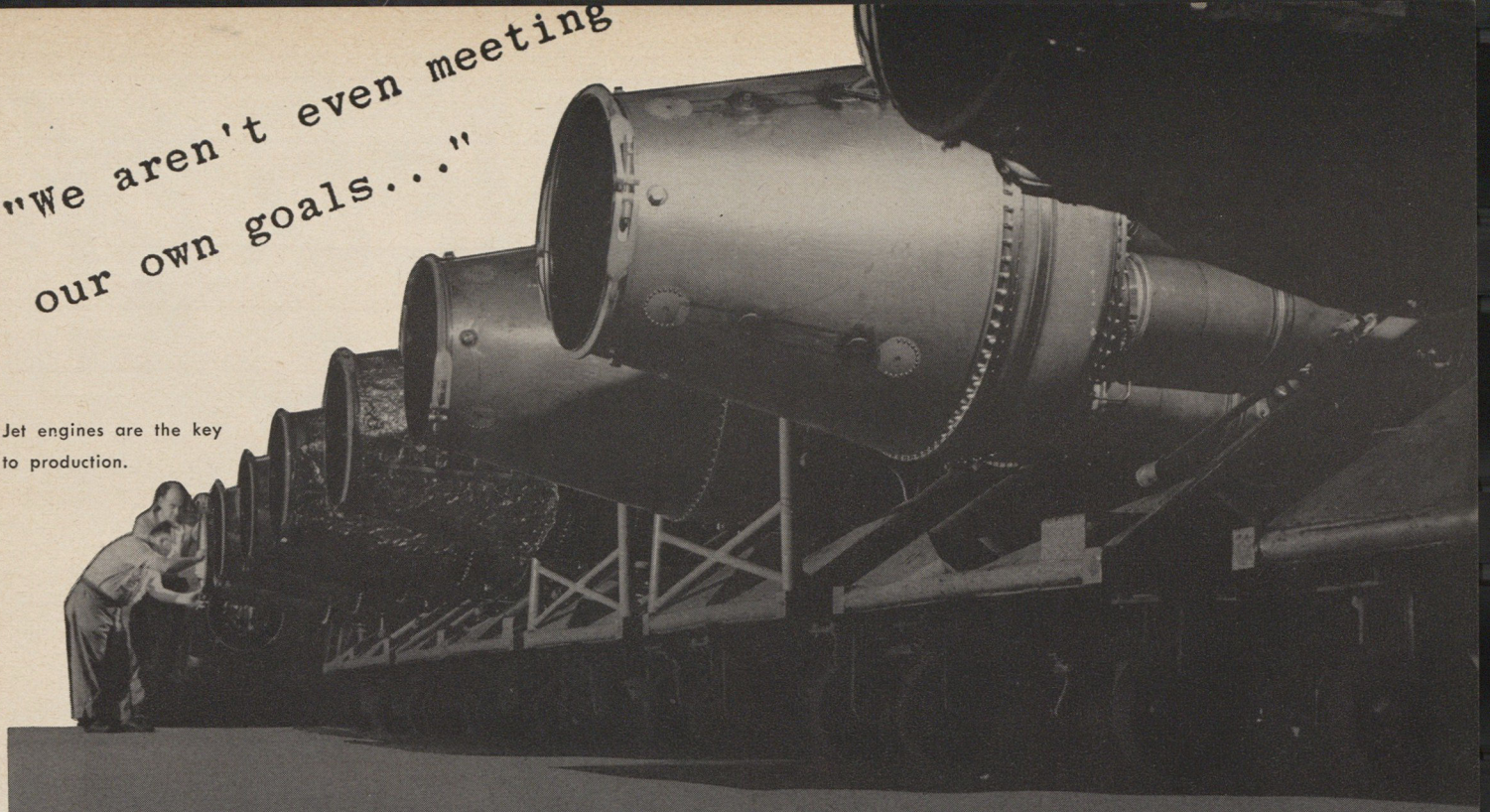
In view of this, it is good to receive your assurance that you had no intention of criticizing the Air Force or any other branch of the Armed Forces.

Reference in your letter to the re-establishment of the Tactical Air Command, as a separate Air Force Command reminds me that we commented editorially at the time that the new status was long overdue; but this has no bearing on the accomplishements of Air Force personnel during a specific period of the Korean War, which is the only point in question.

We have taken issue only with that portion of your statement which concludes that last summer when, as you put it, our ground forces in Korea begged for tactical air support, "it was the Navy and Marines who furnished this close support." We realize that in the same state-

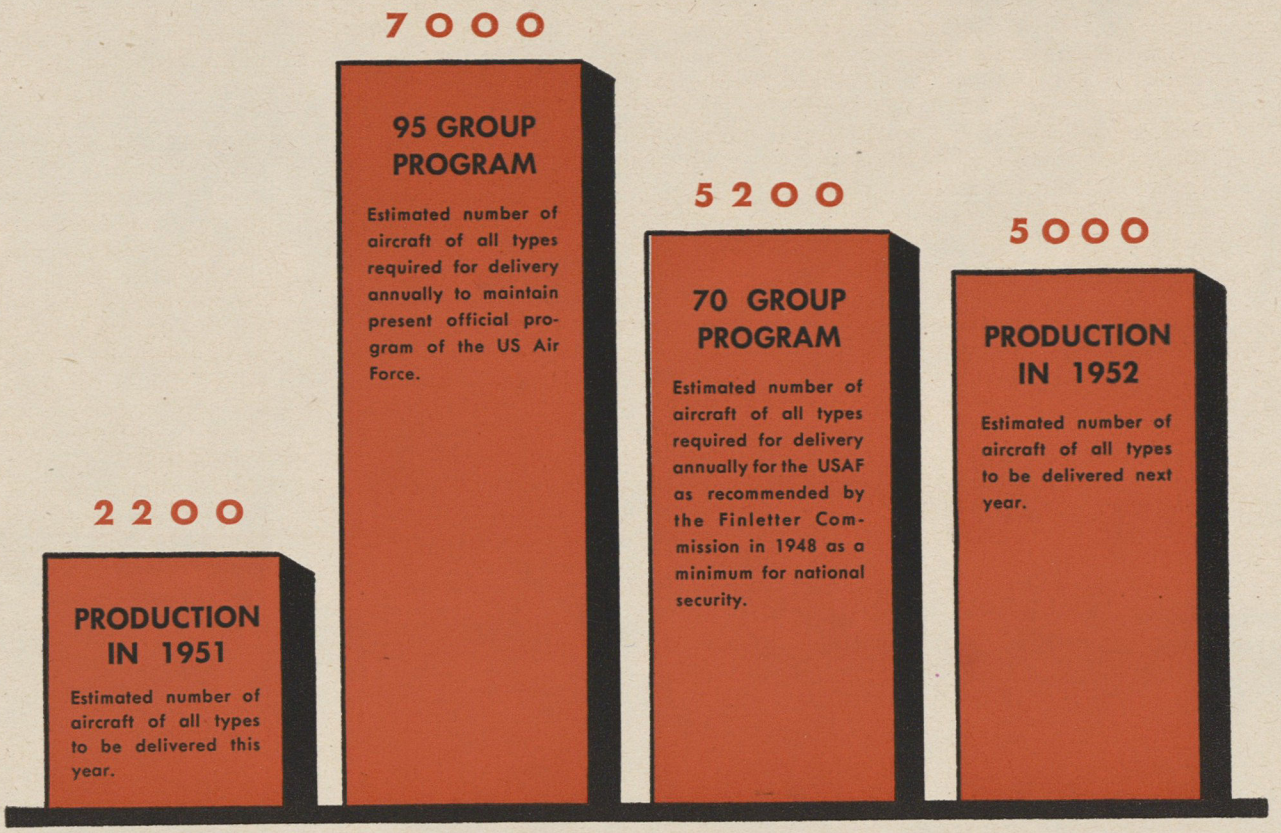
(Continued on page 58)

"We aren't even meeting our own goals..."



Jet engines are the key to production.

On the Aircraft Front—Programs vs Production*



*All figures shown in this chart represent estimates made by the editors of AIR FORCE from publishable information.

Just as jet engines are the key to aircraft production, so is this production a key to airpower strength. These charts reveal, in rough but obvious terms, that programs, as such, mean little if not supported by the actual production to meet programming requirements. In the gaps between what should be and what is, we can read the story of why we are losing the air battle.


He OWNED the

THE STORY OF A RUSSIAN BOMBER PILOT

By His Father

as told to

William S. Friedman

YOU ask me about Russian airmen. To understand them is a very broad job. I knew one very well. He was my son. I knew some of his friends, and they were fine boys. Some of them were a little on the wild side, particularly the ones that flew the little fighter airplanes. At my age, I will not attempt to make any big statements about the whole Russian air force. Its people came from all the Russias: from up near the Finnish border in the lumber country, from the plains where the Kazak horsemen love speed and go from saddle to cockpit apparently without effort, from the steppes and the collective farms, from the felt yurts of far Siberia. There are as many kinds of people in all the Russias as there are in all the United States—perhaps more. However, the kind of training and education the military airmen of Russia receive is pretty much alike, and it marks them with a certain way of thinking and acting.

From a father's viewpoint, I can tell you about one Russian airman, what kind of person he was and how he compares with his American counterpart. This also, however, I can discuss only with a limited authority. One of my neighbor's sons is a pilot in the US Air Force. I have been per-

EDITOR'S NOTE

Ordinarily a Russian pilot does not see much of his parents once he gets into service. But the airman in this story was a pre-war product of the Russian military organization, and the control exercised over the soldier in those days was not quite so rigid as it is now. Then, too, this airman's father worked on a number of airfields and had more of an opportunity to get to know the typical Soviet pilot.

The father who tells this story is a burly, cheerful individual in his late fifties. Today he lives not far from New York City. He drives heavy construction machines for a local contractor. He is an old hand at this for that is how he made his living in Russia. He has lived in America for three years now. He came to this country as a displaced person after years of slave labor in a German prison camp. He has adjusted well to his new country. He has joined a local Russian Orthodox Church and sings in the choir. He doesn't mind talking about the past, painful as it must be, as long as what he says cannot hurt his youngest daughter, the last of his four children, who may still be alive behind the Iron Curtain. In this story he has no name for she must be protected. For this reason, too, certain liberties have been taken with dates and place names.

mitted to know him somewhat by direct contact and somewhat by what his parents and his doting sister tell me about him. He is like my son in many ways. I suppose all airmen have much in common. Yet there are differences that stem not from the stock from which the man sprang, but from the environment and the training to which he has been submitted.

My son Aleksandir was born in 1918, a true product of the era of revolution. The only world he knew was a Soviet world. He and his three sisters fared better than most children. I was a heavy machine operator and I usually earned a pretty fair living. My boy got his first taste of flying when my whole family was flown down to the site of the Dneipestroi Project, where there was a great demand for tractor and heavy machine operators like myself. I remember the flight well—the airplane and the pilot. He was a German, flying for the Red Government under contract. We flew in a machine that was imported from Holland and was equipped with an English engine. *(Editor's note: probably an early Fokker.)* From that time on, my boy was interested only in airplanes.

He became a member of the Young Pioneers, an organization somewhat like the Boy Scouts, but much more political in its nature. I remember the pamphlets that Sasha *(Editor's note: Sasha is a common nickname for Aleksandir)* used to get about "Our Youth Turns Its Face Skyward" along with the usual indoctrination about the way children in other Capitalist nations were made to slave for hire. Sasha began with model airplanes, powered by rubber bands. Once he won a district contest, and was given a ride in a small open cockpit biplane by the OSSAVIAKHIM *(Editor's note: an organization now known as DOSAV, responsible for aviation propaganda, aviation clubs, and model airplane clubs)* director of the area. For many years I carried a picture of Sasha with me, clad in a leather flying coat that was much too big for him.

In 1931, when my boy was half way through secondary school, he joined a Young Pioneer's glider group. Under adult supervision, this group consisted of lads between fourteen and seventeen years of age, working under the direction of some senior instructors. Some of these senior men had been trained in Germany and were expert glider pilots. The boys built what they termed a novice-class glider, a sort of simple frame with a seat in front, a tail in the back and wire-braced wings in the usual place. They built the machine from plans that had been provided by the government through OSAVIAKHIM. The boys earned the government credit for the materials required by doing extra labor around the school or by maintaining very high grades in various subjects that had bearing on government or the military: political science, physical training, etc.

When the boys finished the glider, they received instructions in flying it by the group senior instructor. My boy was very proud of the fact that despite the fact that he was the youngest in his group, he was the first to gain his proficiency badge as a primary glider pilot. Evidently this fact impressed the local OSAVIAKHIM board, who put the boy in with some of the older lads. By the time he was sixteen, he had graduated to the long-winged sailplanes that had been imported from Germany and faithfully copied by many of the glider clubs.

My son's general education ceased at the secondary school. An airman by instinct, he was taken off gliders when he was not quite seventeen and given instruction in powered aircraft.

From then on, I saw less and less of my boy. For about a year, he was taking his training on a local basis. They were short on facilities at the airfield. He was still technically under the supervision of the OSAVIAKHIM. He held a minor administrative job at the tractor plant where I worked as chief test driver, but he was given more and more time off to take flying lessons.

His original instruction was in the little Polikarpov trainers. He used to talk flying at home until his sisters were sick of hearing of it. It was here that the effect of "the propaganda" first started to show up. Sasha was usually very kind to his sisters, but when they showed the first sign of not wanting to hear about flying on an almost evening-long basis, then the trouble began. It was as though a certain line of thought had been injected into his mind—certain challenges brought forth certain set answers:

. . . the sky touched every living thing all over the planet: it was the medium through which the gallant pioneers of the air would carry Lenin's immortal message to every corner of the earth.

. . . the sky belonged to those who would keep it free. In Capitalist countries, rights to the sky had been apportioned to certain selfish airline interests who exploited it for their own profit, so that it was very difficult for the workers who loved the sky to enjoy its freedom. Therefore, it was the eventual duty of all Red airmen ultimately to redeem the freedom of the sky for all men.

Illustrated by VERNON NYE

. . . the sky in Capitalist countries wasn't free like it was for the airmen of the free Soviet. Capitalist airmen did not develop their air instincts, but depended on hundreds of mechanical and automatic devices to do their flying for them. The Soviet airman was different—he learned to fly on a bare set of wings, with not even a motor to help him. He was "reborn in the sky", and not dependent upon artificial devices and instruments.

When Sasha brought his friends home, they used to talk airplanes and politics ceaselessly. However, I should have noted something in their talk at the time that was dangerous. I didn't notice it until it was too late. There was growing up in my boy the idea that because he was a pilot, he was superior to others.

