AIR FORCE

THE MAGAZINE OF AMERICAN AIRPOWER

November 1956 • 35c

CAN WE BEAT THE RUSSIANS AT THEIR OWN GAME?

ALSO IN THIS ISSUE:

Does the Air Force Need Its Own Army?

Mrs. Hubbard's Giant Cupboard

TWO HEADS ARE BETTER THAN ONE

It takes two experienced fliers—the pilot and the landing signal officer—to make a carrier landing. In the same way, two activities—creative engineering and production technique—work together at Arma to develop and produce advanced weapon control systems.

If you are interested in systems for *guidance* and *control*, contact Arma . . . Garden City, N. Y. A division of American Bosch Arma Corporation.

2838-A

ARMA ADVANCED ELECTRONICS FOR CONTROL

B.F.Goodrich

New canopy seal protects F-104 from high altitude blowouts

FLYING on revolutionary knife-sharp wings, the Lockheed F-104 Starfighter is the fastest operational combat plane in the air today. Although actual top speed has not been disclosed, its speed in climb is reported to be equal to its speed in level flight.

To protect the pilots as they blast through the upper atmosphere, all Starfighter production models are equipped with new B. F. Goodrich inflatable canopy seals.

The new seal has a high-lift, quick-action diaphragm of rubber-neoprene, reinforced with nylon fabric. Its precision molded, ribbed striker bead confines cockpit pressurization inside the canopy when the seal is inflated. Upon releasing inflation pressure, the diaphragm has the inherent ability to snap into relaxed position without vacuum assistance. This simplification eliminates parts to save more weight.

Over-all weight is further reduced because the seal's rubber channel base has a compact cross section designed for close tolerances.

Old type extruded seals stretch when inflated, like a toy balloon—with the possibility of blowouts at extremely high altitudes. B. F. Goodrich seals inflate to maximum height without stretching—like a paper bag. This means longer service life and uniform sealing pressure at all points. That's why B. F. Goodrich seals are already being used on more than two dozen makes and models of jet fighters and bombers.

Why not turn your sealing problems over to B. F. Goodrich engineers? They are ready to give you expert help on canopies, doors, bomb bays, capsules, compartments and other specialized seal applications.

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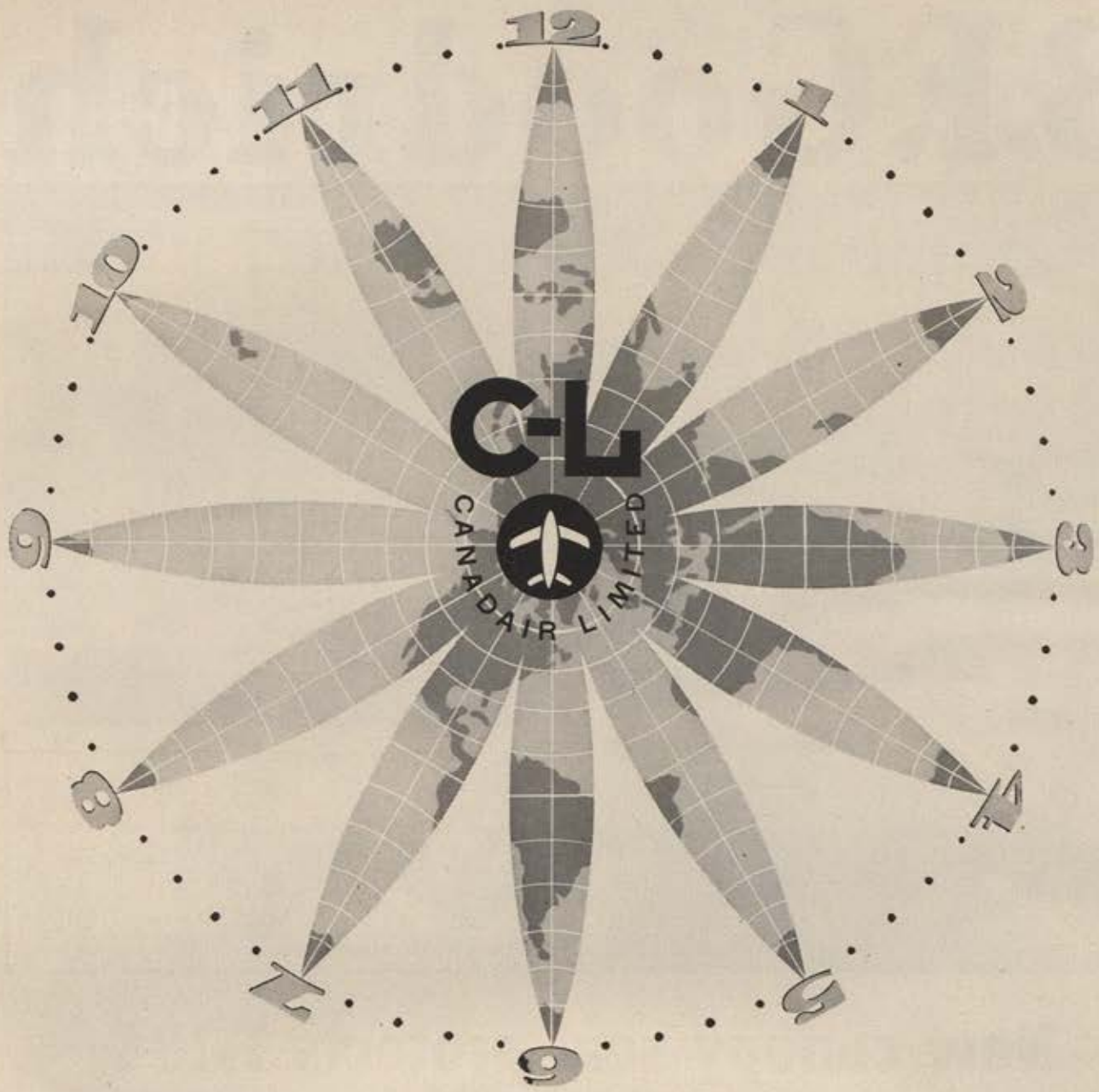

ON CALL ...around the clock ...around the world

There are approximately 2000 Canadair-built aircraft in civilian and military service around the world. Wherever they fly, their operators know that Canadair's personal service on operational or maintenance problems is quickly available. Canadair technical representatives, at present based on four continents, are always on call . . . and as dedicated to the Canadair ideal of sales service as a family physician is to the needs of his townfolk.

These men have come from all parts of the world . . . from all spheres of aviation. They have been selected for their extensive knowledge of maintenance problems and for their specialized experience on the equipment in their charge. Their work is supplemented by aircraft systems trainers at the operator's own base; service repair and overhaul groups at the main Canadair plant, and a continuous flow of manuals, handbooks and bulletins. Around the clock and around the world, service is a continuing obligation to Canadair.