When my boy was eighteen, an old friend of our family who was a mechanic for Aeroflot *(Editor's note: Civil Air Fleet)* suggested that Sasha apply for assignment to the post of assistant pilot on the smaller runs of the civil air line. This is the first time that I ever saw my son deliberately insult one of his elders. "Join that scum," my son cried indignantly, "when I can be a military pilot!" I realized even then that the military pilots had begun to consider themselves vastly superior to the civil transport pilots. However, it took this outburst to make me realize how deep the cleavage was. There was a time when the leaders of the USSR had talked peace, and had glorified the pioneer airmen who had blazed the airways to far places in the Arctic and Siberia. I remember the great excitement when airliners made their first flights to Sakhalin and Kamchatka, to Khabarovsk and to Novgorod. The pilots who made these flights were celebrated as national heroes. That didn't seem so many years ago. Now they were "scum." There was a new spirit growing. The sky belonged to them—all of it, and they were going to take possession.

When Sasha was eighteen, he entered full military service. I saw him only once during 1935. He was home for three weeks leave. He was a cadet pilot, and one of the leaders of his class. I was very proud, but I noted that his superior attitude, so contrary to the original Marxist ideals, was even more pronounced than ever before. He ordered his sisters around like lackies, and they resented it. My eldest daughter was married by this time. Her husband was a young engineer in a local electrical equipment plant. Sasha treated him in a very patronizing manner, and the way my new son-in-law fawned over him made me a little ill.

A few days before Sasha's leave was over, I tried to take him in hand. I tried to tell him that this attitude of self-esteem was good for the younger cadets, but not for one's own family. What I got in return still stays with me and makes me a little sick when I think of it. I was treated to a first-hand explanation of the importance of airpower in the future of an all-Soviet world that was some day to be. It was as though some one had turned the key in a certain lock and a pre-set reaction took place. I tried to search my mind to find what it reminded me of in my own past. There was a certain familiarity about it, not so much in the words or even the thoughts, but in the manner in which they were delivered. Then, suddenly I remembered. I remembered my catechism when I was a child. Questions and answers, committed to memory and absorbed without resort to reason.

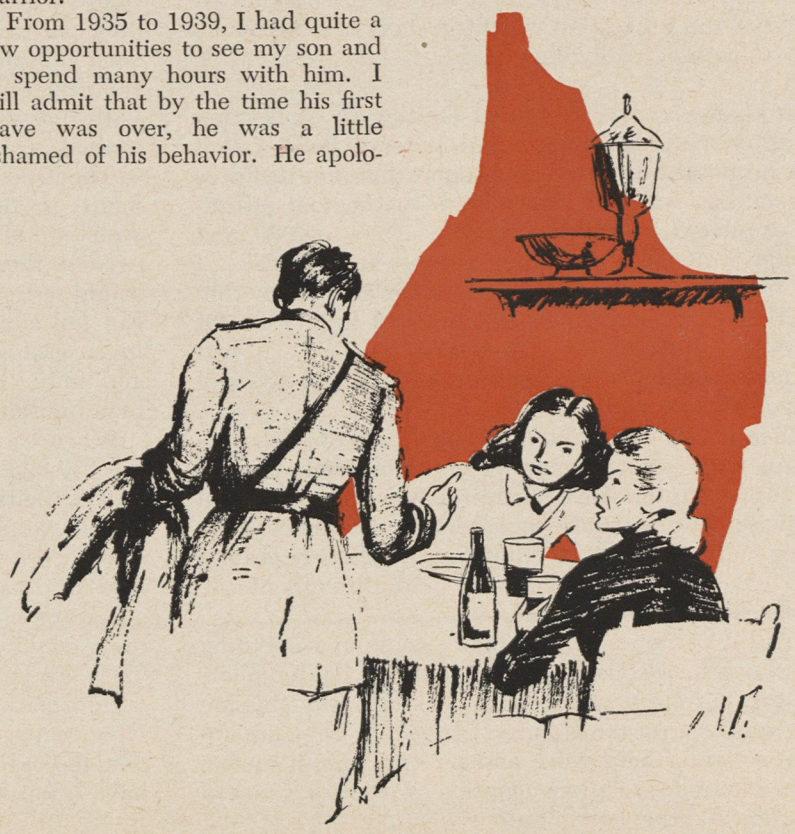
My son had been given a substitute for religion. It was more than just the ordinary Marxist ideas that every Soviet child gets with his ABC's. His religion was a strange mixture of belief in world communism and belief in a sky that was going to help him carry it everywhere. It was a belief that separated him from his family and from his friends. It had made him a new kind of man: half missionary, half warrior.

From 1935 to 1939, I had quite a few opportunities to see my son and to spend many hours with him. I will admit that by the time his first leave was over, he was a little ashamed of his behavior. He apologized to his sisters and to his mother. By that time, we had a car, since I was a supervisory worker, and I drove him to the airfield. Here I was admitted to the officers club, and I had my first opportunity to meet Soviet airmen in numbers. My son, still an unappointed Senior Cadet, acted very humbly in the presence of these ranking airmen. As a matter of fact, he only dared introduce me to one of his instructors who happened to be waiting for the same transport aircraft. This man, who later became one of the leading Stormovik pilots of World War II, introduced me to a number of other officers who were very pleasant to me. I discovered here that the older officers, who were products of the non-military era of Soviet culture, were a lot less impressed with their importance than the younger men.

In the year that followed, Sasha was sent to one of the upper military schools and was appointed sub-lieutenant. He was chosen to fly light bombers. Later I learned that a squadron was being selected to be sent to Spain to fight in the Civil War there. However, Sasha's unit saw service in the fighting in Finland, and Sasha got himself a decoration of which he was very proud.

The last time I saw my boy was early in 1940. He had the rank of major then and was an element commander in a medium bomber

(Continued on page 54)



How OLD Can You JET?

The rumor is that a fighter pilot is washed up at thirty.

Says the Surgeon General, "That ain't necessarily so"

A few weeks ago the Air National Guard officially proposed that the time had come to consider the establishment within its organization of troop carrier or combat cargo units.

In light of the Air Guard's proud record as a fighter plane outfit constituting a large part of the nation's air defenses, the suggestion was little short of sensational. Only something really big could have been responsible for it.

Air Guard leaders explained (to the Air Staff Committee on National Guard and Reserve Policy) that their proposal was based on a report that the Air Force Surgeon General had determined "the combat utilization of pilots for jet type aircraft ceases at age 30, and for conventional type fighter aircraft at age 32."

If true, this certainly was cause for concern within the Air Guard, and for its new interest in C-46s. "Of the 3,941 pilots in the Air National Guard," it was further explained to the committee, "3,263 or 83% will be over 30 years of age by 1954."

When it was determined that the Surgeon General's records were not as damaging to the old men of 30 as was supposed, the Air Guard proposal was withdrawn forthwith, but not until members of the policy committee had confessed that these same beliefs regarding pilot age were quite generally held throughout the regular Air Force establishment.

This bit of news will probably come as something of a shock to a considerable number of fighter pilots who are currently engaged in socking away mission after mission over the Korean battlefield. They are doing very well, thank you, and no one, except an occasional public relations caption writer, has asked them how old they are in quite some time.

But something must have caused the rumor and the Surgeon General's office is inclined to blame the "handle seekers" within the regular establishment who, for perfectly legitimate reasons, try to back the Surgeon General into a corner and make him give a cut-off age figure which they can grab hold of and use as a planning yardstick in their own departments. There is no such inflexible figure, but if pressed hard for a "handle", the Surgeon General's office can usually come up with one to meet the requirement for which it is intended.

The trouble is, others insist on applying the same figure to their own particular problem, and it just won't stand up.

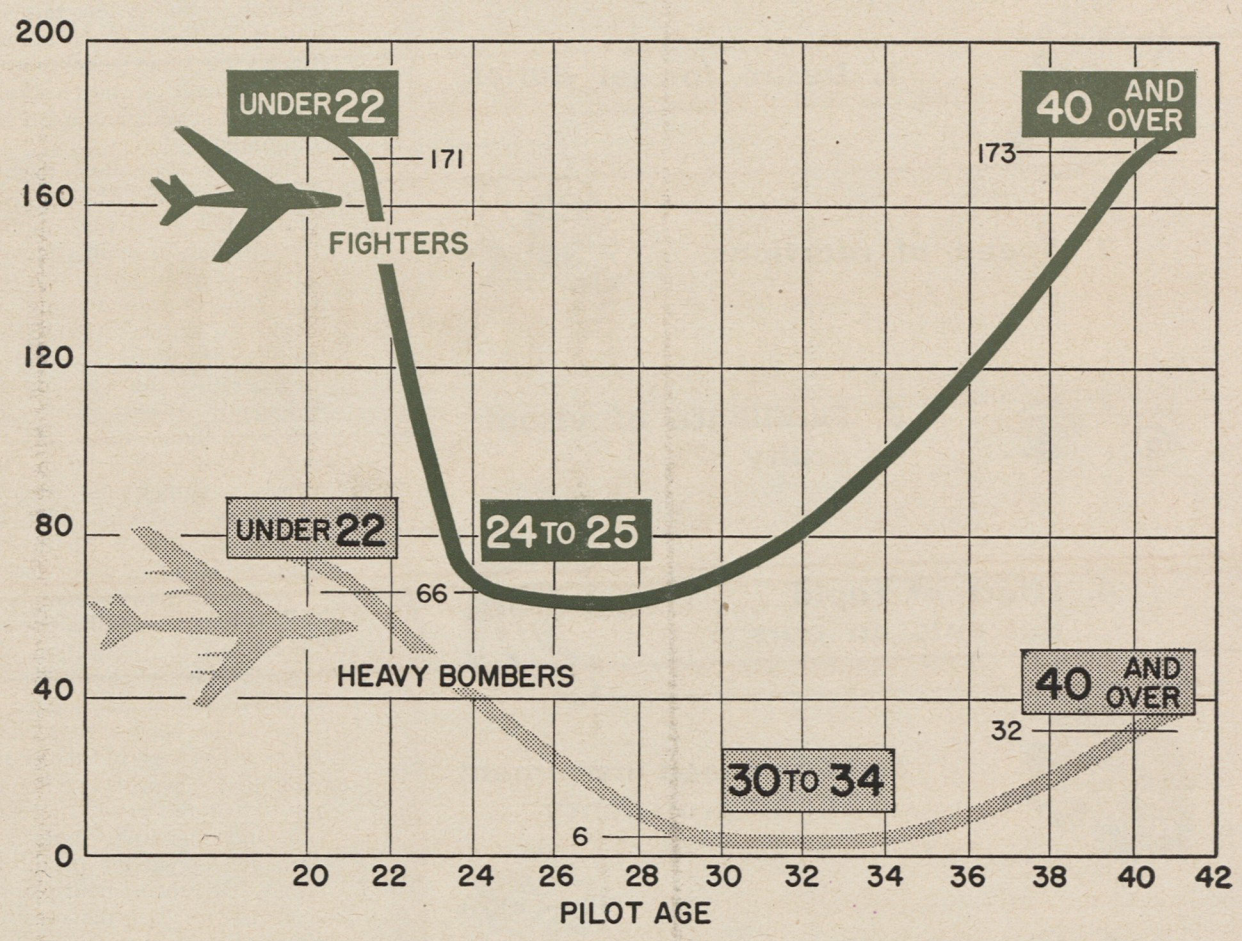
Now, there does not exist in the Air Force today a sound testing procedure on the operational level which can tell a man who appears to be physically fit that he is washed up as a fighter or a bomber pilot unless and until this fact becomes patently obvious to the man himself or his superiors.

When the National Guard, therefore latched on to the "30-32" figure, they were grabbing a handle that wasn't theirs. This particular handle belonged to the people responsible for determining *how many new pilots we need each year.* When cadet program planners approached the Surgeon General's office they asked for bomber and fighter pilot cut-off ages which they could use for replacement *planning* purposes. They got just that.

Information was needed for a particular purpose: How many new pilots do we need a year to replace men too old to fly combat? The Surgeon General didn't have a yardstick. Both the Royal Air Force and the

(Continued on page 34)

ACCIDENTS PER 100,000 FLYING HOURS



THE above accident rate chart represents one of the few "yardsticks" available to the Surgeon General's office in evaluating the efficiency of pilots at various age levels. As a gauge it has many weaknesses, but because there is so little statistical data available on this whole pilot age question, it has been used, and can be used, *with caution*.

The data on this chart was taken from a study made by the Air Force during the war and released shortly thereafter. It applies, therefore, to plane types operational at that time, not to jets. Actually there has not been much research done on accident rate with jet type aircraft, but all available data indicate that the introduction of the jet factor would cause very little change in the above curves.

The dangers in interpreting this chart as an accurate guide to "ideal" pilot age are great.

1. It is immediately obvious that a "safe" fighter pilot is not necessarily a good fighter pilot. When a fighter pilot gets cautious he often loses his effectiveness. As a man reaches his thirties, he has usually picked up a wife and family along the way and is humanly inclined to "play it safe".

2. Many of the accidents on this chart may have taken place the first time a particular pilot ever flew that particular *type* of plane. In this regard it is interesting to note that an older pilot is less likely to have as much experience in a new type of fighter or bomber than an officer in his mid twenties. This is because a new fighter or bomber has an operational life expectancy of, say, five years, before it is replaced with a more modern type. A pilot of 24 is flying every day. When he gets a new type of plane, therefore, he masters it quickly, not necessarily because of his age, but because he maintains proficiency by constant flying. But his commanding officer is probably an older man—over thirty. He doesn't fly every day. Many of his duties keep him tied to a desk—and when the new type of plane is assigned to his squadron, or wing, he may give it a whirl on a "my-boys-are-flying-it-I'm-going-to-fly-it" basis but he doesn't earn his bread and butter day after day in the cockpit. His accident *rate* therefore will probably be higher.

Here again age is not necessarily the determining factor.

Oddly enough it is at the under 22 end of the graph that the evidence is most significant. These accident rate figures were largely responsible for the discontinuation of the teenage cadet program.

Father Time's

CHECK LIST
for Aging Fighter Pilots

☐ 1. Desire for jet duties

☐ 2. Speed of reactions

☐ 3. Excellence of visual acuity

☐ 4. Effect of rapid descents on ears

☐ 5. High speed instrument flight proficiency

☐ 6. Oxygen use competence

☐ 7. Complete lack of air sickness during aerobatics

☐ 8. Ability to withstand high G forces

☐ 9. Resistance to bends

☐ 10. Keenness for aerobatics

HOW OLD? CONTINUED

(Continued from page 32)

Navy Bureau of Medicine had made extensive studies on this complex question. Each study brought virtually the same conclusion: "It is very difficult, if not impossible to establish a reliable yardstick in determining optimum ages."

But this was no help to the Cadet program people. The Surgeon General's staff, therefore, approached the problem in more general terms. After a certain age, they reasoned, the "law of diminishing returns" begins to set in. After 35, for example, early signs of cardio-vascular degenerative diseases appear more frequently, twenty-twenty vision is likely to fade, speed of reactions will probably slow down. In other words, a fighter pilot after the age of 30 and a bomber pilot who has passed 35 cannot, *in a statistical sense* be counted on for active duty.

A certain parallel can be drawn here between the utilization of aging pilots and the utilization of aging aircraft. The Air Force "writes off" a C-54 after it has logged 14,000 hours. The Navy writes off a C-54 when it has logged 8,000 hours. By definition, "writing off" does not mean that the crew chief takes his .45 and mercifully puts a bullet through a cylinder head. It *does* mean that procurement planners see to it that for each plane as it passes the write-off age, there is a new craft off the assembly line ready to take its place. However, as long as the old plane continues to function satisfactorirly in its assigned mission, it will probably not be withdrawn.

The above parallel is not perfect. A plane does not gather "experience" as it grows older. When a plane is through flying there is nothing ahead but the spart parts pile; when a pilot is through flying, there is always a desk. Whether from a policy point of view a 35-year-old lieutenant colonel, for example, is more valuable at a desk than in a cockpit is a question in itself.

What must be emphasized here is the fact that the older pilot with the higher rank *does* carry command responsibilities and when he leads his flight on an important mission his value lies more in his qualities of leadership than in his sheer flying efficiency.

If you're pushing 30, check yourself on the list to the left. Assuming you are operational and not desk-tied, here is the Surgeon General's answer to "How old can you jet?" Pass this and you can fly at 50. Fail it and you're washed up at 22.

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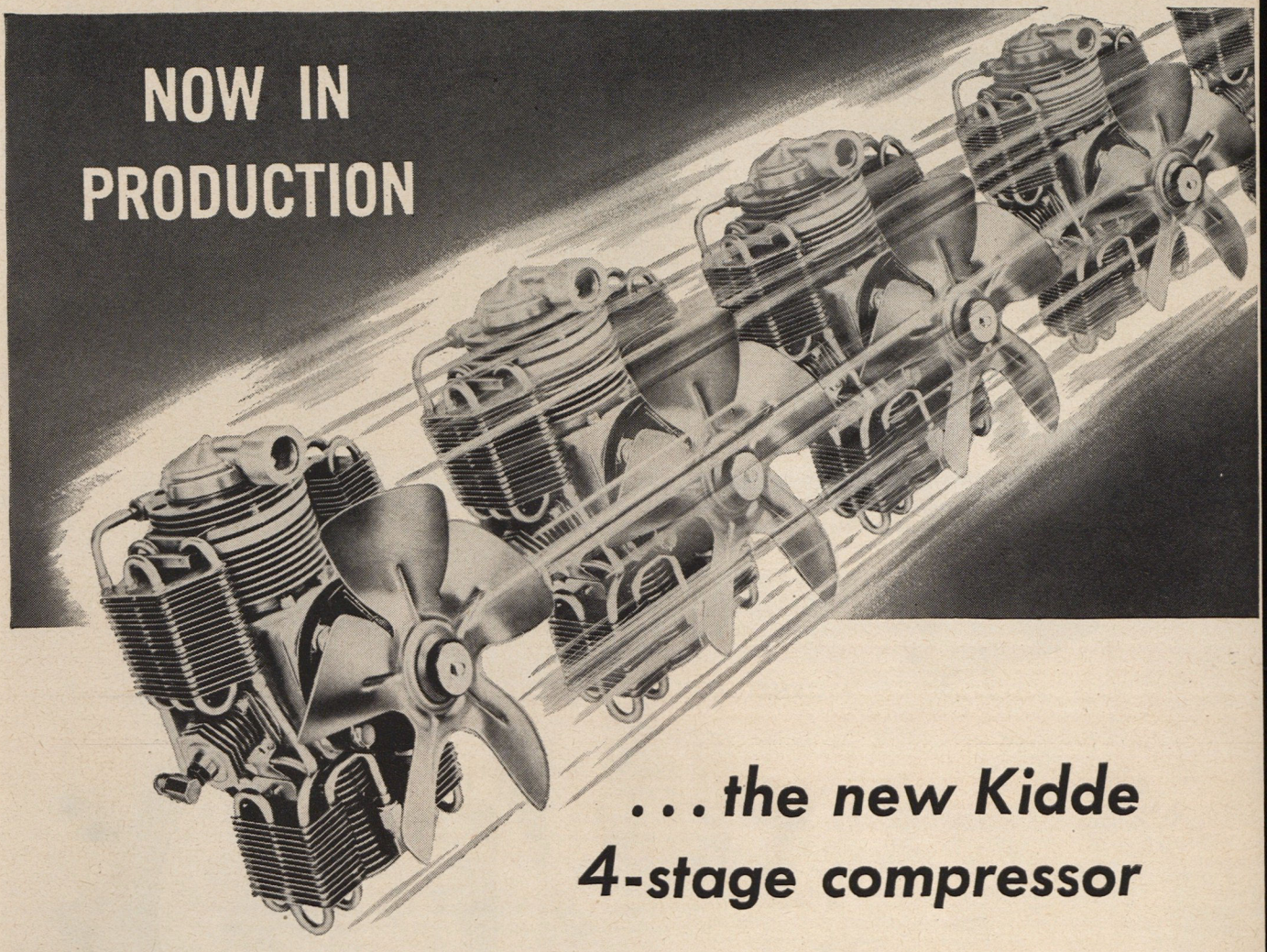

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SQUEEZING THE PROP

Korea proved a number of things: among them the undisputable fact that the conventional airplane propeller is far from obsolete. For virtually every purpose other than pursuit or high-speed bombing, the plain airscrew has great virtue as a means of moving aircraft. For that reason, the new process announced by the Propeller Division of Curtiss-Wright for making steel propeller blades by the hot-extrusion process is of great military importance.

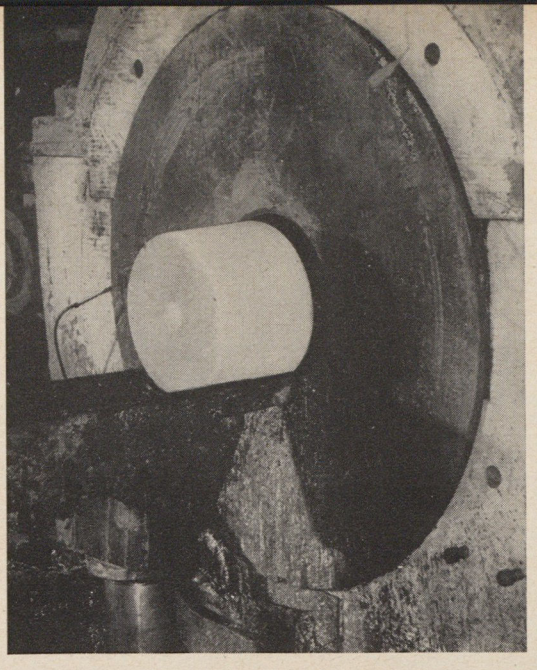
Until recently, steel propeller blades were made by welding together, brazing and forming two flat steel plates. The process was slow, expensive and still subject to a certain degree of mechanical imperfection. It has been conceded for many years that the ideal process for making hollow steel blades would be to make them out of a single billet of steel, somehow molded to the correct internal and external shape. To achieve this result, a method for extruding steel prepeller blades was developed by the Air Force Development Center at Adrian, Mich., in co-operation with Curtiss-Wright, as a joint AMC-Industry operation.

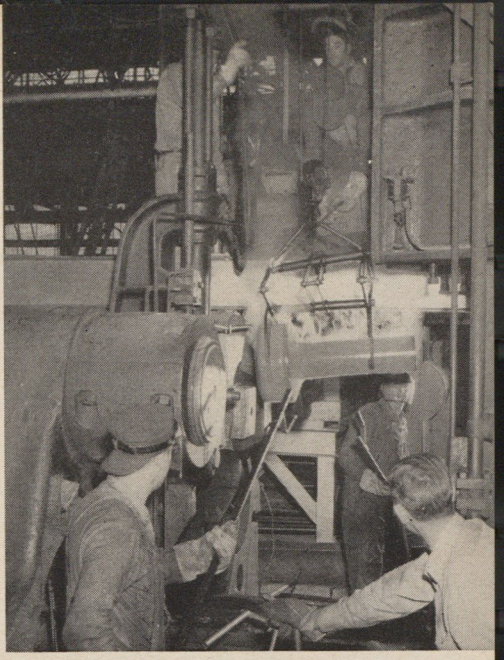
Extrusion is the art of forming material by forcing it through a die. The commonest form of extrusion is forcing toothpaste or shaving cream out of a tube. For over a quarter of a century, simple extrusions have been made, either hot or cold, usually from light metals. However, extruding a shape that has to be finished into as complex and sophisticated a shape as a modern airplane propeller blade is a more difficult matter. The shank of a modern propeller blade, for example, must, in some models, take a stress equal to the weight of sixty medium-sized automobiles. Still, the inside of the blade must taper in thickness over the complete length of the blade, while retaining an amount of properly-placed metal to form the leading and trailing edges of the blade.

The extrusion process begins with a 400 lb. chrome-nickel-molydenum billet, which is made white hot in a salt bath. It is passed through three sets of appropriate dies, until it comes out an internally-tapered tube with a set of "ears" or ridges running from tip to shank 180 degrees opposite on the circumference of the tube. In subsequent operations, this tube is flattened and shaped, and the "ears" become the leading and trailing edges of the propeller. The blade is then surfaced and finished in the conventional manner.

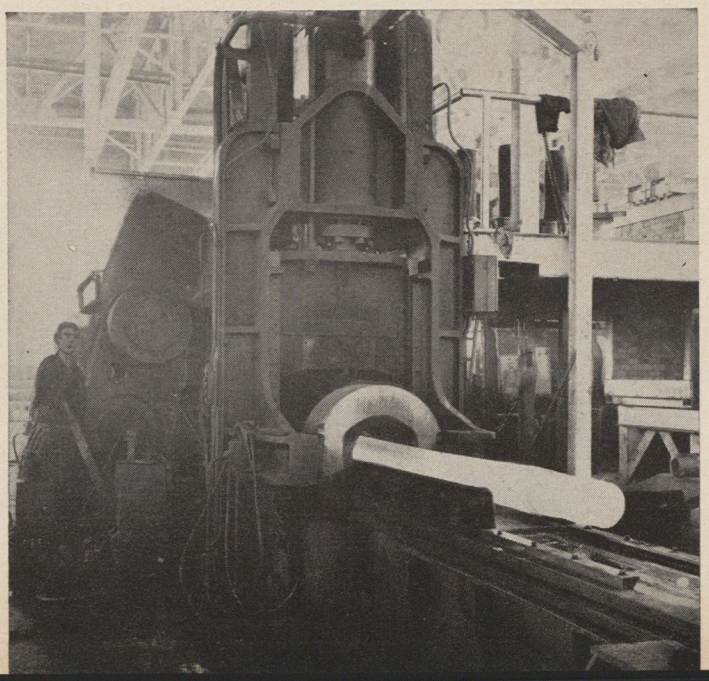
While exact figures on the economy effected by the use of this process have not been officially released, one hint can be taken from the fact that to form a 200 lb. ten-foot blade by the new process takes a 400 lb. original billet. By the old process, two specially-processed steel slabs weighing 750 lbs. had to be used. Any conversion process in steel is likely to take place in proportion to the weight of metal removed. This indicates a saving of about 50%.

Possible applications of this new extrusion process, both Curtiss-Wright and the Air Force admit, goes far beyond that of propellers or even that of the airplane industry. Parts vital to our war needs, such as landing gear struts, helicopter masts, drive shafts, gun barrels, tank and ship parts and prefabricated members of bridges and towers can be made by this process, simpler, faster and cheaper than by older processes of casting, forging and machining.





The white-hot billet, left is being set into the die container for the first part of the extrusion operation. Right, partially-formed billet is reheated for the second step.

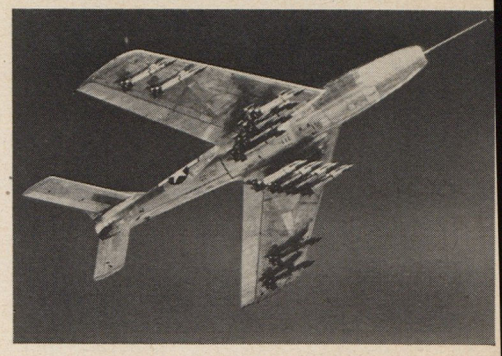


Shank end first, a white-hot propeller blade emerges from the press on the third and final operation. It will be transformed into a finished blade by flattening and forming in a die form.

TECHNIQUE PIX

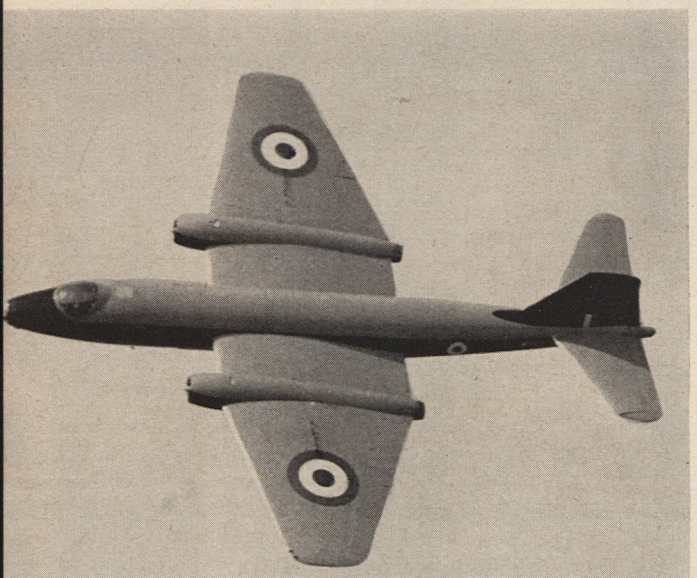
Wolf Fur from Nylon

With the USAF's emphasis on cold weather operation, the problem of keeping warm is of more than passing interest. Natural fur for Arctic clothing is hard to get and very expensive. Air Materiel Command, in cooperation with the George W. Borg Corporation have come up with a shiny nylon pelt which bears a startling resemblance to natural wolf and is every bit as warm. Examining the experimental pelt, left, are Brig. Gen. Frederick R. Dent, Jr., chief of AMC's Engineering Division, and Donald B. Huxley, chief of the Aero Medical Laboratory Clothing Branch. After further tests at Wright-Patterson AFB, the pelt will replace natural fur.



F-84F Gets Testing

Republic's latest Thunderjet, the F-84F, nearly ready for production, is shown above as it underwent extensive flight tests at Edwards AFB. The Air Force has ordered large numbers of the new fighter-bomber which can carry more armament than its predecessors. It has a swept-wing configuration and was designed for long range, high speed operations.