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AIR FORCE

THE MAGAZINE OF AMERICAN AIRPOWER

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STAFF

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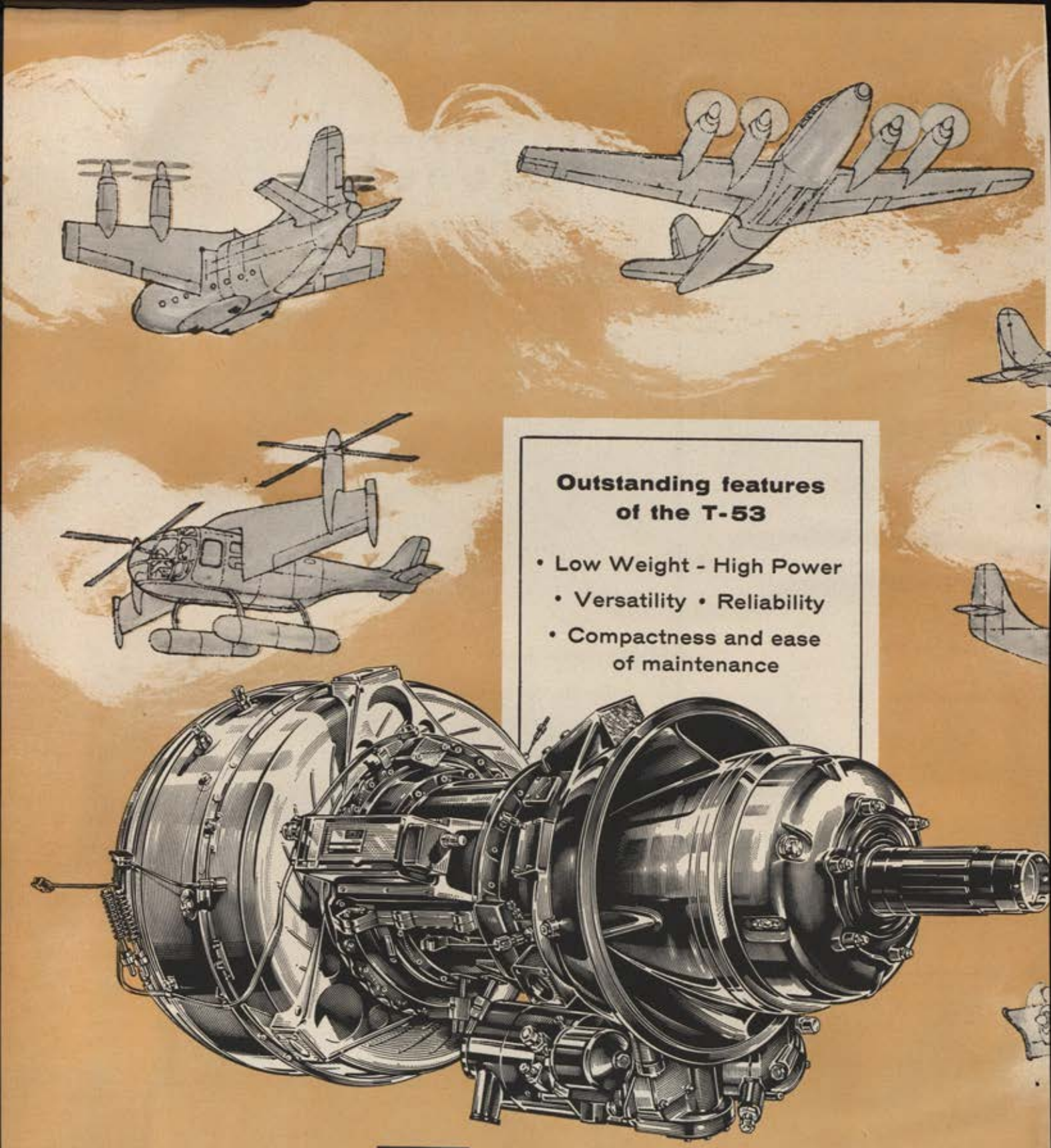
Features

Departments



Outstanding features of the T-53

- Low Weight - High Power
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When you take gas turbines out
of the lab and put them into the air...

The New
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weighs 75 pounds less
than any other complete engine
of comparable h.p.
for turbo-prop applications!

For the rapidly expanding field of STOL and VTOL aircraft, the new Lycoming T-53 offers a more challenging potential than any turboshaft engine ever developed in the "small-power package" range.

Developed under the sponsorship of the U. S. Army and the U. S. Air Force, the T-53 has already been selected to power the Army's newest Utility 'Copter (Bell XH40). Bell and Kaman have received their flight test engines. Even now the T-53 is being installed in boats, and stationary power plants are under consideration. Yet it is in the field of turbo-prop applications that the T-53 might very well offer its most exciting possibilities.

Ready to take to the air, the complete turbo-prop weighs only 460 lbs. and delivers 960 h.p. from a compact 47.6 length x 23-in. diameter. Using a variety of fuels including automotive and aviation types, gasoline and JP-4, it operates at a low 0.655 lbs. per e.s.h.p. per hr. consumption. Rugged design features and unprecedented ease of maintenance guarantee safe operation and long life.

In addition to its weight advantage as a turbo-prop, the Lycoming T-53 could be made available with front-end or rear-end power take-off or simultaneous power extraction at both ends.

There can be no doubt that the T-53 will set new standards for small aircraft. Developed by the men who built the first mass-produced jet engine to fly, Lycoming's T-53 may solve the turbo-prop problems you're facing *right now!*

To learn more about the T-53 and Lycoming's ample facilities to produce it, phone, wire or write for turbine information to Avco Lycoming, Stratford, Conn.

ENGINEERS WANTED

Challenging opportunities for outstanding men in the gas turbine field. Write Vice President, Industrial Relations, Stratford, Conn.

TODAY'S MILITARY SERVICES, WITH THEIR TREMENDOUS TECHNOLOGICAL ADVANCES MADE POSSIBLE THROUGH SCIENCE, OFFER A VITAL REWARDING CAREER.

Repro of AF Seal

Gentlemen: During the many years I have been a member of the Air Force Association I have never written letters offering praise, criticism, or suggestions of earth-shaking importance. However, after long consideration I have decided to forward the following suggestion as a permanent part of your editorial policy:

For the AIR FORCE Magazine to include a full-page color reproduction of the US Air Force Seal as a part of the first month's edition each year to be printed on paper of the same weight and texture as the enclosed Orenda advertisement (which was taken from my copy of AIR FORCE Magazine).

I believe such an addition to the magazine, if publicized, will have the same effect as a subscription campaign since nearly all of us would like to have a color reproduction of the Air Force Seal for our offices and homes. I, for one, have searched everywhere, including the Pentagon, to find a suitable reproduction for framing to be used in my office, and my job is Air Force Liaison with the Civil Air Patrol! And the Air Force just refuses to provide us with a personal copy, which is understandable since it would more than likely end in a Congressional investigation!

Maj. William E. Burgin
Minneapolis, Minn.

● *Worth thinking about.—The Editors.*

A Woman's Continued Contribution to Airpower

The following came from DelVina Wheeldon, Cincinnati radio commentator who won an AFA Citation of Honor as the first woman passenger to fly faster than sound. Her story appeared in the August '56 issue of this magazine. Since then, DelVina says, she's received much correspondence as a result of broadcasts about her experiences.—The Editors

Gentlemen: This is a sample of many exchanges I have been having as a result of the article in your August issue. I have been sending copies of the scripts, especially the ones on career and flying safety, to all the mothers whose addresses are made known to me.

The station thinks the recruiting office has been moved over from the Post Office, but it's a wonderful feeling to me to be sought out by air cadets and lieutenants who have mothers like this—to give them a little help so they can stay in the Air Force without parental protests.

DelVina Wheeldon
Cincinnati, Ohio

Dear Miss Wheeldon:

I have read with great interest of your recent supersonic experience and work in behalf of the Air Force. It gives me great pleasure to see that someone is on my side.

You see, I am an aviation cadet currently undergoing jet training here at _____ AFB. I'm quite content, love to fly jets, and plan to remain in the Air Force – that is, if I can clear my big obstacle. It's my mother. She is deathly afraid of flying, especially jet flying. I suppose this might be considered "normal," but it really affects my progress as a student jet pilot.

I personally supervised her reading of your article in "Fying Through the Sound Barrier"—really can't say what the results are, but I certainly appreciate your efforts. Please don't stop now.

Aviation Cadet

Dear Cadet:

I'm sure your mother must be very proud of you because, as I have often said in private and on my broadcasts, if *I* had a son and he was a jet pilot, I would be the proudest mother on earth.

It is my sincere conviction that yours is the luckiest generation in our history, since, by being ready to fight and having the best equipment and instruction to insure our being strong, we are making those who might otherwise want to tackle us think it unprofitable to do so. You and the cadets like you who want to fly in jets and stay in the Air Force will give us a dedicated body of men able to do something our country has never done before—keep major war from even starting.

I am enclosing some of the scripts of shows I have done so far in my series. If you would send me your mother's address I would like to send a set to her. I believe she would find the scripts especially informative. And you have my appreciation for your wish to continue in the Air Force, and my congratulations for having shown your heart to be in following the most important career in our country today.

DelVina

So We're Printing It

Gentlemen: I demand this letter be printed! Reason? Because you humble slaveys would probably ditch it as an "embarrassing bouquet." Thus, I demand (*please*) to have a brief public say on three points:

1. The New Orleans AFA Convention arranged by your small but versatile AFA headquarters and AIR FORCE Magazine staffs was the finest aviation convention of all time. There were excellent symposiums and conferences on a truly worthwhile, well-arranged agenda. Active USAF people, Reservists, the industry and the general public were given a chance to communicate with each other on the vital subject of airpower.

2. Your September, "never-mind-the-publishing-budget" issue, is a reference item for all who want a valid analysis of US airpower's key issues.

3. The ten-year-old AFA is a strong and aggressive organization that plays

(Continued on page 9)

FREE

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Chicago 51, Illinois

Observe the resourceful little prickly pear cactus. Tempting, green and juicy, it blossoms unmolested and thrives uneaten on the hungry, arid desert, because it has the good sense to be prickly first and succulent second. Some say you must eat or be eaten in this world. There is a third way to live. Keep some stickers showing and you, too, can take time to grow flowers. REPUBLIC makes a very efficient brand of stickers . . . they're called THUNDER-CRAFT.