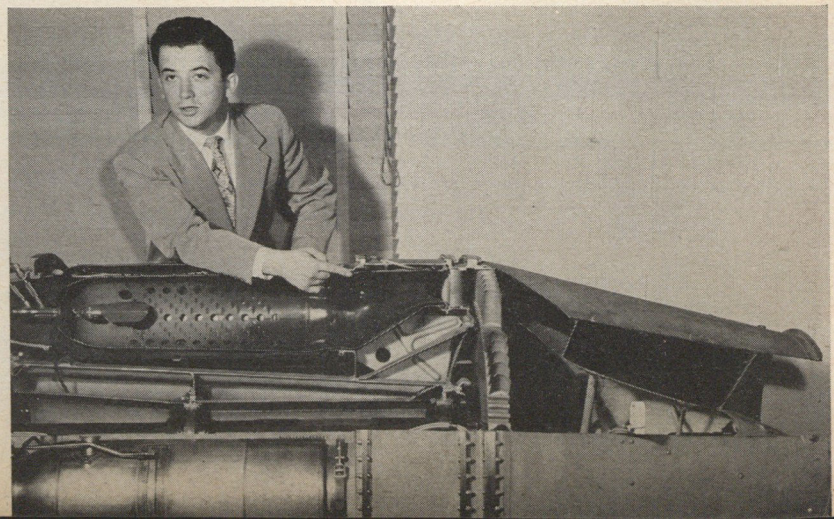


Martin to Make British Canberra

A simultaneous announcement from London and Washington revealed recently that USAF's Air Materiel Command has been directed to order the Glenn L. Martin Company to build an undisclosed number of the new British Canberra, a twin-jet light bomber. The Martin version will be a night intruder model. In connection with this event the plane was demonstrated to Martin personnel, left, by Wing Commander Roland P. Beamont, chief test pilot of the English Electric Company. Beamont performed a series of fast climbs, slow rolls, chandelles, swift fly-bys, extremely slow turns and other maneuvers to the approval of the people who will be concerned with designing and building the USAF version of the airplane. Although no official date has been released, Martin is expected to go into production soon.

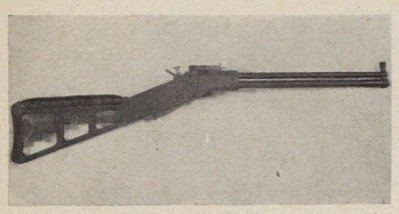
Afterburning With No Afterburner

AMC's Power Plant Laboratory has come up with a method for retaining all the effects of afterburning without its disadvantages in weight and size. The new device calls for the injection of fuel just *ahead* of the turbine. Delay in ignition causes explosion just *behind* wheel.



Testing at -65F

In a room at Wright Field equipment is tested at temperatures ranging from 160 above to 65 below. Temperatures as low as 100 below have been encountered in actual operations and may soon go lower.

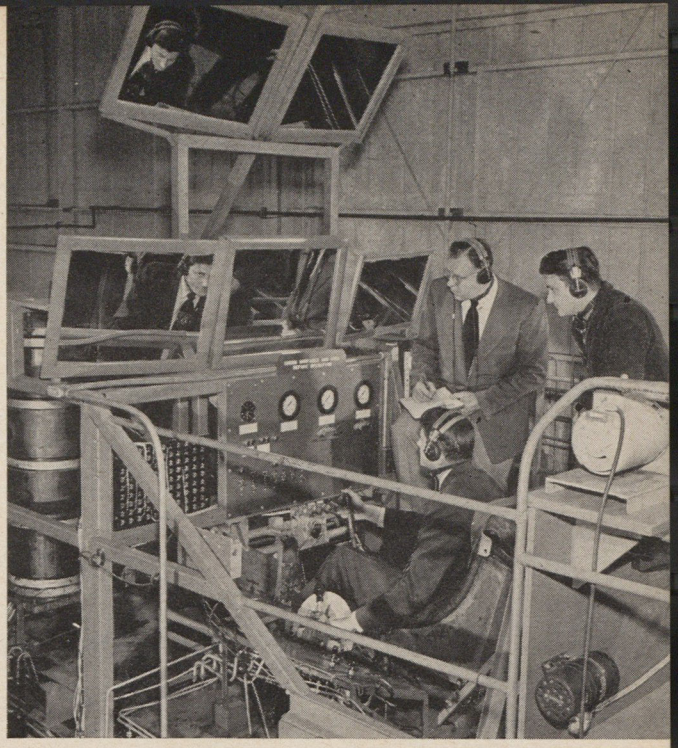


Rifle-Shotgun

This new combination over-and-under rifle, shotgun was developed by Army Ordnance for the Air Force and will be used in USAF survival kits. The weapon is a combination .22 calibre rifle and .410 gauge shotgun. It folds at the stock and can be carried easily.

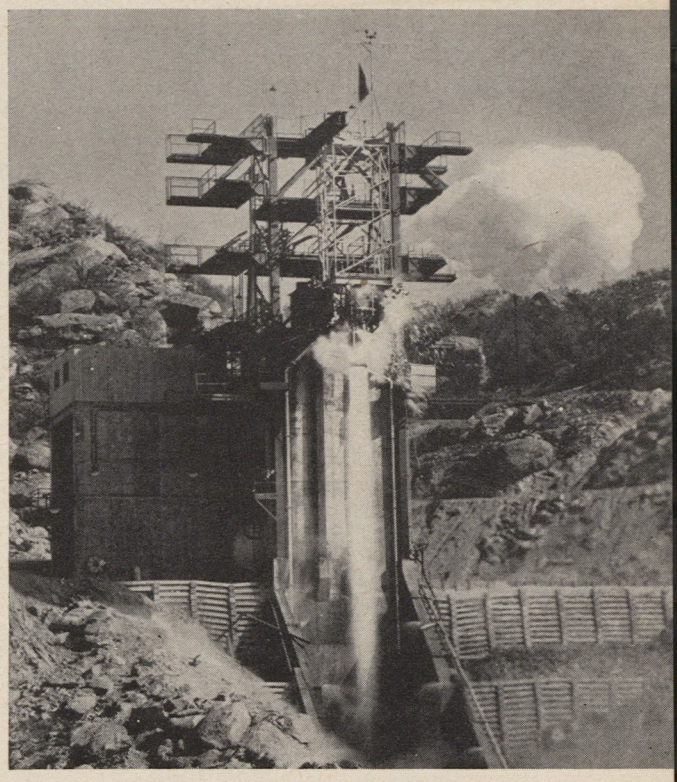
F-89's "Iron Ike"

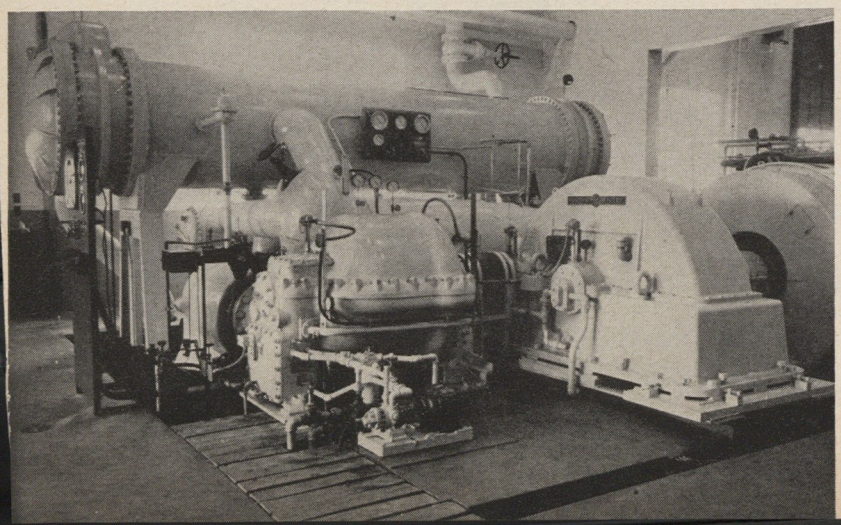
The impressive looking test stand, right, is known as "Iron Ike" around the Northrop Aircraft plant in California. From this landbound cockpit, Northrop engineers "fly" their F-89 Scorpion on simulated missions. The mirrors enable the man at the stick to follow movements of controls and the actions of other members of the test crew. Throat mikes and headphones enable crew members to coordinate. No effort was made to simulate the instrument panel of the F-89. The instruments shown are only those essential to the operation of the stand itself. "Iron Ike" is an insatiably active gatherer of flight data, a great time saver, and a valuable man to have around.



Testing Rockets

Built into the side of one of the peaks of the Santa Susana Mountains north of Los Angeles, North American Aviation's Aerophysics Field Laboratory has constructed this static test stand in conjunction with its guided missile program. This is the place where rocket power is measured, for the rocket engines which will drive the guided missile of tomorrow will have to develop many thousands of pounds of thrust. The stand, right, is a static one. The engines never leave it. A test stand of this type is proving of great value not only in its ability to measure thrust, but as a guide to fuel consumption rate, and as an instrument to test the ability of materials to stand up under the terrific heat and pressure requirements. It can also be used in testing the efficiency of various rocket fuels, lubricants and various types of engine installations.



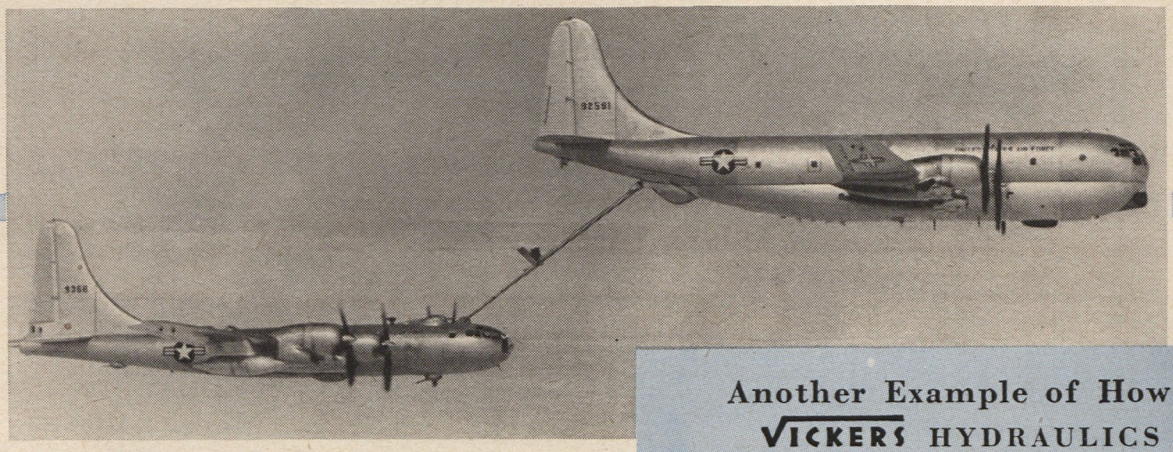


World's Largest Cooler

A new 3,900 horsepower single compressor cooler, left, largest in the world, has made it possible for the three wind tunnels at Wright-Patterson AFB to operate for longer periods than heretofore possible. Because these wind tunnels are of the closed circuit variety, the circulating fans generate tremendous heat and the tunnels themselves must be refrigerated. The cooling agent is 24,000 tons of brine at −40F. The engine can drop the temperature of the brine from 120 degrees to 40 below in less than 19 hours, thus increasing operation time of the whole installation.

Boeing Aerial Tanker delivers fuel twice as fast with weight saving of 550 lb.

Uses New Refueling Pump driven by VICKERS HYDRAULIC MOTOR



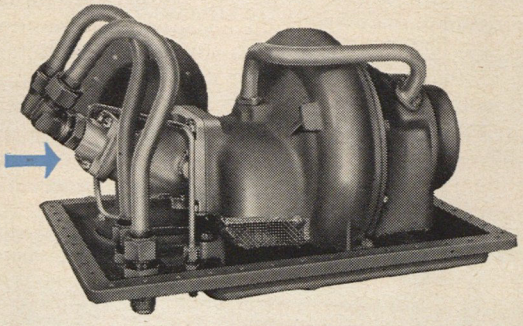
A significant advancement in in-flight refueling has been made possible by a new hydraulically driven fuel transfer pump (shown at the right). On the Boeing KC-97A Stratofreighter aerial tanker, two of these replaced 16 electrically driven pumps and deliver almost twice as much fuel per minute. The weight reduction was 550 lb. with an important saving in space. Totally submerged in the fuel tank, this new pump eliminates trouble from vapor lock . . . serious at high altitudes.

Vickers Hydraulic drives are also used for the accurate control required in guiding the fuel transfer boom. These hydraulic drives, powered from the engines, greatly reduce the tanker's electrical power requirements. Vickers builds the most complete line of hydraulic equipment for aircraft. Ask for new Bulletin A-5200.

Another Example of How VICKERS HYDRAULICS

1 IMPROVES PERFORMANCE

2 SAVES WEIGHT AND SPACE



New refueling pump, designed under supervision of US Air Forces, Air Materiel Command and built by Nash Engineering Co. Arrow points to Vickers Hydraulic Motor (Piston Type—Constant Displacement) directly coupled to pump drive-shaft. Entire unit is completely submerged in fuel tank.

4483

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DIVISION OF THE SPERRY CORPORATION

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

19 Service-type Air Guard Units Get EAD

All 1951 AF ROTC Graduates Will Be Ordered into Active Military Service, as U. S. Air Force Continues Current Expansion Program.

The Air Force will order 19 non-flying units of the Air National Guard, having a strength of approximately 10,000 officers and airmen, into active military service within the next nine months, USAF Headquarters announced recently.

The service-type units will include eleven Aircraft Control and Warning groups, five Signal Light Construction companies and three communications squadrons.

First of the units will be ordered into active service within two months and the remainder spaced over a seven-month period. Unit designations and future assignments cannot be disclosed for security reasons.

These units are in addition to the 22 fighter and light-bomber wings that have been previously announced as being scheduled for active military service. More than half of these wings are already on active service, and the remainder will be in service by the middle of April.

One Aircraft Control and Warning group of the Air National Guard has previously been ordered into active military service and was redesignated as a Tactical Control Group. The new plan orders into service the balance of the original 12 Aircraft Control and Warning groups of the Air Guard.

It is the present plan of the Air Force, acting under provisions of Public Law 599, to release Air National Guard units and personnel by the time they have completed 21 months service in the Air Force.

Under the school policy for alerted units, the AF Division of the National Guard Bureau is acting favorably on all requests for attendance by Air Guardsmen at the various specialist schools and at courses of the regular service schools provided these requests are received in time to permit arrangements for entry into classes prior to the date the unit officially enters active service. The school program for unalerted units is also to be continued.

Upon completion of the courses the Air Guardsmen will be returned to their units if possible even though the units may already have entered active service with the regular Air Force.

All Air Force Reserve Officer's Training Corps students graduating during 1951 will be ordered into active military service within 90 days of the date they are graduated and commissioned as second lieutenants in the Air Force Reserve. Approximately 8,100 officers will be affected including the January-February graduates and the May-June graduates from various service schools.

January-February appointees will be ordered into active duty within 90 to 120 days.

Those Air Force ROTC students who satisfy all prerequisites, and who are graduated in May-June, will be ordered into active military service as soon as practicable after their graduation and appointment.

Since AFROTC camp training has been discontinued until January 1, 1952, these students who are otherwise qualified will be appointed without camp training during this period, and will be ordered to active duty within 90 days after their appointment.

Air Force ROTC second lieutenants will be offered an opportunity to volunteer for flying training or for a limited number of training spaces at special one-year graduate courses in meteorology to be conducted at several of the country's leading colleges and universities. If selected for either program, they must agree to serve on active duty for three years after completion of their training.

The continued recall of the following categories of the Volunteer Air Reserve is authorized: (a) Mobilization designees; (b) Qualified second lieutenants required to meet technical school quotas; (c) Second lieutenants who are AROTC graduates; (d) Qualified officers to meet outstanding combat crew technical school quotas; (e) and qualified officers needed to meet any other special quotas allocated to ConAC from USAF Headquarters.

Company grade VAR officers holding either MOS 1035 (bombardier) or 1034 (navigator) interested in extended active duty with possibility of assignment to Strategic Air Command and further training to acquire MOS 1037 (bombardier-navigator) are invited to submit applications for service through appropriate ConAC numbered AF headquarters. Initial duty will be B-29 combat crew training school work; thereafter comes crew duty with SAC during which time the officers may demonstrate their qualifications for additional training at Mather AF Base, Calif.

Several hundred VAR pilots with 1000 hours of flying time or more will be ordered to active duty in the coming months. Particularly sought are men with considerable experience in B-29, B-26, and C-54 aircraft, as well as single-engine and jet fighter pilots.

Under current plans, no further orders will be issued to effect the involuntary entry into the active military service of airmen of the Volunteer Air Reserve.

Thousands of Organized Reserve airmen being recalled during April and May will not be sent directly overseas, but initially will be assigned to a Zone of Interior station for duty until they have demonstrated proficiency in their AF specialty code. Officers fully qualified in their MOS may be given immediate overseas assignments, depending on the needs of the Air Force.

The bar against immediate overseas duty applies to enlisted members of the 21 recalled AFROTC wings, numerous corollary units, and mobilization assignees and designees.

For practical purposes age-in-grade limitations as outlined in AF Regulation 45-5 are still in effect; however, limitations have been lifted on Mobilization Assignees and Designees.

Women of the Air Force who are members of reserve units going to duty as units will be ordered to active duty along with other airmen and officers of the organization. It is contemplated that they will be reassigned to other outfits in the AF within six months thereafter, since the assignment of all WAF personnel is controlled at USAF Headquarters.

Many inquiries concerning the recall of Air Reservists to active duty have flooded AFA's Personal Service Department during the past few months. As a service to other readers who might have similar problems AIR FORCE Magazine once again reports the answers as furnished by Headquarters, USAF:

Q. I received my commission as a second lieutenant after relief from active duty. I have been told that if I am called to active duty, my date of rank starts from the first day I go on EAD, and all the work I did in the Reserve doesn't count at all toward my promotion to first lieutenant.

A. National Defense Act of 1916, as amended, states that date of rank of Reserve officers reordered to active duty will be predated by any active duty they may have performed in the grade in which ordered to duty or any higher grade.

Q. Do you have any information at this time as to whether or not airmen Reservists called to active duty for one year will be released in accordance with their present relief date?

A. USAF is actively studying the question of extending to 21 months the active duty period of those Reservist airmen recalled late last year for a 12 months tour. Authority for such extensions exists under Selective Service Act of 1948, but no decision as to applying it has been reached.

Q. Upon my request I was commissioned (2nd Lt.) in June '49, as Reserve officer in Medical Service Corps. At the end of current semester I shall have completed all requirements for the Doc-

(Continued on page 42)

torate except my research and dissertation. My plans are to continue my work as psychologist and also work on my doctoral thesis. Since I have furthered my experience as well as academic background since date of commission, what would be the chances for promotion?

A. You may apply for reappointment to higher grade in Reserve under AF Manual 36-5. Copies are available by writing AFA Headquarters.

Q. If recalled to active duty in the near future, will I be able to wear the World War II type uniform?

A. World War II type uniforms are authorized until July 1, 1952, at which time the new blues will be mandatory.

Q. How do physically-retired personnel fit into the current expansion plans of USAF?

A. Utilization of personnel retired for physical disabilities and active duty offers to individuals with minor physical disabilities cut adrift from the AF with severance pay do not fit into present AF recall plans. Individuals in this status were turned loose from service because of physical ailments judged to be 10, 20, or 30 per cent disabling and of a permanent nature. The AF has no legal hold on these men, since all commissions or enlisted warrants were surrendered, by law, at the time of separation.

USAFR Promotes Again

Authority to resume promotion consideration for Reserve officers not on extended active duty has been given to the major Air Force commands, Secretary of the Air Force Thomas K. Finletter announced recently.

Inactive duty promotions, except for second lieutenants, have been frozen since last summer when USAF Headquarters temporarily suspended such promotion authority pending the ordering of large numbers of Reserve officers to active duty. The action was taken at that time to permit a study of inactive duty Reserve rank as compared to that of officers, both Reserve and Regular, who have remained on extended active duty since the war, and to correct as far as possible any promotion inequities.

The study revealed that at that time more than 25 per cent of the Reserve officers on inactive duty were holding grades higher than the highest rank they achieved during World War II. At the same time a large majority of Reserve officers still on active duty, although having several more years of active service, were then serving in their World War II grades because of the limited postwar promotion possibilities.

With the completion of current promotion board action, it is believed that the schedule of active duty promotions effected since last summer will have accomplished this adjustment.

The new promotion program for inactive duty Reservists will not permit consideration of any Reserve officer who received a terminal leave promotion.

Promotions, except to the grade of first lieutenant, will be made only to fill unit vacancies.

Eligibility consideration will be determined as follows:

a. For promotion to first lieutenant, 70 points while in grade of 2nd Lieut.

b. For promotion to captain, 105 points while in the grade of 1st Lieut.

c. For promotion to major, 175 points while in the grade of captain.

d. For promotion to lieutenant colonel, 105 points while in the grade of major.

e. For promotion to colonel, 140 points while in the grade of lieutenant colonel.

f. Minimum period of service-in-grade as follows:

2nd Lieut to 1st Lieut	2 years
1st Lieut to Captain	3 years
Captain to major	5 years
Major to Lt. Col.	3 years
Lt. Col. to Colonel	4 years

Points may be obtained by inactive duty training, temporary active duty training and by correspondence course study.

New OCS Requirements

Air Force Secretary Thomas K. Finletter announced recently that applications to U. S. Air Force Officers Candidate Schools will be restricted to the following:

1. Airmen on active duty
2. Personnel in Air Reserve or Air National Guard units
3. Female civilians or enlisted members of the WAF

Under the new policy, no applications for OCS will be accepted from male civilians. Heretofore, qualified civilians wishing to pursue the Officers Candidate Course could apply for and enter such training directly from civilian life.

Applicants for OCS must now be in the categories enumerated and if unable to complete the prescribed courses satisfactorily will be returned to the enlisted rank held prior to entering OCS.

The new restrictions do not apply to those civilians whose applications have already been received and acknowledged. Personnel in this category may enter prescribed classes.

The Volunteer Air Reservist finally got a break as six VAR officers from the Chicago area won dates for the evening as their reward for taking part in Arlene Francis' ABC-TV "Blind Date" program staged in Chicago recently. Left to right, Joyce Morton, Lt. Ivan Kincheloe, Norma Waite, Lt. Jim Smith, Lt. Robert Fisher, Pinky Parker, TV star Arlene Francis, Shirley Talbott, Capt. Perry Brank, Elaine Stewart, Lt. Dante Ferrara, Carolyne Collins, Maj. Donald Norris. Capt. Brand arranged for the officers' appearance on the program.

USAF Cadets Must Enlist

Prospective U. S. Air Force aviation cadets will be enlisted in the USAF before assignment to cadet training under a new policy announced recently.

The change, effective immediately, requires enlistment for a four-year period and will affect cadets appointed from civilian life who may be eliminated for academic reasons or flying deficiency prior to completion of training. Until now, those individuals were given the opportunity to accept discharge from the service to return to civilian life, in contrast to cadets selected from airmen ranks who were returned to their former duty and assignments.

Enlistments will be made in the grade of private, unless the individual has acquired specialized skills, which under existing Air Force regulations, qualify him for enlistment in a higher grade. Regardless of the grade, the individual will be appointed an aviation cadet when he enters into flying training.

Under the new policy, all eliminated cadets will revert to airman status.

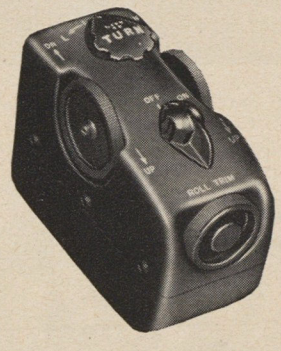
THE COLLIER TROPHY

Aviation's Highest Award...

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

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

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



LEAR INC. GRAND RAPIDS, MICHIGAN • LOS ANGELES, CALIFORNIA • ELYRIA, OHIO

AFA's Fifth Anniversary Marked in Toledo

Ed Sullivan joins AFA, USAF, CAP and city officials in day-long commemorative program arranged by the Joe E. Brown AFA Sq

Above, Mrs. Anna Brown cuts AFA's fifth anniversary cake as Ed Sullivan, left, and Toledo Sqdn. Cmdr. Larry Hastings look on. Below, Mr. Sullivan, center, is shown with Squadron members and Lincoln-Mercury dealers after AFA Unit presented him with an engraved AFA lighter during ceremony at AFA cocktail party.

Ed Sullivan, famous master of ceremonies and co-producer of the Toast of the Town radio and television show, recently joined with the Toledo (Joe E. Brown) Squadron in celebration of the fifth anniversary of the Air Force Association.

On a recent visit to Toledo, Mr. Sullivan presented Mrs. Anna Brown, mother of Joe E. Brown, a corsage on behalf of AFA; and she cut a big, decorated cake, celebrating AFA's anniversary at a ceremony on the stage of the Toledo Civic Auditorium. The well-known producer was featured guest at an AFA cocktail party and banquet held later in the day at Toledo's Secor Hotel.

Mr. Sullivan was met at the Ohio State Line by a delegation including AFA, USAF, CAP, and city officials. During Mayor Czelusta's reception at City Hall, Mr. Sullivan turned over to the Mayor a new Mercury station wagon for Associated Charities of Toledo, with the compliments of Toledo Lincoln-Mercury Dealers Ass'n.

Activities of the day were arranged by Toledo Squadron Commander, Larry G. Hastings, 28 West Delaware Avenue, Toledo, Ohio, and included a visit to the local U. S. Air Force Recruiting Station.

Illinois AFA Wing Holds Convention in Chicago

Dr. Harvard L. Hull, director of Remote Control Engineering Division, Argonne Laboratory, was principal speaker at the Airpower Luncheon recently staged at first convention of the Illinois AFA Wing in the Congress Hotel, Chicago.

Other luncheon speakers included Col. John S. Gulledge, commanding officer of 441st Troop Carrier Wing; Col. Victor H. Strahm, commanding officer of O'Hare Field, Chicago; and Ray Ireland, Regional Vice-President of AFA for Great Lakes.

A new note in interstate AFA relationship was the presence of the AFA Michigan Wing Officers at the convention.

Morry Worshill, 2054 Hood Avenue, Chicago, was elected Chicago AFA Wing Commander, for the coming year. Other Wing officers selected were: Robert Ryan, Deputy Wing Commander; Will H. Bergstrom, secretary; and Gertrude Pastryk, treasurer.

The election of officers was followed by an address by Ralph Whitener, Organizational Director of AFA, and a mobilization forum conducted by Captain Bill Rogers and Lt. Jerry Eakle, of the Information Division, Office of Special Assistant to Chief of Staff, USAF, for Reserve Forces.

158 USAF Volunteers take enlistment oath at impressive ceremony under sponsorship of Passaic-Bergen Squadron, AFA.

Passaic Bergen Squadron Honors 158 AF Enlistees

At the first such mass ceremony ever held in the New Jersey area, 158 enlistees in USAF were sworn into service recently at a special farewell luncheon arranged in their honor by the Military Manpower Committee of Paterson and the Passaic-Bergen Squadron of the Air Force Association.

The young men came from 54 different communities in Passaic and Bergen counties. They enlisted under the Passaic-Bergen Air Force Training Flight plan which allows them to take their basic training as a unit.

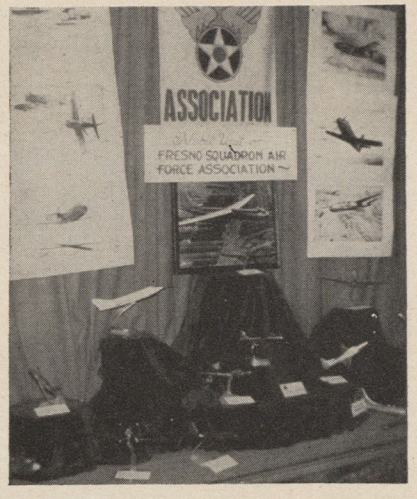
After the luncheon in the Alexander Hamilton Hotel, the volunteers left by bus for Newark and from there entrained for Texas where they will take their basic training.

Harry B. Haines, publisher of The Evening News, presided as master of ceremonies. Maj. Gen. Irving J. Phillipson, USA retired, was guest speaker, and Brig. Gen. Clyde Mitchell of ConAC gave the oath of enlistment.

Among the honor guests were John J. Currie, N. J. AFA Wing Commander; and Leo Sweeney, of AFA.

Col. Haviland, C. O., N. Y.-N. J. Recruiting District, extends congratulations to Leo E. Sweeney, Jr., vice-cmdr. of Passaic-Bergen Squadron, AFA, for the Squadron's part in the mass enlistment program. From left to right, John J. Currie, N. J. AFA Wing Cmdr.; Brig. Gen. C. Mitchell, ConAC; Haviland; Sweeney.

Honored guests at the Illinois Wing convention in Chicago included, left to right, Col. John Gulledge, C. O., 441st Troop Carrier Wg.; Ray Ireland, Vice-Pres., AFA Great Lakes region; Lt. Col. Donald Conard, Dep. C. O., O'Hare Field; Dr. H. L. Hull, Argonne, Labs.; Col. V. H. Strahm, C. O., O'Hare Field.



Models of AF and Navy planes battling in Korean skies are shown in a Fresno AFA Squadron exhibit in the San Joaquin Power Building, Fresno.

Lt. Col. Ernest C. Pruett, center, CO of the Exhibit Unit checks plans for a future display with two of his key non-coms, M/Sgt. George Ruby, left, and M/Sgt. Edward Stroble.