25 YEARS

REPUBLIC AVIATION

FARMINGDALE, LONG ISLAND, N. Y.

Designers and Builders of the Incomparable **THUNDER-CRAFT**

a vital role in preserving this nation's future existence. But it would not be such an organization without the tireless efforts of the AFA and AIR FORCE staff.

This whole thing could have folded on a number of occasions were it not for the loyal efforts of all you men and women. Congratulations! You have a right to be proud of your work and successes.

Jack Shea
Tullahoma, Tenn.

Another Word of Praise

Gentlemen: This is just a note to compliment you on your excellent September issue of AIR FORCE.

I noted with interest that your article "Symington Subcommittee Winds Up Investigation," made good use of the Soviet vs. US comparative statements developed from the final testimony in the airpower hearings. To me this was such a devastatingly impressive and discouraging list that I was pleased to see the prominent attention you gave it.

Ed Welsh
Washington, D.C.

And Still Another

Gentlemen: I would like to say a word about the excellent Tenth Anniversary issue of AIR FORCE. All of us here in Wiesbaden have enjoyed reading it and have distributed copies to our unit ISOs throughout the command.

Lt. Col. William R. Berkeley
Hq, USAFE
New York, N.Y.

Safety Program Article

Gentlemen: I would like to see you publish some articles on safety. Although there are a great number of problems in policy to be decided, I personally feel one of the finest aspects of the Air Force is its flight safety program. Since it requires a great number of years to develop a prospective pilot and a few more to make him "worth his salt," wouldn't it be worth at least one small column in your publication? There are a number of pilots, I'm sure, currently flying quite a bit, reading your magazine, and I for one would be interested.

Capt. Hugh S. West
Pensacola, Fla.

Voice From Abroad

Gentlemen: As I am a member of the Royal Netherlands Air Force, I read AIR FORCE Magazine regularly, the magazine being sent around by the Station Library.

Being an ATC officer (after many years on a jet airfield now working at the Air Defense Staff) I find the issues very interesting indeed.

As far as I know, AIR FORCE is not being sold in this country, which I regret very much. Many of the problems discussed (as at the Jet Age Conference, for example) are more or less the same we in the Netherlands are about to face.

Capt. J. S. Smit, RNAF
Utrecht, Netherlands

Too Many Extras?

Gentlemen: I read the vast curriculum of the Air Force Academy. The topic was so vast, including a full college course which would take in several degrees, plus flight training right up to the jet fighters and bombers.

The Academy states this would take eight years. The most important factor is that our enemy is not going to wait all that time to give us that advantage, to be sure. Many subjects in the academic courses are of little value to our pilots in their effort to make good fighting material, which is the most important training the Academy can give them.

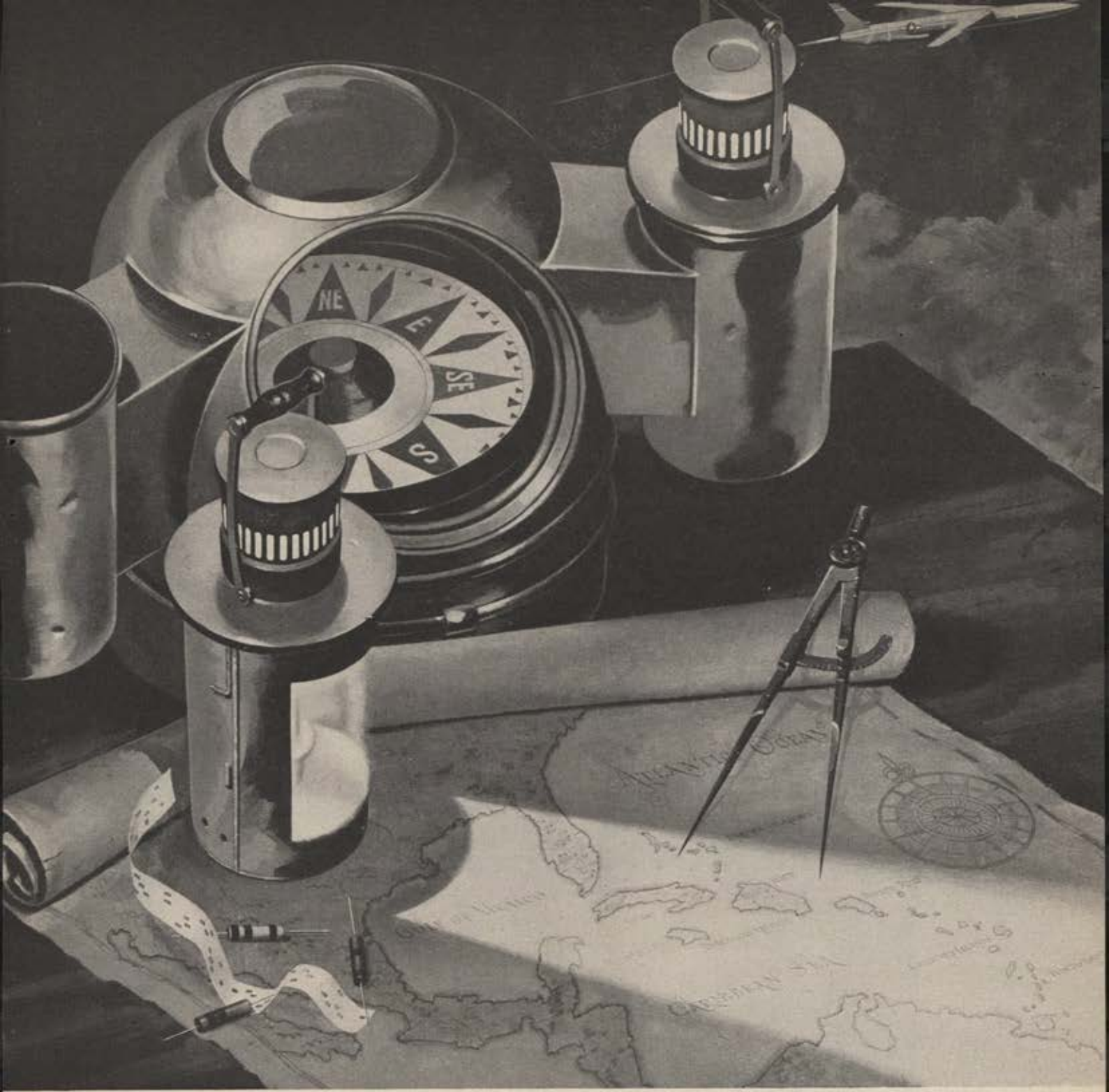
Lt. Jack Richmond, USAF (Ret.)
Los Angeles, Calif.

Dear Lynn: Thought you'd like this Texas-Size postcard of the $4,000,000 Texas-Size layout Southwest Airmotive is building for business airplanes. Much of it will be ready in '57 in time for SAC's 25th Anniversary. Wish I could join you as you putter around in your gingham apron cookin' that Thanksgiving turkey. I'll bet it takes a lot of drumsticks for my 23-yr.-old, 128 lb., 5'8", blonde, blue-eyed Texas-Size chefess!

Love, Daddy

SOUTHWEST AIRMOTIVE CO. • LOVE FIELD • DALLAS, TEXAS

INDEX TO ADVERTISERS



TRAIL BLAZING – Many frontiers of science have been charted by Northrop Aircraft engineers and scientists in seventeen years of research and development of manned and pilotless aircraft. Northrop Snark SM-62s, first intercontinental guided missiles to be disclosed by the U. S. Air Force, are now flying from the Florida coast over the USAF missile test range. Northrop's newest trail blazer is a supersonic trainer designed to help pilots master the complexities of tomorrow's combat aircraft. Other Northrop trail blazers include Scorpion F-89 interceptors; pilotless target aircraft and missiles from Northrop's subsidiary, Radioplane Company; ground support and armament equipment from the Anaheim Division; and entirely new concepts of integrated weapon systems which are constantly being initiated to improve our national defense.