The Exhibit Unit's displays are not designed for "adults only." In above photo a group of Air Scouts watch a Unit airman operate the controls on a model of the B-36 bomber.

USAF WINGS ON WHEELS

Nothing pleases a taxpayer quite as much as seeing what he is paying for. This is especially so when it comes to defense spending. Since many taxpayers never get to visit Air Force installations, to see the people and the machines which make up this portion of our airpower, the United States Air Force Exhibit Unit, stationed at Dayton, Ohio, and San Bernardino, California, takes the Air Force to the public.

Realizing the great need for public understanding and support of airpower, the Air Force instituted this unique military group in 1945 and assigned it an air-age education mission.

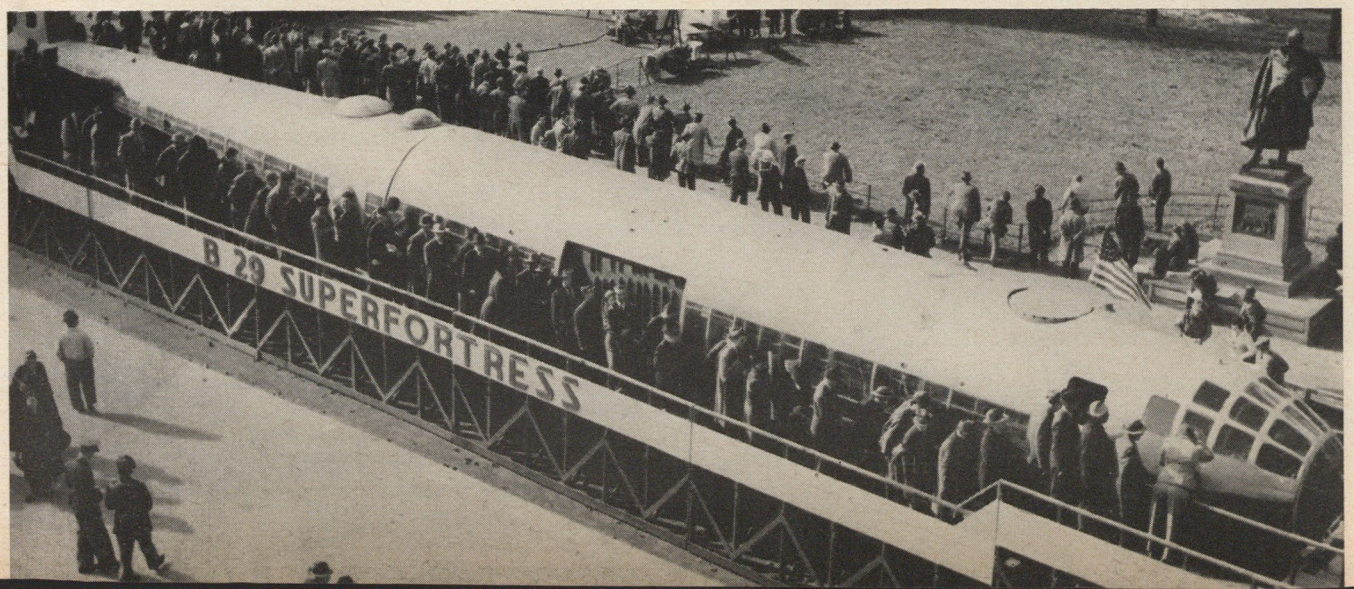
Over 25 million people have viewed the exhibits in the past five years. During 1950, more than 10 million persons inspected the displays, and the unit travelled approximately 345,640 vehicular miles. For 176 presentations in 39 states, the cost to the unit per spectator was only .4 cents—a most reasonably priced show ticket.

Lt. Col. Ernest C. Pruett commands the unit. His personnel consists of 18 officers, 248 airmen, and 14 civilians. Capt. Lee R. Gulley is the liaison officer between USAF Headquarters in Washington and the unit in the field.

Current "major" effort of the unit is a 4,000 mile tour of 40 cities in 13 southeastern states from March 15 to May 3. This Aircade—a special title—is the fourth such extended tour made by the unit. The key exhibits of this tour are fuselages of the B-29 and F-84, and cutaways of the J-35 jet and the R-2800 conventional engines.

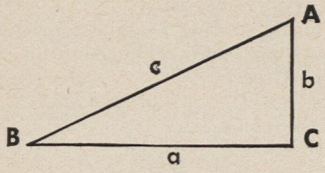
Arrangements for scheduling unit tours are usually made through the local Chambers of Commerce. Other community organizations frequently co-sponsor the unit's visit to the city. Air Force Association Squadrons, in particular, often assist in publicizing the tour and making arrangements. A typical AFA participation will take place in Beckley, West Virginia. The current Aircade is scheduled to hit Beckley on April 28-29. The Chamber of Commerce approved the exhibit and arranged for one of the main streets to be roped off to accommodate the display. The Beckley AFA Squadron will be in charge during the exhibition and will conduct the spectators through in groups, with Squadron member assigned to each group to answer questions.

Endless line of spectators, below, always congregates wherever the B-29 110-foot "Wingless Wonder" is on display.



LITTLE THINGS ARE IMPORTANT!

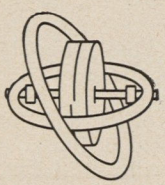
Arma Electrical Resolver



Making important things little is a militarily vital objective of the accelerated engineering activity which characterizes Arma. Making them little and interchangeable and more accurate...all at the same time.

An example of advancing miniaturizing accomplishment is the new lighter, more accurate and interchangeable Arma electrical resolver. This is one of the computing components that replaced a formidable aggregation of gears, bearings and slides previously used in fire-control equipment to solve the trigonometric functions. It is the "thinking" mechanism in modern military instrumentation which solves such gun-laying equations as $a = c \sin A = c \cos B$ instantaneously.

The mechanical resolvers of World War II have since given way to the electrical. Application of the new miniature Arma electrical resolvers to the needs of all the Services is widening as rapidly as accelerated engineering can push it. This is another way Arma engineers work to help make America safe against those who wish to destroy it.



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AFA STATE ROUNDUP

KENTUCKY

Covington: The Covington AFA Squadron has appointed a committee to contact Mr. L. Kays of the Airport Board to determine what room or space, if any, is available in the administration building for a lounge for servicemen and women at Greater Cincinnati Airport.

The lounge committee is composed of Paul Ammon, William C. Whitson and Harry J. Johnson.

Charles D. Walker, 42 East Orchard, Fort Mitchell, was recently elected commander of the Squadron.

MARYLAND

Baltimore: Mr. R. L. Daniels of Bendix Radio addressed a meeting of the Baltimore AFA Squadron at the Air National Guard Hangar, Harbor Field, on March 2.

The discussion by Mr. Daniels was also attended by pilots of the 104th Fighter Squadron of the Maryland Air National Guard.

John S. Warner, 19 Cedar Avenue, Towson 4, Md., is secretary-treasurer of the Squadron.

NEW JERSEY

Montclair: The Montclair-Essex Squadron, AFA, is now the sponsor of two Air Explorer Squadrons. Squadron No. 2 held its initial organization meeting recently at which 15 potential members were present. USAF movies were shown and officers elected.

Squadron No. 1 has been active with trips to New York, prominent guest speakers at their meetings and activities designed to advance the status of individual members within the Air Explorer framework.

Members of both Air Explorer squadrons have been invited to participate in a future three day encampment at Alpine Scout Camp, New York.

A recent special edition of the Montclair-Essex Squadron Newsletter was devoted entirely to the Explorer Squadrons and their activities.

The AFA Squadron meets the third Monday of each month at 8 Highmont Terrance, Montclair, N. J.

OHIO

Cleveland: A venison dinner was held by the Cuyahoga Founders Squadron, AFA, at Harry's Restaurant, recently.

After the dinner, a feature movie starring Douglas Fairbanks, Jr., and Elizabeth Bergner was presented. The name of the presentation was "Catherine the Great."

The Squadron meets the second Tuesday of each month at 8:30 p.m. in Allerton Hotel, Cleveland.

PENNSYLVANIA

State College: The Nittany Squadron, AFA, is now editing a squadron "Newsletter" and will forward it to all of their members on active duty with USAF as a means of keeping them informed of everyone's whereabouts, according to Leonard A. Work, 804 Allen Street, commander of the Squadron.

Col. George Haller, Dean of Physics at State College, gave a talk concerning his recent inspection of all USAF Guided Missile installations at a recent meeting of the Squadron.

TENNESSEE

Memphis: Unique in the history of the Air Force Association, the Memphis All Life Member Squadron was chartered at a recent meeting. It is AFA's first.

The twenty-one charter life members of the Squadron are: Everett R. Cook, Thomas H. Baker, Ceylon B. Brazer, J. Graham Short, Joseph Wade, Jr., Henry Halle, Jr., Reid Bondurant, James C. Haverty, Robert Haverty, Swayne Latham, Sidney W. Farnsworth, R. Vance Vonfleet, A. E. Hohenberg, Edward W. Cook, H. Price Curd, Willis W. Mitchell, Pietro Crespi, R. R. Snowden, William W. Goodman and Thomas J. Semmes. All members reside in Memphis.

Everett R. Cook, 84 South Front Street, is commander of the Squadron.

Life member dues are $100.

●A famous general of the U.S. armed services recently said, "When an airplane is sitting on the ground, it's going to waste."

This applies to commercial air transports as well as to military aircraft. And today, when *all* aircraft are vitally needed to help sustain our fighting forces overseas and our defense drive at home, Douglas is making every effort to keep more airplanes in the air more hours.

Much of this effort consists of manufacturing and delivering spare parts. For, under stepped-up flying hours, aircraft parts need replacement more often. Without them the plane is "going to waste."

Supplying tons of spare parts every month for aircraft in all parts of the world is just one segment of the vast Douglas operation. In addition to the many aircraft models currently coming off the production lines, Douglas engineers and research experts have under development advanced types of aircraft, guided missiles and electronic equipment.

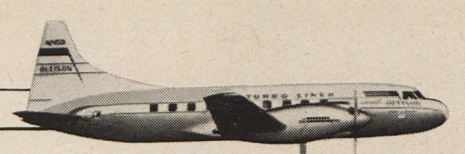
Depend on

DOUGLAS

Skilled engineers and technicians find Douglas a good place to work!

WORLD'S LARGEST BUILDER OF AIRCRAFT FOR 30 YEARS ➤ MILITARY AND COMMERCIAL TRANSPORTS
FIGHTERS ➤ ATTACK PLANES ➤ BOMBERS ➤ GUIDED MISSILES ➤ ELECTRONIC EQUIPMENT ➤ RESEARCH

PUSH-BUTTON SELF-STARTER FOR THE FIRST U. S. TURBOPROP TRANSPORT



ANOTHER AIRESEARCH FIRST!

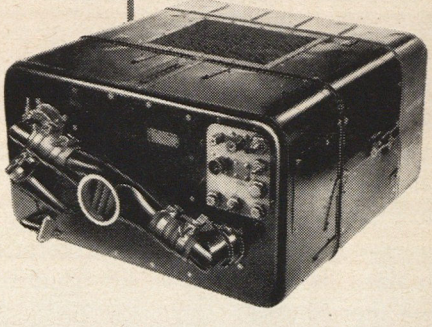
A flick of the switch . . . a 2750 hp Allison 501 engine roars into action. Seconds later a twin 501 is fired . . . and America's first turboprop airliner is ready for takeoff.

It's the Convair Turboliner purchased by Allison Division of General Motors to demonstrate turboprop engines in air transports. This is the first turbine powered airliner in the world able to start its own engines an unlimited number of times.

This self-starting system was pioneered by AiResearch, working with the Navy Bureau of Aeronautics. A low pressure pneumatic system, it consists basically of a small gas turbine the size of a hand valise and two small air turbine starters. It is the only self-contained, continuous self-starting system for turboprop and turbojet engines light enough to be airborne!

Development of the AiResearch low pressure pneumatic power system was begun six years ago. It is also being used on the Navy Convair XP5Y turboprop flying boat and the Navy Douglas A2D turboprop dive bomber now in production.

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



AiResearch lightweight gas turbine

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• AiResearch — Specialists in the design and manufacture of equipment involving the use of high-speed wheels — is a leader in the following major categories:

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AiResearch Manufacturing Company, Dept. L-4, Los Angeles 45, California

cow and the doughboy in a foxhole in Berlin—the battle for command of the air.

Our ability to win this battle and properly support our troops can be gauged not by looking down and counting our doughboys on the ground, but only by looking up and counting the Russian planes in the air.

Most of the principals in the "great debate" have finally concluded that it is useless to attempt to match the Russian ground army, man for man. That is rather an obvious deduction, but still a sign of progress. In counting our airpower needs, however, our leaders are left with no alternative. They must out match Russia in numbers of modern planes, and must build aircraft toward that goal.

The current furor over how many divisions for Europe, from a military standpoint at least, is not the primary point to be argued. Whether we send 4 or 400 divisions to Europe, we must first build and maintain air strength capable of mastering the air strength of Russia. Without this mastery, Western Europe becomes a huge trap for our soldiers and for the soldiers of all the free nations. Without it, our mobilization efforts and mobilization dollars will be wasted.

In our preparation for the battle to command the air we can find little refuge in our stockpile of planes in storage from World War II. Only a few of the light bombers now in mothballs might be utilized in this battle, and they will not be adequate much longer. This part of the airpower job calls primarily for fighter aircraft, and the thousands of reciprocating fighters we have in mothballs will be useless. This will be a job for jets—because Russia has them by the thousands.

An evaluation of our position in an air battle for Western Europe must begin with a comparison of our jet fighter strength and that of Russia. We can eliminate from the figuring our jet fighters which must be held in Korea or in other parts of the world, depending on the situation of the moment, and those we must hold in North America for the air defense of our homeland. And we cannot depend, for several years at least, on other nations of the Atlantic Pact providing us with many jet fighters for the air battle. The few jets our Allies will be able to produce, even under the best conditions, will be sorely needed for their own local air defense. Great Britain especially will need all the jets she can produce, and then some, for the defense of her own shores, within which lies some of the free world's most important air bases.

There are many other factors, of course. Quality of equipment and quality of manpower are two important ones, and in neither of these categories should we sell Russia short. As the engineering battle rages today behind the scenes for command of the air, we can find little solace in the knowledge that Russia is building her jet fighter fleet with the help of and from the designs of some of the world's greatest fighter plane experts—the German scientists and technicians she obtained as booty from World War II. They put the first combat jets in the air and in 1944 were at least five years ahead of the rest of the world in jet fighter development. Perhaps we have overcome this technological lead, but it would be faulty military thinking of the first order to depend and plan on it. As for the Russian airmen, we know enough about them to judge them with respect; our superiority in this field, if one exists, must not be over-emphasized in our planning. All in all, we can presume —but not count too heavily on—a qualitative edge in this battle for command of the air, and this is more than outweighed by Russia's vast quantitative superiority.