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Pioneers in All Weather and Pilotless Flight

WESTERN AIRLINES

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Allison Prop-Jet Engines and Aeroproducts Propellers

for new heights of luxury air travel in 7-mile-a-minute Lockheed Electras

Advancing into the jet era of air travel, Western Airlines has selected the matched team of Allison Prop-Jet engines and Aeroproducts Propellers to power its new fleet of Lockheed Electra airliners. These 400-mile-an-hour-*plus* luxury airliners will bring new jet-age standards of speed, performance and comfort on Western's celebrated "Champagne Flights" between all principal cities of the fast-growing West. Flying faster than any other turbo-prop aircraft, they will substantially reduce travel time between these metropolitan centers. Allison salutes Western Airlines on its choice of this great new General Motors aircraft power plant—the most advanced of its type available anywhere —to match America's smartest air service.

ALLISON DIVISION OF GENERAL MOTORS—Indianapolis, Indiana

With its tremendous power geared to a matching Aeroproducts Propeller for higher efficiency and better fuel economy, the Allison Prop-Jet will enable passengers in these luxury airliners to enjoy faster flights, smoother take-offs, higher cruising altitude, top dependability, and new comfort and convenience!

AMERICAN BUILT FOR THE JET ERA IN AIR TRAVEL

wing tips

By Wilfred Owen

During the first half of 1956, five US personal and executive aircraft manufacturers sold 443 planes valued at $5 million to twenty-four foreign countries. Export business was up twenty-five percent over the same period in 1955.

• • •

Passenger helicopter service has been approved by the CAB for a sixty-mile radius around Chicago. Main terminals for Helicopter Air Service Inc. will be O'Hare Field, Midway, and the Loop.

• • •

Low-fare tourist service now accounts for one out of every three passenger-miles flown on domestic air carrier flights and for two out of every three passenger-miles flown by US flag carriers on international and overseas flights.

• • •

The US government has contracted with the airlines to purchase an emergency airlift package comprising forty-five percent of the industry's four-engine aircraft. If the $400 million package ever had to be delivered, it would provide three-quarters of a million ton-miles of airlift per hour.

• • •

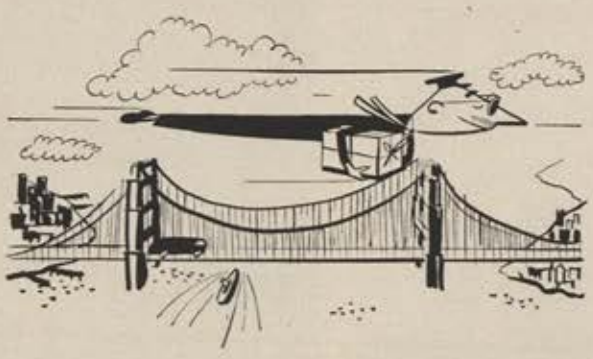
Since 1946, airline speeds have doubled, the number of persons flying has more than tripled, and the volume of available transportation service has quadrupled.

• • •

The wings of a medium bomber are now capable of supporting a stack of automobiles as high as the Washington Monument. And the wing tanks on a heavy bomber are as large as some fighter planes.

• • •

In San Francisco recently, when a hotel official asked his hotel porter to send 700 copies of a brochure to the neighboring city of Oakland just across the Bay, the porter



dispatched the forty-five-pound bundle by air express, explaining that messenger service would have cost more than $9, while air express did the job for only $1.55.

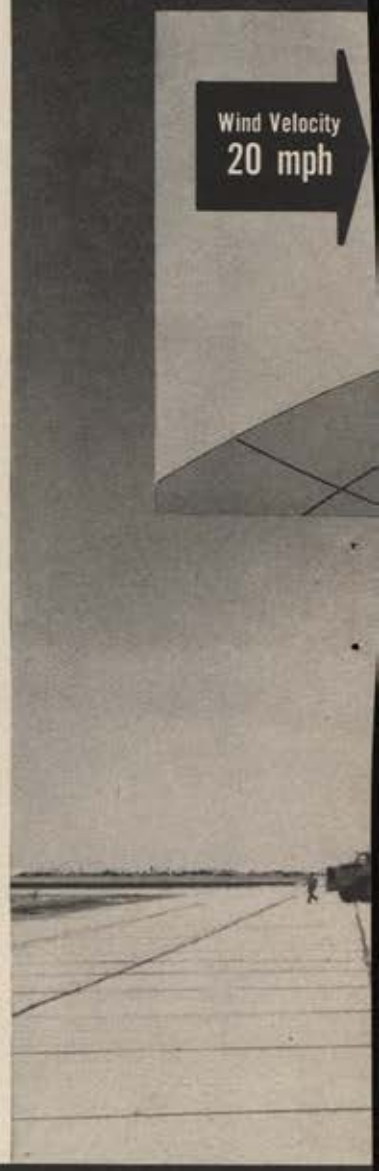
• • •

At any hour on a normal day the population of the air space over the US is 25,000.

Lead plane wins 1900-mile dash by 21.3 seconds as . . .

ALL THREE SAC B-47's BREAK SPEED MARK IN GENERAL ELECTRIC TROPHY EVENT

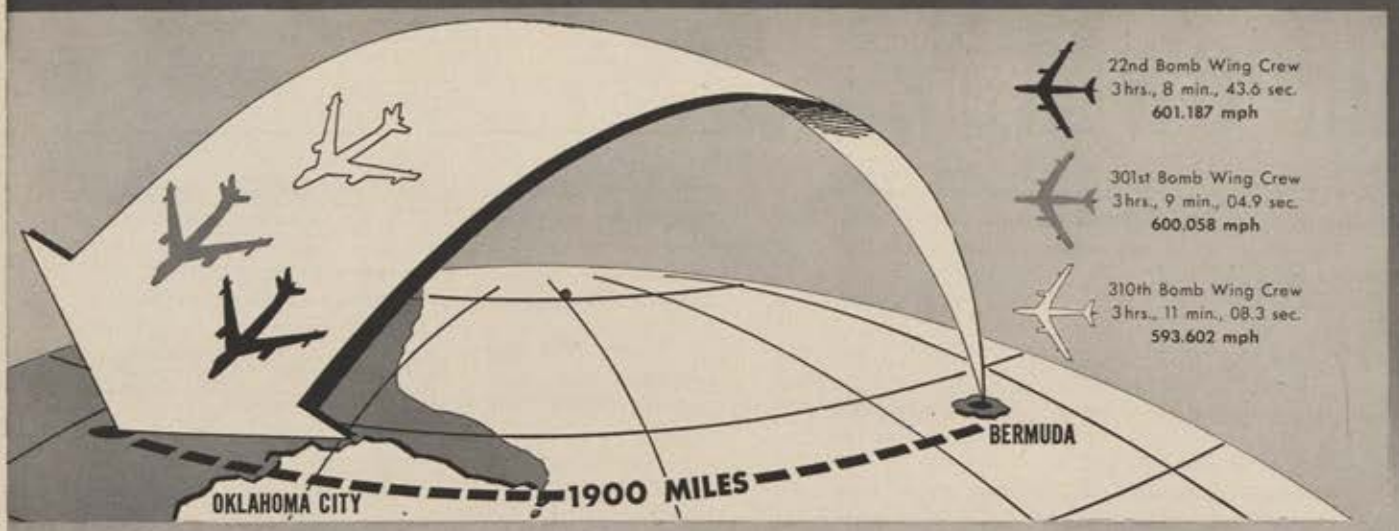
Bermuda-Oklahoma City race emphasizes mobility, readiness of SAC, demonstrates performance, reliability of G-E J47 engines



CONGRATULATIONS are extended to Major J. Schreiber, commander of winning plane, by General E. W. Rawlings, AMC Commander.

TROPHY PRESENTATION. (l. to r.) Capt. D. O. Peterson; Tech. Sgt. J. Richardson, Major J. Schreiber, Major C. J. Luecke, George Fouch, head of G-E jet engine manufacturing, Maj. Gen. W. O. Senter, Commander, OCAMA.

NATION-WIDE TELECAST announced event record to 30,000,000 viewers of G.E.'s Sunday night TV Theatre shortly after race ended.



Averaging 601.187 mph, SAC's 22nd Bomb Wing crew landed its Boeing B-47 only 21.3 seconds ahead of the runner-up aircraft to win the 1956 General Electric Trophy.

Near "photo finish" times logged in the 1900-mile, non-stop dash demonstrate the reliability of the General Electric J47 turbojet. Flying the race into the face of challenging west-to-east prevailing headwinds for the first time, each entry broke the existing Trophy Event B-47 speed mark of 589.294 mph set in 1955.

Eighteen engines—all with throttle settings at maximum allowable power—performed so precisely that only 144.7 seconds separated the competing bombers at the finish line.