The problem resolves itself, of course, on the production lines of America. Here it becomes evident that as a nation we are not taking our own best advice or even meeting our own production programs, much less matching Russia's output.

With the billions appropriated for the military, it is hard to believe that we are not building an Air Force of the strength recommended as far back as 1948 by the President's Air Policy (Finletter) Commission as a *minimum* requirement for "Survival in the Air Age." It is even harder to believe when we realize that this committee's report preceded evidence of Russia's atomic developments, the Berlin Airlift and the war in Korea. And yet, the fact is that we are not measuring up even to this "survival" program.

True, it has been announced that we are shooting for a 95 group Air Force by the end of 1952. And the President has announced that we will increase our aircraft production five times by the end of 1951. But let us weigh announced production objectives against production line facts.

(Continued on page 52)

AIRPOWER ODDS CONTD.

Jet engines are the key to our airpower production effort. Shortly after the President's announcement, a leading engine manufacturer stated bluntly that we could do no better than triple our aircraft production by the end of 1951. At the current rate of expansion programming, we will be fortunate to achieve two and a half times the production rate in 1951, and again in 1952.

Our 95 group program is moving slower than planned. We cannot possibly realize it by mid-1952. And even if we could, this program would not equal in numbers of planes or in sustained striking power the 70 group Air Force recommended by the Finletter Commission. The reason, of course, is that the Commission's program calls for sizable aircraft and manpower reserve—all told, an Air Force totaling 97 groups, including 27 in the Air National Guard, all "equipped, trained and ready for immediate action in the event of war," plus 34 "adequately equipped" groups in the Air Force Reserve. The 95 group program, which will absorb virtually all organized Air Reserve and Air Guard Groups available, obviously does not call for such reserve strength.

By pulling planes out of mothballs we would have enough aircraft to equip, in numbers, a 95 group Air Force by the end of 1952. But this would be providing an Air Force half equipped with obsolescent planes. And we would still be faced with the basic problem of providing by that time sufficient trained personnel.

In terms of the modern planes needed to match Russia in the air—the only terms worthy of consideration—we are building the equivalent of a 50 group Air Force through 1952.

What are our airpower production needs? To meet the Finletter Commission's "survival" recommendations—more than double the estimated number of aircraft that will be produced for the Air Force this year. To meet the requirements of the 95 group program—more than triple the estimated number of aircraft to be produced for the Air Force this year. To meet the requirements of an air battle with Russia is another story.

But this is the only story that holds the key to command of the air and, therefore, to the defense of Western Europe. And it is the only story that counts for our ground troops who, however brave, as Russia learned at Stalingrad, "are helpless without air protection."

(Continued on page 59)

Sperry Gyrosyn Compass

now provides stable directional indications for the U. S. Air Force's Republic *Thunderjet* . . . as it has been doing for other military aircraft. In the commercial field, the DC-6 is one of the many type aircraft on which the Gyrosyn* has proved itself with thousands of hours airline flying time.

► For both commercial and military aircraft the Gyrosyn Compass provides accurate magnetic headings under all flight conditions. A directional gyro synchronized with the earth's magnetic field, it does not oscillate, swing or have northerly turning error. And it requires no resetting.

► No matter what the speed of your aircraft or the air turbulence encountered, you can be sure of your heading with the Sperry Gyrosyn Compass.

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group. He was very proud of his machines; he used to make the most fabulous claims about them, boasting that they were as fast as the little fighter airplanes.

Like many senior pilots, he had gotten old before his time. The early phase of the war had made a deep impression on him. I had been assigned to a unit of men who repaired and maintained airstrips for our light bombers. We had obtained some imported equipment, including tractor equipment from the US. My job was seeing that the green help did not abuse the new machines. However, I spent most of my time actually driving the largest equipment, so that the key units would sustain the minimum of damage. The German bombers would blow holes in the runways, we would fill them up. We built earthwork shelters for the airplanes and kept the field in order. It was at one of these airstrips that I met Sasha for the last time. His unit operated from here.

For nearly a month I got to know my son as he really was. Sasha carried heavy responsibilities. There were fourteen airplanes in his unit. Most of them were flown by pilots of relatively little experience. Spare parts were hard to get, competent mechanics were few. My son's face had gotten those hard lines in his forehead and around his mouth. He seldom smiled. The girl he married the year before had been a primary instructor somewhere in the South. She was killed in a simple accident caused by a basic structural failure in a much overworked airplane. It was the period when things looked very bad for all Russia. My wife and one of my daughters had been killed by the Germans. We had lost track of our other two daughters who were serving as nurses in Odessa. Somehow, Sasha carried on. I guess I kept going simply by watching him.

I remember the last evening we were together. The Germans had struck the airfield while the group was out. They wrecked all but one of the tractors and shot up the two airplanes that were caught outside the revetments. When the bombers came back, two of them hit holes in the field, since our radio equipment was damaged and we could not warn them adequately.

I talked to my son. He knew that the Germans had better airplanes. He knew that there were more of them than he could count. Of the

(Continued on page 61)

for **1** man . . .

or a Division . . .

Travel by Train

is FIRST with the

SERVICES

There's no military transportation job too big or too small for the world's greatest transportation system—

THE RAILROADS OF THE UNITED STATES

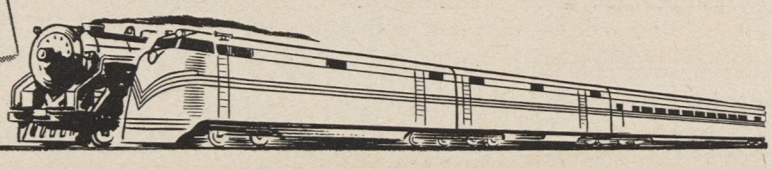
Memo

TO TRANSPORTATION OFFICERS

Units travel as units—officers, men, weapons, and equipment—when you route them by rail. That's just one of the reasons why the railroads carry 90% of the military travel. And remember—

10% DISCOUNT

from regular passenger fares is allowed by the railroads for all personnel of the Department of Defense traveling on transportation requests.



Here's what you wanted to know about

AFA ACCIDENT INSURANCE

EDITOR'S NOTE: *We recently asked a cross-section of our membership for reactions to this insurance. Here are comments about, and answers to, the questions which came up most frequently. To all who took the time to reply to the questionnaire, our sincere thanks.*

"What about War Coverage?

Death or injury resulting from invasion, bombardment or enemy action is not covered. Actual combat coverage would be prohibitively high in cost. *But AFA Accident Insurance covers accidents in the combat zone not due to enemy action.* For example, General Walker's death in a jeep collision with a South Korean truck was a combat zone accident not due to enemy action, and would have been covered.

"What if I accidentally fall off a roof and die?"

You're covered under every type except B-2. Of course, you're not covered if you deliberately jump in order to commit suicide.

"If I buy Class C, and then am called to active duty as a pilot, what happens?"

You have these options:

1. Converting, as of the date your status changes, to your choice of A-1 or A-2, paying only the difference in rates.
2. Cancelling, and getting pro rata rebate.

"If I buy Class B-1 or B-2, and then go on active duty as an administrative (non-flying) officer, what happens?"

You can convert to Class C, with a pro rata rebate.

"Does it cover all types of accidents in daily work?"

Depends on your daily work. If you're a professional automobile racer, no. If you're a pilot of experimental aircraft, no. If you're in about 99% of civilian occupations, and carry Class B-1 or Class C, yes—unless the accident is a result of attempted suicide, or is sustained while under the influence of intoxicants or narcotics. The people who died in the February train wreck in New Jersey would have been covered by any class of AFA policy. Those who suffered dismemberment or loss of sight would have been covered by Classes A-1, B-1 and C. If you're "flight-rated personnel" (see Note 1 in chart on opposite page for definition) and carry Class A-1 insurance, you're covered for military aviation accidents, civil aviation accidents, and other accidents except those resulting from attempted suicide or those sustained while under the influence of intoxicants or narcotics.

"What are the settlement options?"

No options. The insured, if living, or his beneficiary, receives full payment within 7 days after proof of death or dismemberment.

"What are the limitations as to beneficiary? Can I name anyone I choose, or does the beneficiary have to be some kind of a relative?"

No limitations. Name one or more beneficiaries at the time you apply for coverage. Change beneficiaries any time you need to—in writing to the Association.

"Why doesn't AFA Accident Insurance have cash or loan values similar to other policies?"

Because you're not paying for cash or loan values. You're buying accident insurance and paying for the risk involved. When you buy life insurance with cash or loan values, part of the premium you pay goes to set up these reserves. With AFA Accident Insurance no such premium is charged.

"How about death or injury resulting from a bail-out? Your definition of 'Aviation Accident' seems to exclude this important point, since it states 'while *in* an aircraft'?"

Bail-outs are covered (except bail-out due to enemy action).

"Why should I do anything about insurance now? I'm not sure from one day to the next what my status is; I may be recalled to active duty anytime."

Accidents have little regard for status. Buy the protection you can afford right now in the class you come under right now. Change it (without losing anything) to the different class when the time comes. Pay only the difference in premium at the time the change is made. If Class C meets your present situation, buy it now. For example, full Class C coverage would cost $30 annually. If you go on active flying duty 3 months after you buy Class C, you could convert to Class A-1 or A-2; your rebate on ¾ths of Class C premium would apply to your new rate. If you go on active *non-flying* duty, your Class C would still cover you and no change is needed.

For Your Security and Peace of Mind: AFA Accident Insurance

LOW-COST PROTECTION FOR MILITARY AVIATION ACTIVITIES PLUS

general accident insurance—including private and commercial flying

issued by Lloyd's of London for Air Force Association

HERE'S A NEW insurance plan which protects you and your family, day and night, at home or away, on land, on sea, and in the air, any place in the world, even while you pilot—or are a passenger in—military aircraft, and even while you are on active duty with the Air Force.

AFA Accident Insurance requires no physical examination. It pays off for loss of sight or limb, as well as for accidental death, in certain categories. No other accident insurance offers you—at such small cost—comparable military and civilian air and ground protection. Available in units of $1,000—up to a maximum of $10,000 — AFA Accident Insurance is exclusively for members or associates of the Air Force Association. Annual premiums per $1,000 of insurance range from $3 to $15. See chart below.

SELECT THE INSURANCE suited to your own status

CLASSES A-1 and A-2

Designed especially for pilots and other flight crew members of the REGULAR military services, who are engaged in military flying activities as a full-time occupation. A-1 covers accidental death and loss of sight or limb from any cause, including military or civilian accidents, on land or sea or in the air, world wide. A-2 offers the same accidental death coverage as A-1 but does not cover loss of sight or limb.

CLASSES B-1 and B-2

Designed especially for pilots and other flight crew members in the RESERVE military services, whose flying activities are part-time (generally limited to weekends and the two-week annual military service period). B-1 covers all types of accidental death, whereas B-2 is limited to death from aviation accidents only. B-1 also has broader loss of sight and limb benefits than B-2 (see chart).

CLASS C

Designed for all persons who are not flying personnel and whose participation in aviation is limited to traveling in aircraft as passengers or to working in or around aircraft on the ground. Death or injury from every type of non-aviation accident, and from certain types of aviation accidents, is covered (see chart).

HERE'S EXACTLY WHAT YOU GET AND WHAT IT COSTS

Premiums payable annually, semi-annually, or quarterly

CLASS OF POLICY	PERSONS ELIGIBLE: All AFA members and associates (other than paratroopers and airborne infantry) except as follows:	SCOPE OF POLICY COVERAGE (indicated by √)						ANNUAL PREMIUM PER $1,000
		Death Benefits			Loss of Sight or Limb Benefits			
		Military Aviation Accident	Civil Aviation Accident	All Other Accidents	Military Aviation Accident	Civil Aviation Accident	All Other Accidents	
A-1	No exceptions	√	√	√	√	√	√	$15.00
A-2	No exceptions	√	√	√				13.80
B-1	Flight-rated REGULAR military personnel not eligible (see note 1)	√ (see note 2)	√ (see note 2)	√		√ (see note 2)	√	7.20
B-2	Flight-rated REGULAR military personnel not eligible (see note 1)	√ (see note 2)	√ (see note 2)			√ (see note 2)		4.80
C	FLIGHT-RATED Regular and Reserve military personnel not eligible (see note 1)	√ (see note 3)	√ (see note 3)	√	√	√	√	3.00

NOTE 1: "Flight-rated personnel" means pilots, co-pilots, navigators, flight engineers, radio operators, bombardiers, aerial gunners, and similar flying personnel of the military services or their reserve components.

NOTE 2: Class B-1 and Class B-2 policies expire with respect to aviation accident coverage if the insured person serves 120 days, consecutively or non-consecutively, on active military duty during the policy period; but Class B-1 coverage continues in effect thereafter for other types of accidents.

NOTE 3: Class C coverage does not apply to accidental death of the insured person on an aircraft unless he is on such aircraft as a passenger or in the course of his employment as ground crew or administrative personnel.

CLIP AND MAIL TODAY

AIR FORCE ASSOCIATION

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Please send complete information about AFA Accident Insurance, together with schedule of optional means of payment, and application blank.

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CITY.....ZONE.....STATE.....

CONGRESSMAN CONTD.

ment you acknowledged, as you have explained in your letter, that the Air Force also participated in the close air support of our troops in Korea, but frankly, this merely reiterates the obvious. Nothing in your statement indicates you believe other than that the Air Force played a relatively minor role in close air support of the troops in Korea last summer. And now your letter identifies your remarks before the House as ". . . an interpretation of the conditions that existed in Korea early in the campaign."

It was to clarify misconceptions such as these that we devoted our entire March issue of AIR FORCE to a re-evaluation of tactical airpower in terms of the Korean experience. This is the first comprehensive report to be published on the subject. I enclose a copy of the issue with this letter and invite your close examination of it.

Specifically, I call your attention to the charts on pages 34 and 35 which present the facts on air support during the early period of the campaign which you have referred to. These statistics reveal: that beginning on the *first* day of the crucial 51-day period of withdrawal between June 26 and August 15, Air Force planes were in action on *51* of the first 51 days; that Navy planes first participated in the Korean War on the eighth day of the campaign and were in action on *16* of the first 51 days; that Marine planes first participated on the *forty-first* day of the Korean War and were in action on *11* of the first 51 days; that the Air Force flew *89.5%* of all *close support* sorties flown by all the services during this critical 51-day period of the war.

These statistics in no way discredit the magnificent accomplishments of our Navy and Marine airmen in Korea. Nor do they excite our ground troops. As we have stated editorially in recent months, it doesn't much matter to the GI in Korea whether the planes that come to his aid are Air Force, Navy or Marine—so long as they come.

Yet, the facts cited above are not generally known, and the record must be kept straight—not so much from an Air Force point of view but from a national point of view. With this in mind, I am far more interested in calling your attention to another set of statistics in the March AIR FORCE (page 42) which reveals that in the Korean War to date, airpower—Navy, Marine and Air Force combined—has accounted for 81% of

(Continued on page 61)

AIRPOWER ODDS CONTD.