Powerplants with this same demonstrated reliability are in service today with more than 1500 SAC B-47's. In this respect, this year's G-E Trophy Event emphasized dramatically the combat mobility and readiness of USAF's Strategic Air Command. General Electric Company, Cincinnati 15, Ohio. 235-11

ENGINEERS: Illustrated booklet "Thrust & Progress" is available for qualified engineers interested in the field of flight propulsion. Write: Technical Personnel, Dept. L, Building 100, AGT Division, General Electric Company, Cincinnati 15, Ohio.

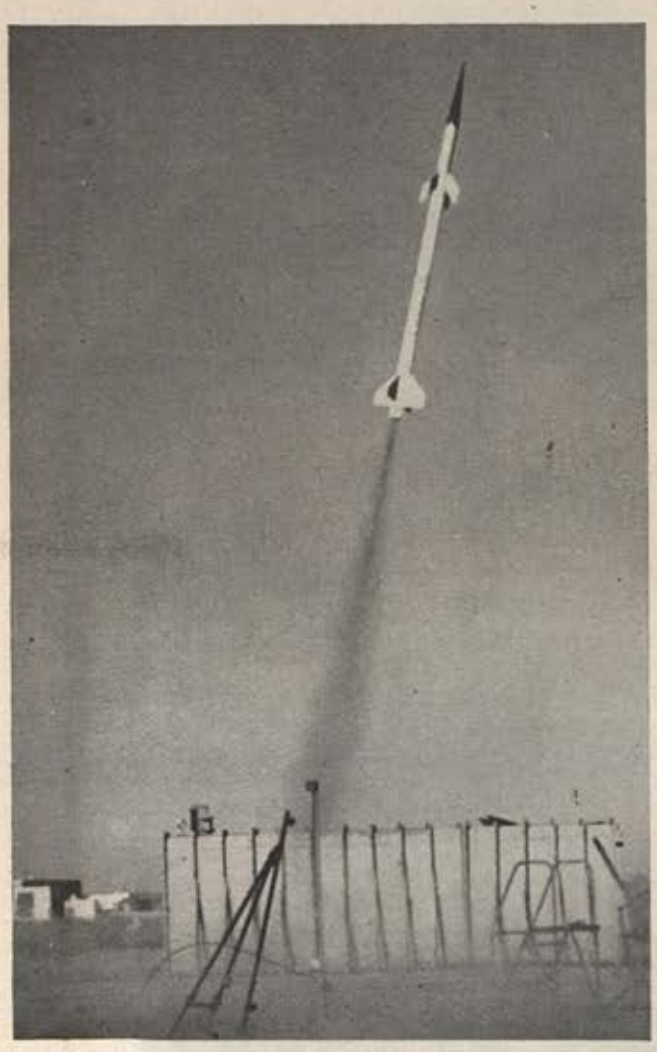
Progress Is Our Most Important Product

GENERAL ELECTRIC

AIRPOWER IN THE NEWS

■ **Capt. Milburn G. Apt,** the AF test pilot who crashed to his death in the **Bell X-2 rocket plane** late in September, was flying **"faster than any other human being has been known to fly,"** before the experimental plane went out of control minutes after its B-50 "mother" plane released it high over Edwards AFB, Calif. This was revealed by **AF Secretary Donald A. Quarles** in a speech before the National Guard Association in Spokane, Wash., last month, and indicated that on his first flight in the X-2 Captain Apt was flying **at 2,000 mph or better.** Earlier, **Lt. Col. Frank K. Everest** had flown the X-2 an unofficial **1,900 mph,** and on another flight, with **Capt. Iven Kincheloe** as pilot, the X-2 had reached a reported altitude of **126,000 feet.** The X-2 was designed to explore the so-called "thermal barrier." The cause of the crash had not been announced at presstime.

Meanwhile, it was learned that the government was planning a **new rocket-powered research plane,** designated the **X-15,** which may be ready to fly in about two years. The North American X-15, according to reports, will be capable of flying more than **4,000 mph** at altitudes above **thirty-eight miles.**



New, lightweight research missile, the Terrapin, is exceptionally simple in design and inexpensive to produce. It was developed by Republic and the Univ. of Maryland.

■ Field tests leading to the launching next year of the **Vanguard earth satellite** will begin "within a few months." This is how **Dr. John P. Hagen,** director of the project for the Naval Research Laboratory in Washington, D. C., described progress on man's attempt to place a basketball-sized satellite in an orbit 300-500 miles above the earth. Dr. Hagen said that equipment and test personnel are **now being assembled** at Patrick AFB, Fla., from which the first test vehicles will be fired.

Meanwhile, also at Patrick, the **Army** was reported to have fired a test device in the initial trial of its **Jupiter IRBM** (Intermediate Range Ballistic Missile) program. The device, not yet a weapon, was described as traveling **"many hundreds of miles"** over the test range. This announcement has given rise to **speculation** that the Army may be thinking of using a combination of its own missiles in an attempt to jump the gun on the Navy, by launching an **Army space satellite** before the Vanguard satellite can be readied.

■ The **National Advisory Committee for Aeronautics** announced that it had fired a **four-stage, rocket-propelled research missile** to an altitude of more than **189 miles.** It reached a speed in excess of **Mach Ten** or 6,600 mph at high altitude. The missile was fired from Wallops Island off Virginia's eastern shore. The nose of the research missile was packed with instrumentation and telemetering equipment to record and transmit data to the ground. As each of the first three stages burned out, they dropped off, leaving the fourth and smallest motor as part of the test missile. The first two stages are of the type used to boost the Nike missile.

Another rocket announced by NACA which also has record-breaking capabilities, is an inexpensive, portable, sounding rocket, developed for use in the International Geophysical Year program. It is designed to carry a **forty-pound nose cone** filled with instruments to an altitude of 100 miles at a speed of more than 4,000 mph. This is a **two-stage rocket,** which also has the Nike booster rocket as its first stage. The second stage is a high-performance rocket developed through NACA. The combination provides a relatively inexpensive sounding rocket that can be readily transported and launched.

In another development in high-altitude research, the **University of Maryland** and **Republic Aviation Corp.** jointly announced the first flight of a new and extremely **lightweight research missile** (*see cut*) that raced 3,800 mph, to a height of eighty miles. It has also been fired from NACA's proving ground at Wallops Island, Va. The two-stage rocket, called the **Terrapin,** is less than fifteen feet long. Its first stage motor blasts the missile to 10,000 feet at a speed of 1,900 mph. The missile then coasts up to 30,000 feet where the second stage boosts it to **50,000 feet and 3,800 mph.** Readily portable, it can be fired from a zero-length launcher. It is exceptionally simple in design and can be **produced at a fraction of the cost** of other high-performance rockets.

While research rockets were making "out of this world" news, NACA last month announced **another test vehicle** of a vastly different character. It is a fifty-ton test carriage that will test **full-scale landing gear** in simulated landings. The giant vehicle is located at the **Langley Aeronautical Laboratory,** Langley AFB, Va. The carriage is mounted on wheels that run on 2,200-foot-long rails. A hydraulic

(Continued on page 19)

New country doctor makes world wide rounds

U. S. servicemen—in their most remote arctic or tropic outposts—are often closer to medical care than their relatives in isolated areas back home, thanks to the work of Air Force Aeromedical Evacuation Units flying Douglas planes.

Trained medical personnel and equipment can be raced by air within hours to almost any spot in the world to treat or evacuate patients.

The rugged, dependable Douglas C-47 transport—a favorite Air Force workhorse—makes long flights carrying heavy loads of evacuees and medical supplies with ease—even from small, rough fields.

More than 1,000 medical patients scattered over an area five times the size of the U. S. are evacuated monthly by the U. S. Air Forces in Europe. Among air evacuation teams, the C-47 has earned the reputation of "the plane that won't wear out."

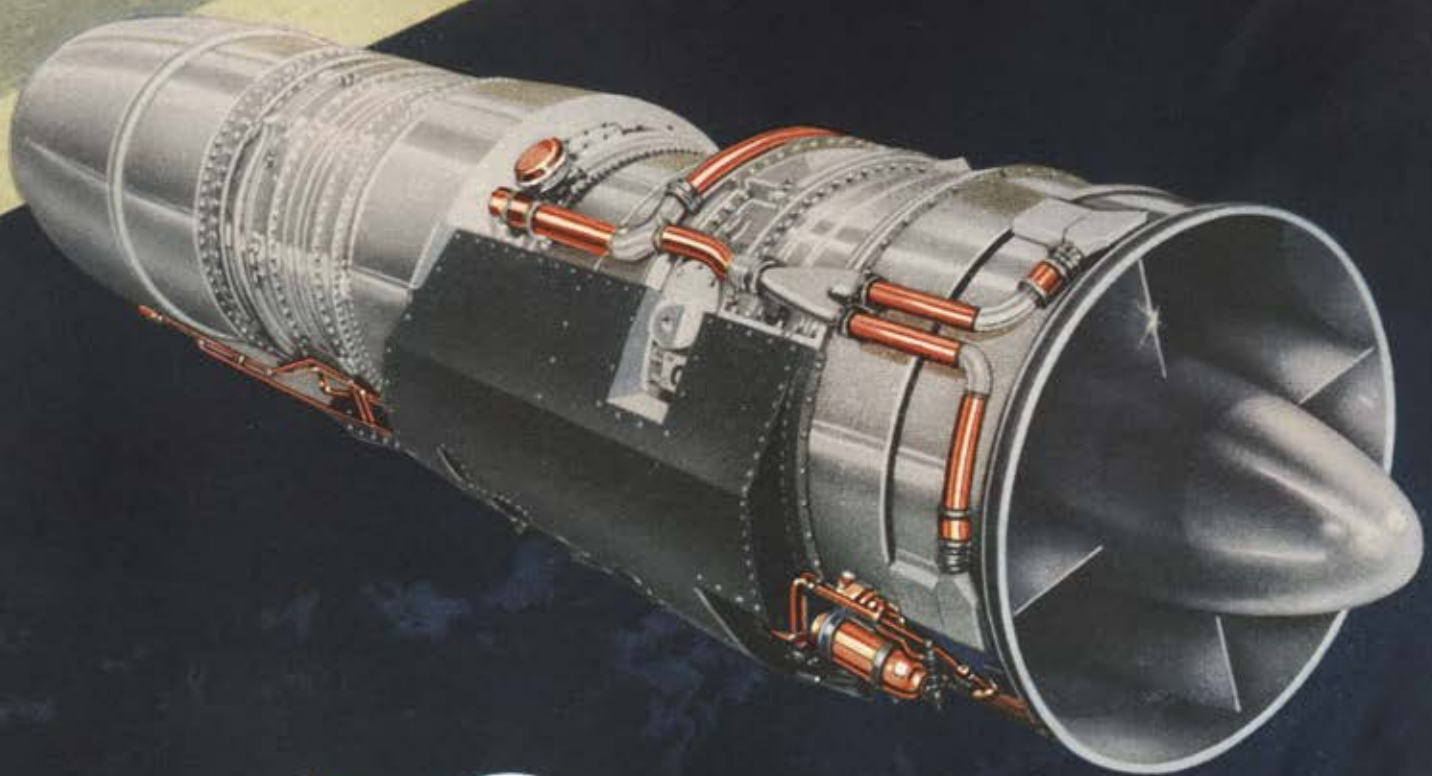
Douglas C-47 makes "house calls" from England to Pakistan and from Norway to Morocco. Arrival of the Air Evacuation plane is often the signal for American personnel to bring in the sick for examination by their airborne country doctors. There's satisfaction in many such "well done" jobs as a member of the Air Force. Ask your recruiter about the interesting, varied, vital duty it offers.

Depend on *DOUGLAS* First in Aviation

Flight test for

IROQUOIS,

pod-mounted on the rear fuselage of a B-47 bomber, will be next step in the development schedule of Orenda's supersonic turbojet.



ORENDA
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MALTON, CANADA

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jet of water directed into a specially shaped water bucket mounted on the carriage catapults it down the track. The jet stream, forced through a nozzle by air pressure, produces a **thrust of 400,000 pounds** and can accelerate the carriage to **150 mph** within 400 feet in three and one-half seconds. A full-size landing gear, suspended within the carriage, is then dropped onto a **concrete runway** between the rail tracks, producing loads and stresses that can be recorded and studied.

■ **Eighteen of the major US airlines** have moved toward **ending** a virtual ban against **hiring Negroes for flight work.** In a policy statement that resulted from a series of meetings with the N. Y. State Commission Against Discrimination last May, the airlines—all of which fly into New York—announced a policy of "judging applicants in all categories of employment and upgrading on the basis of merit, without regard to race, creed, color, or national origin." **Some 5,000 Negroes,** or about four percent of the work force, now are employed by airlines in non-flying jobs.

■ The AF has announced "a **new concept of on-base living**" through **six-story, hotel-type dormitories** for single airmen. Construction on two of the new units is expected to begin at **Goose AB, Labrador,** and on two others at **Harmon AFB, Newfoundland,** next spring. The buildings will provide living quarters and lounges for 700 men and will include dining facilities and self-operated, automatic elevators. The AF points out, however, that while these new dorms will be used where warranted, the **three-story masonry buildings** for 200 airmen, standardized in 1954, will remain the mainstay of the present building program.

■ On October 12, the AF's rocketry training base near Yuma, Ariz., was renamed **Vincent Air Force Base,** honoring the late **Brig. Gen. Clinton D. "Casey" Vincent.** General Vincent (*see cut*) became a general at twenty-nine, and was only forty when he died alone in his room at Ent AFB, Colo., in July 1955. He had just been assigned as DCS/Operations at Continental Air Defense Command headquarters. General Vincent was the real-life prototype of **"Gen. Shanty Town"** in **Milton Caniff's** comic strip "Steve Canyon." It was on July 1 of this year that "General Town," the man who never stopped driving himself, died from overwork in the comic strip. Caniff, who in 1953 won AFA's Arts and Letters Trophy, made the dedication speech at the renamed base last month.

General Vincent was graduated from West Point in 1936 and after Pearl Harbor joined **Gen. Claire Chennault** and the Fourteenth AF's **"Flying Tigers"** in China. He became Chennault's chief of staff, and, at twenty-nine, the AF's **second youngest general officer.** His exploits during the war inspired cartoonist Caniff, then drawing "Terry and the Pirates," to create the character of **"Vince Casey,"** who appeared on and off the rest of the war. After the war, General Vincent, who was married and the father of four children, dedicated himself toward helping establish an air defense system for the US.

■ **AIRPOWER NOTES** . . . One of Britain's giant V-class bombers, an **Avro Vulcan,** crashed last month outside London during the last minutes of a highly publicized **proving flight** to Australia, New Zealand, and back. Four of the six-man crew died when the giant, delta-wing bomber crashed in flames at the end of its **26,000-mile flight.** One of the survivors was **Air Marshal Sir Harry Broadhurst,** chief of the British Bomber Command. On the return flight the Vulcan made only two stops—at Aden and Singapore—and averaged more than 500 mph. . . . The **US Navy** has launched its **third super aircraft carrier,** a 60,000-ton flattop of the *Forrestal* class, named the *USS Ranger*. . . . **William E. Boeing, Sr.,** who in 1916 formed the company that later became the Boeing Airplane Co., died of a heart attack in September. At the time of his death, at seventy-four, he no longer held a financial interest in the company. . . . A heart ailment also claimed the life of Britain's **Sir Richard Fairey,** who died in September at the age of sixty-nine. Executive chairman of the Fairey Aviation Co., Ltd., which he founded in 1915, Sir Richard was also the **inventor of the wing flap,** in the 1930s. . . . The **Veterans Administration** has announced that some 5,350,000 veterans will receive **$236 million** in dividends on National Service Life Insurance policies next year, an average increase of **thirteen percent** over payments this year.

Wide World Photos, Inc.

West German Air Force officer examines the iron cross, symbol of the new West German AF, on the side of an F-84.

The AF's rocketry training center at Yuma, Ariz., has been renamed Vincent AFB, in honor of Brig. Gen. Clinton D. Vincent, the AF's second youngest general, who died last year at 40. He inspired Milton Caniff's comic-strip character "Gen. Shanty Town," in "Steve Canyon." **See page 38 for other pictures.**

■ **STAFF CHANGES** . . . **Maj. Gen. Samuel R. Brentnall** has retired. He was Assistant Chief of Staff for Guided Missiles, Hq., USAF. **Brig. Gen. Charles M. McCorkle** now occupies this position. . . . **Brig. Gen. Harvey T. Alness,** Ass't. DCS/Operations, Hq., ADC, has been reassigned as DCS/Plans and Operations, Continental ADC. . . . **Brig. Gen. Robert Taylor,** DCS/Intelligence, Hq., ADC, has moved to the position of DCS/Intelligence, Continental ADC. . . . **Brig. Gen. Arthur J. Pierce,** former Director of Plans and Requirements, Hq., ADC, is now Director of Plans and Requirements, Continental ADC. . . . **Brig. Gen. Haskell E. Neal,** director of Communications and Electronics, Hq., ADC, became DCS/Communications and Electronics, Hq., Continental ADC, on October 1. . . . **Brig. Gen. James W. Andrew,** Commander of the ADC 27th Air Division, has been reassigned as a Special Assistant to the Commander of WADF.—END

What's New With ★ RED AIRPOWER

Here's a summary of the latest available information on Soviet air intelligence. Because of the nature of this material, we are not able to disclose our sources, nor to document the information beyond the fact that the sources are trustworthy.