That we are not preparing to give our troops, and those of the other free nations, even the minimum air protection they deserve, by all the rules of modern war, is apparent in the production deficiencies now staring us in the face.

The airpower odds we have created and continue to create against the ground forces being built up for the defense of Western Europe are nothing short of appalling. From the best available published figures, it can be concluded that in numbers of front line modern aircraft available for an air battle over Western Europe today, Russia holds at least a 10 to 1 margin; and on the basis of our present production tempo, even if we assume no increase in Russia's current air strength (an implausible assumption used only to emphasize our own position) it can likewise be concluded that the free world will still be on the short end of at least a 5 to 1 margin in Western Europe at the end of 1952. And even this doesn't reveal the true measure of Russia's air superiority in Western Europe, for we must assume that her air strength includes, in addition to front line aircraft all crews that qualify for such an air battle, and a reserve of planes and crews, also qualifying, as replacements against combat attrition. By the very nature of our airpower buildup, such reserve strength cannot be assumed, under present programming for our own Air Force.

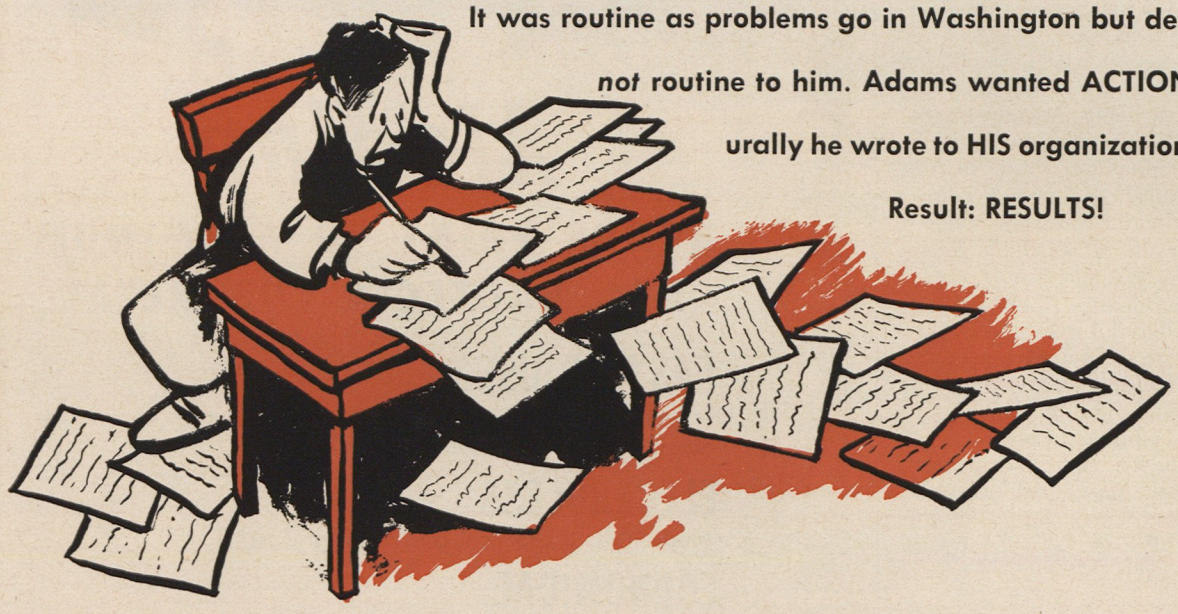
Let us think for the moment of only the front line odds, of what it means to be outnumbered 10 to 1 or 5 to 1 or even 2 to 1 (as Russia was outnumbered at Stalingrad) in a struggle for command of the air. Think of what it might mean to our troops down below, to the tide of battle in Western Europe, to the whole war effort of the free world.

In these airpower odds against us, we find the cold, hard facts of modern war, of inadequate mobilization —of potential disaster.

There can be no more fiddling with our airpower. With wisdom and courage we must strive for command of the air. It may not yet be too late, and whether it is or not, we have no alternative but to go after it. We must not deviate from our goal. We must use all the skills and tools necessary for the job. And we must conquer, at the very outset, the one real barrier that faces us. Before we can broaden our mobilization base to achieve command of the air, we must first broaden our mobilization thinking. This is the crucial step in the air battle, and we must take it today.

Adams had a problem!

It was routine as problems go in Washington but definitely *not* routine to him. Adams wanted ACTION. Naturally he wrote to HIS organization, AFA. Result: RESULTS!



AS ADAMS PUT IT "Last year I wrote to your office regarding an appointment in the USAFR. I came out of the last war as a corporal. Through your courtesy I was sent a copy of the Air Force regulations pertaining to me and other information regarding a commission. I followed your instructions and, by golly, I MADE IT. Second lieutenant, USAFR!"

Merlin R. Adams
North Hollywood, Calif.

AIR FORCE ASSOCIATION specializes in cutting red tape. Experts in AFA's greatly expanded Personal Service Department follow requests from members through Washington's huge and complex administrative machinery until they *get the answer.* We are the PERSONAL WASHINGTON REPRESENTATIVE of every AFA member. *Every* question that comes from members is important. *Every* question gets ACTION. Here are a few of the personal services AFA performs for its members:

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ASSISTS Air Reservists on assignments, commissions, promotions, field training, extension courses, MOS changes, applications for reserve and active duty assignments and Aviation Cadet training, requests for Awards and Decorations.

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Merlin R. Adams, of North Hollywood, is only one of the many AIR FORCE ASSOCIATION members who has been helped by AFA's red-tape cutting department. This is no time for fumbling about in the dark. In the uncertain days ahead you will want, quick, authoritative answers. AFA represents YOU in Washington.

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all enemy trucks destroyed; 75% of all enemy tanks destroyed; 72% of all enemy artillery destroyed, and 47% of all enemy troop casualties. Such astounding facts as these, compiled from official non-airpower sources, must be carefully weighed by our mobilization leaders if we are to achieve the type of preparedness demanded by the world situation.

In this connection, I was particularly disturbed by your report that the information regarding air support action in Korea had come to you from "spokesmen of the Department of Defense." For while this indicates a source in which you had every reason to have confidence, it also underlines the need—in all quarters and at all levels—for clarification—and greater knowledge of the facts of airpower.

We appeal to you to see that these facts are given the consideration they deserve. In so doing, we believe, your time will be well spent and the taxpayer will be well served.

Sincerely,

JAMES H. STRAUBEL
Editor

OWNED THE SKY CONTD.

aid that was to come from America, he knew little, and had even less faith. Yet, somehow, my son knew that the Nazis would never win. I asked Sasha why that evening. His answer is the key to what makes a Russian airman what he is.

"My father, we own the sky. It spreads over Russia and over the world. The Germans may get into it but they cannot own it. It belongs to men with hearts like ours. We are the free men. The sky is the last free place. For that reason, we will control the sky and whatever is under it. We have, in our hearts, the cause of freedom; we got it from Marx, from Lenin, from Stalin. I don't understand what it is, and I can't put it into words, but I feel it and for that feeling I will die gladly."

The following day, the aircraft were ordered off the field. The Nazis were moving forward too fast for comfort. I loaded the last working bulldozer onto the last truck, gathered up my crew and headed toward what I thought was safety. It was a bad guess. We were taken prisoners; truck, bulldozer and all. The rest you know. I never saw my son again. Later thev told me he was dead.

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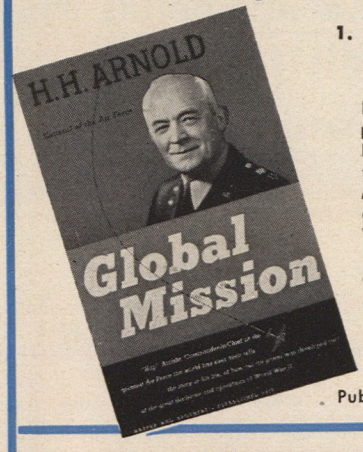

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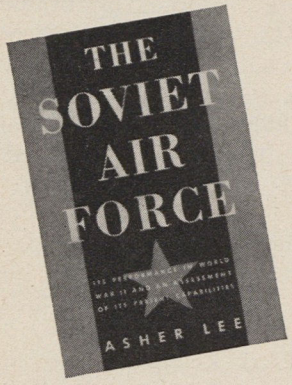

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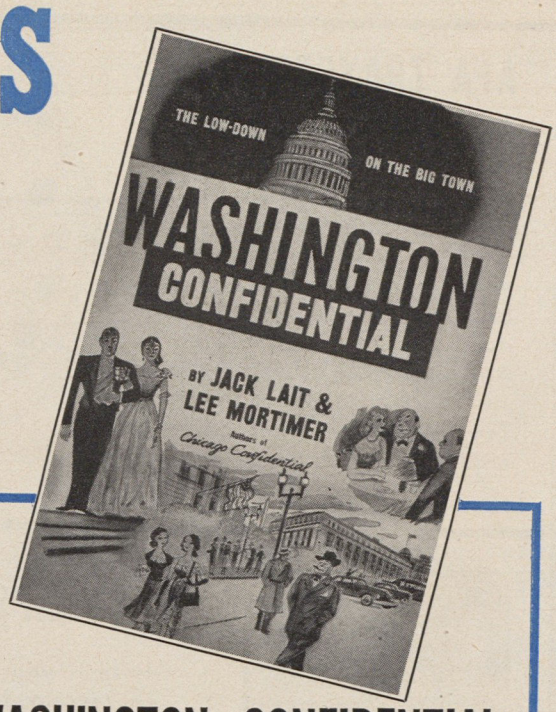

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NEW YORK: The 1951 New York Wing convention will be held in Syracuse at Hotel Syracuse, May 19. Forrest Vosler, 6 Bradley Street, Marcellus, N. Y., is convention chairman.

NEW JERSEY: Paterson's Alexander Hamilton Hotel will be the scene of the 1951 New Jersey Wing convention on June 16, John J. Currie, 136 Carlisle Avenue, Paterson, Wing Commander for the state, announces.

NORTHEAST REGION: The first convention of AFA's Northeast Region—New York, New Jersey and Pennsylvania—will be held at the Robert Treat Hotel in Newark on April 21. Irving Zeichner, 114 First Avenue, Atlantic Highlands, N. J., is convention chairman.

OHIO: The 1951 Ohio AFA Wing convention will be a two-day event—May 26 and 27. Dayton is the site and the Biltmore Hotel will be the headquarters. The convention will be climaxed by the opening on Sunday, the 26th, of the annual Dayton Squadron Glider Meet. Convention chairman will be Dr. J. H. Meyer, 1814 Wabash Avenue, Dayton.

Contact the appropriate convention chairman for information.

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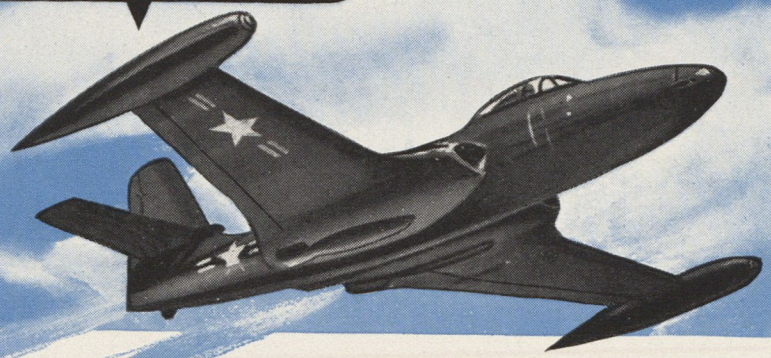

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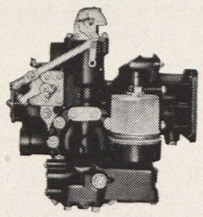
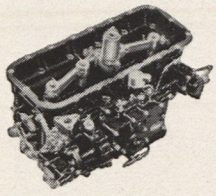


Fuel Metering Unit for jet engines



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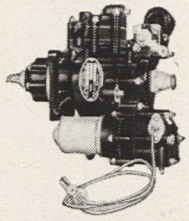
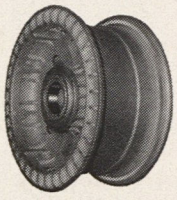


Speed-Density Fuel Metering Unit



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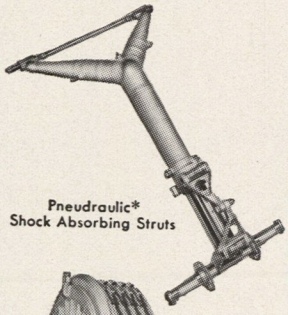

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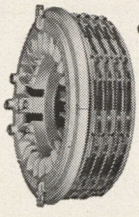

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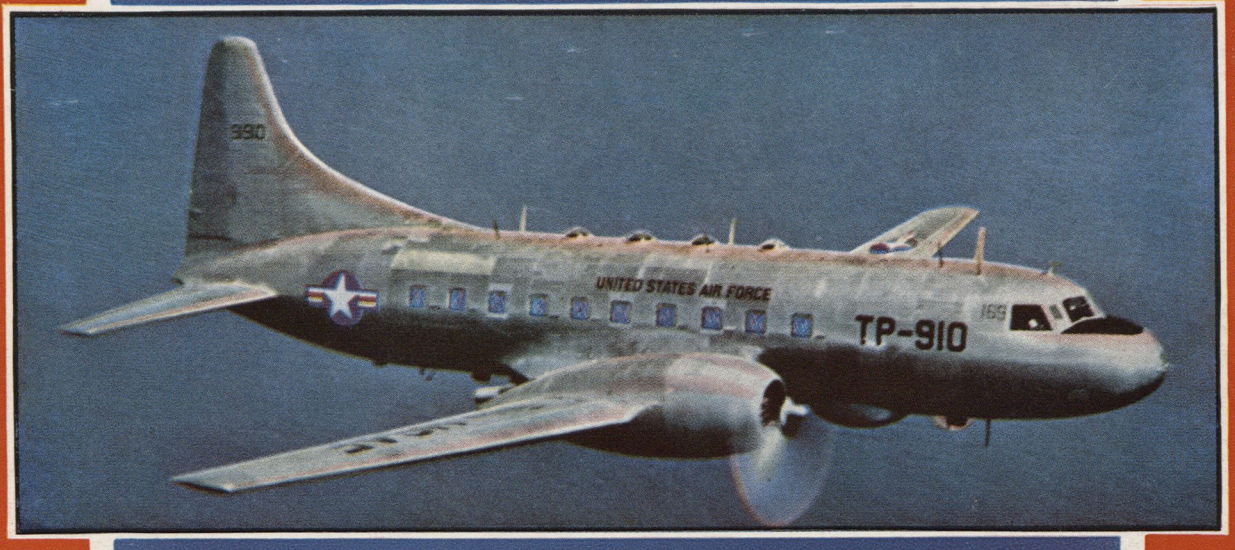

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