The name of one Russian Intercontinental Ballistic Missile, according to an unconfirmed report, is "Grom." It means "Thunder."

• • •

For some time construction has been underway on a guided missile launching complex near Vladivostok in Far Eastern Siberia. Presumably the launching pads are for a type similar to the German V-2 of World War II fame. All of Japan is within 1,000 miles of the area; most of it is within 500 miles.

Reported by one source, but otherwise unconfirmed, is a claim that the Russians actually have two missiles that can be launched underwater by submarines. One such missile was reported last year—a large type with a range in excess of 100 miles and suited to large target areas. The new missile is said to be much smaller, intended for small type targets which are not otherwise identified.

• • •

For whatever it is worth, one late Russian rocket powerplant is known to carry the number "742." The number probably refers to the design as it first appeared on paper and so may give some slight indication of the extensiveness of Russian design studies. However, if it is the number of a rocket power plant design actually built, it would mean the Soviets have built a fantastic number of different rocket engines. (It is Russian practice to build a great many prototypes and actually test them out rather than eliminate too many in the paper design stage.)

• • •

Job restrictions imposed on Russian aircraft and other industry workers recently were reduced, by the Presidium of the Supreme Soviet.

Laws passed in 1940 made absenteeism or lateness in reporting to work three times in one month or four times in any two-month span a criminal offense. This might lead to a sentence of six months of labor-corrective work (less desirable and at reduced pay). Furthermore, workers could not change jobs without management's permission, and many skilled workers (especially in defense industry) were compelled to work in certain jobs.

The criminal penalties seem to have been removed in 1951 and 1952, according to recently announced (but never-before published) decrees. And now all of the 1940 laws have been repealed, and workers may leave their jobs after giving the familiar two weeks' notice. However, this will cost them all of the social security benefits built up on their old job.

• • •

The essence of Soviet military structure and doctrine was succinctly stated at the Communist Party's Twentieth Congress earlier this year by Georgi Zhukov in a 2,800-word speech: "American strategy amounts to atomic war kept far from American soil, but that possibility is past; they will get what they give, perhaps more. Our strategic policy is to retain powerful ground forces with a closely co-ordinated set of large sea and air arms; this pattern is not in principle affected by the new military techniques, nor by the atomic, chemical, and bacteriological agents of mass destruction now available."

One Soviet missile design that is supposed to have received much consideration beginning in 1948, at a time when Stalin was pushing his own and captive scientists hard to develop defensive weapons was called "Sokol," which means "Eagle." It is a canard-type missile, with vertical stabilizers (*see diagram*) on the wing tips. An air-to-air type, it was designed for use against bombers.

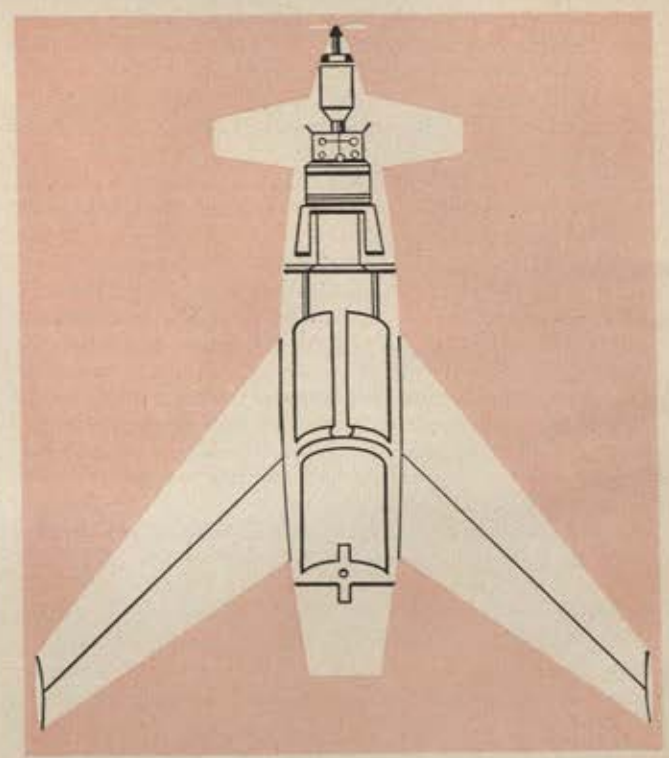
It was expected that this missile, which never was built, would have a range of 1,200 to 1,800 miles. Guidance was to be by means of a VHF pulse-type system, whose operation is not explained. Its top altitude would be just over seven miles. Top speed was expected to be about Mach One.

The warhead would carry incendiary-type high explosives and would be triggered by a proximity fuse. As far as is known, this was one of the many designs the Russians worked up but never built in the immediate post-war period.

• • •

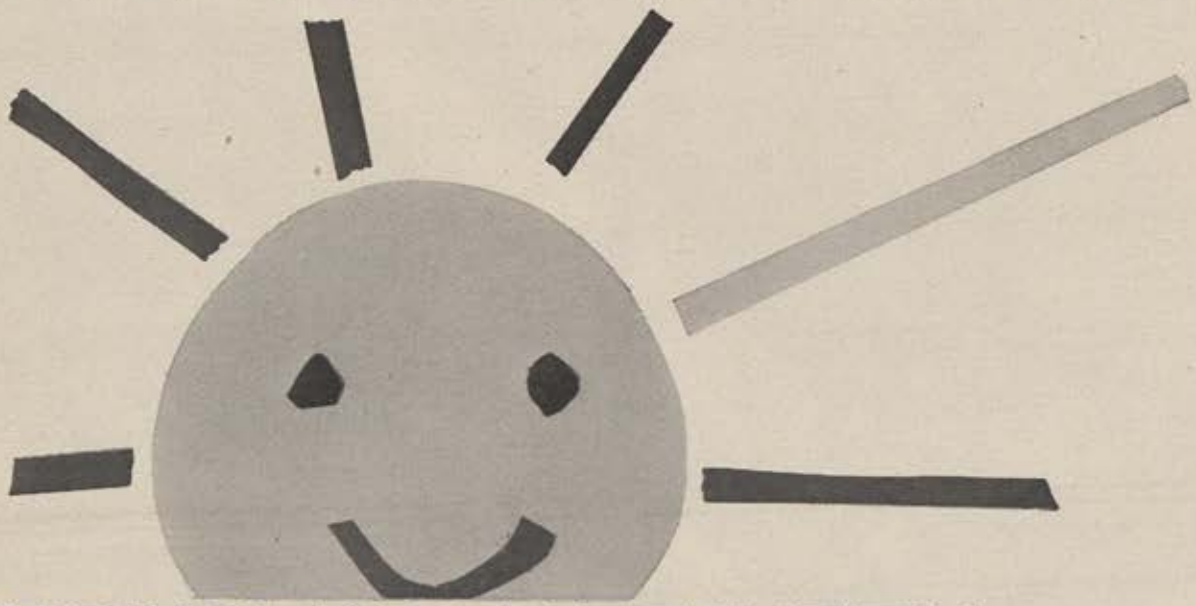
Number Three airfield near Novosibirsk—with two large runways—is claimed by refugees arriving in Berlin to be a test site for missiles, including some that are over sixty feet high (they are launched vertically).

The missiles may be manufactured at nearby Kamenskoye (not to be confused with Ramenskoye, the Russian "Wright Field" not far from Moscow), where there is a large fenced-off area. (Most defense plants are completely fenced in the USSR.)—END



Though never built, Russian "Sokol" or "Eagle" missile was designed for-air-to-air use against bombers. Control surfaces ahead of wing make it canard-type missile.

MORNING 'TIL NIGHT
EVERY HOUR ON THE HOUR



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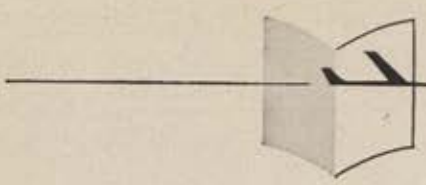

airman's bookshelf

At a time when men of evil purpose are challenging basic American ideals throughout the world, it is reassuring to see a public record of our firm belief in the brotherhood of mankind. Such a record is found in *Rescue*, by Elliott Arnold (Duell, Sloan and Pearce, $5), the story of how the USAF's Air Rescue Service aids civilians in all parts of the world.

This dramatic volume contains thirty-three exciting and heartwarming stories—each a factual tale of disaster in some corner of the globe. Elliott Arnold, author of sixteen books (including *Blood Brother, The Commandos, Time of the Gringo,* and *Tomorrow Will Sing,* and such movies as "Deep in My Heart" and "Broken Arrow"), traveled the Air Rescue circuit world-wide. He spent nearly nine months living and flying with the men who live their motto "That Others May Live."

Arnold gathered an incredible amount of detail from the rescue crews, from unimaginative mission reports, and from people in many foreign lands to whom an air rescue crew and aircraft meant the difference between life and death. Into these stories he has blended absorbing, colorful background.

The knowledge that military airpower—usually thought of only as a destructive force—can make a positive contribution to society gives new meaning to American democracy. Of this Arnold writes: ". . . the young men of the [USAF] Air Rescue Service have won for themselves a very special place in the deepest part of the hearts of many plain and silent people around the world. It is not very often that this feeling can come out beyond a brief prayer or a handclasp or a thank you. But on very rare occasions it can emerge crystal clear as something else, and at those times, wherever it happens, it is happening for all people in all the other places who never had a chance to show it but who would . . . in their own way, if they could." And it is these plain and silent people who are so important.

Rescue is not only an outstanding airpower book; it is also one of the most effective documents to counter Communist propaganda about American policy objectives abroad.

Another inspiring example of humanitarianism is found in *Battle Hymn*, by Col. Dean Hess, USAF (McGraw-Hill, $3.95), an unusual, moving autobiography of an Air Force fighter pilot. When the Japanese struck Pearl Harbor, Rev. Dean Hess, a Protestant minister, was serving three small churches near Cleveland, Ohio, and to make ends meet fired boilers at night in a steel mill. A few weeks after Pearl Harbor, Hess, who as a minister was draft-exempt, enlisted for combat service. His conscience would not permit counseling others to fight or give sons to battle without fighting himself. He signed up for service in the Army Air Corps and was sent to Maxwell Field. There he began a career that allowed him to minister to the spiritual needs of his comrades while flying more than 300 combat fighter missions in World War II and Korea.

If any one event led to what he considers his greatest achievement, it happened in the skies over Germany in World War II. A hung-bomb, accidentally released, plummeted into the side of a huge building. After the war he visited the German village where it happened and saw what remained of the structure he had unintentionally bombed. He learned it had been an orphanage, and that his bomb had killed a number of children.

His hour of atonement came during the Korean war. In 1951 hundreds of destitute war orphans were about to be engulfed by the onrushing Chinese Communist armies. Through tireless efforts Colonel Hess gathered these youngsters at Seoul City Airport and with Fifth Air Force transports had them flown to Cheju Island off the southern coast of Korea in the famous airlift "Operation Kiddy Car." On Cheju, Hess begged, borrowed, and finagled to provide these homeless, nameless tots with food, shelter, and clothes. And it was here that the great story begins of the organization and building of a Korean Orphanage, of which he is now a Director.

Battle Hymn is the story not of a big man, but of a great man, who translates his dedication to God, country, and mankind into tireless, unselfish service. The Universal-International motion picture, "Battle Hymn," based on his book, will be released in March 1957. All royalties and profits from both movie and book will go to the Korean Orphanage that Colonel Hess founded.

Vision: A Saga of the Sky, by Harold Mansfield (Duell, Sloan and Pearce, $5), is an interesting narrative chronicle of the long line of Boeing airplanes from the 1915 "B&W" to the B-52, the KC-135 and its "civvy" counterpart, the 707; and ground-to-air pilotless aircraft, from GAPA 600 to the IM-99 Bomarc. It is a lively and valuable popular history.

Mansfield, Boeing's public relations chief, took a year's leave of absence to research and write the Boeing story. In spanning the era from the stick-and-wire crates to the intercontinental jets, he unfolds the hectic events behind the failures and triumphs in design, development, and flight test. Of special historical interest are the detailed accounts of the evolution of the family of Boeing bombers. The sections dealing with the B-17, B-29, B-50, B-47, and B-52 are excellent.

But *Vision* is more than the story of airplanes. Behind the machines, from the weird early birds to the jets and beyond, stood men of vision, courage, and determination—pioneers of the air. And it is the story of these men that gives flavor to the book and propriety to the title.

For the young readers there are two very worth-while new air books. C. B. Colby, well known aviation writer and former war correspondent, has added another volume to his Colby Book Series. *Operation Watchdog: Rockets, Guided Missiles, Aircraft and Radar of Our Defenses* (Coward-McCann, $2), is a beautifully illustrated, forty-eight-page, oversize book about the men and the weapons that provide America's air defense. This factual, authentic picture story of Continental Air Defense Command is one of the best simplified presentations we have seen.

Tops in teen-age fiction is a new novel, *Sabre Pilot*, by Stephen W. Meader (Harcourt, Brace, $2.75). Steve Meader, one of America's most successful and popular writers of books for young people, comes up with a fast-moving adventure story about an Air Force jet pilot.

This story is based on authentic background Mr. Meader gathered from research trips to various Air Force bases, personal interviews with AF jet aces out of Korea, flights in AF jet fighters, and official records from the Korean war. In an unusual foreword Meader says, "I have tried to put into this story some of the boundless respect and admiration I feel for the Air Force [his two sons, Steve, Jr., and John are former AF pilots]. If the book helps to inspire even a few readers to choose careers in the air, I shall be satisfied."—End

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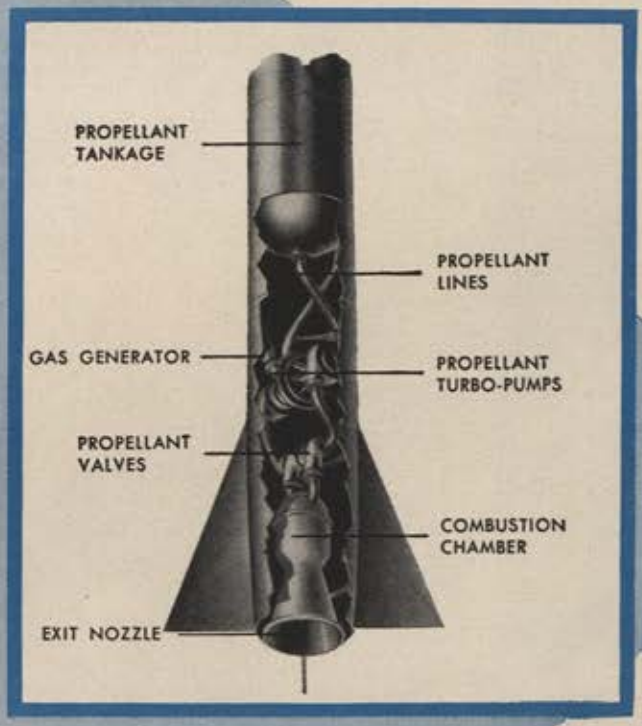

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Rocket engine designs are governed by the requirements of their installation and function. RMI has had extensive experience in the development of pressurized liquid propellant engines, multichamber engines, variable thrust liquid propellant engines with a wide range of power outputs. RMI has also been extensively engaged in advanced research on the design and development of improved solid propellant rockets.

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Unparalleled practical experience has been obtained by RMI through the application of liquid propellant rocket engines as the primary or permanently installed auxiliary power source for piloted aircraft, providing an unequalled technical foundation for current projects in this field. Continuous advancement and important technological breakthroughs at RMI are contributing to the development of superior power sources and component systems to meet the challenge of tomorrow's unprecedented requirements for piloted aircraft, missiles and satellites. RMI's extensive program of physical, chemical, and engineering research assures continued technical leadership in the field of rocket propulsion.

Currently, RMI is engaged in the development and production of complete rocket propulsion systems for major military requirements. Important supporting programs are also in progress concerning advanced liquid and solid propellant chemistry, combustion research, and the development of improved rocket system components.

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Rocket-on-Rotor (ROR) provides safe, dependable auxiliary power for helicopters, increasing take off payload capabilities, raising hovering ceilings and increasing power-off glide range.

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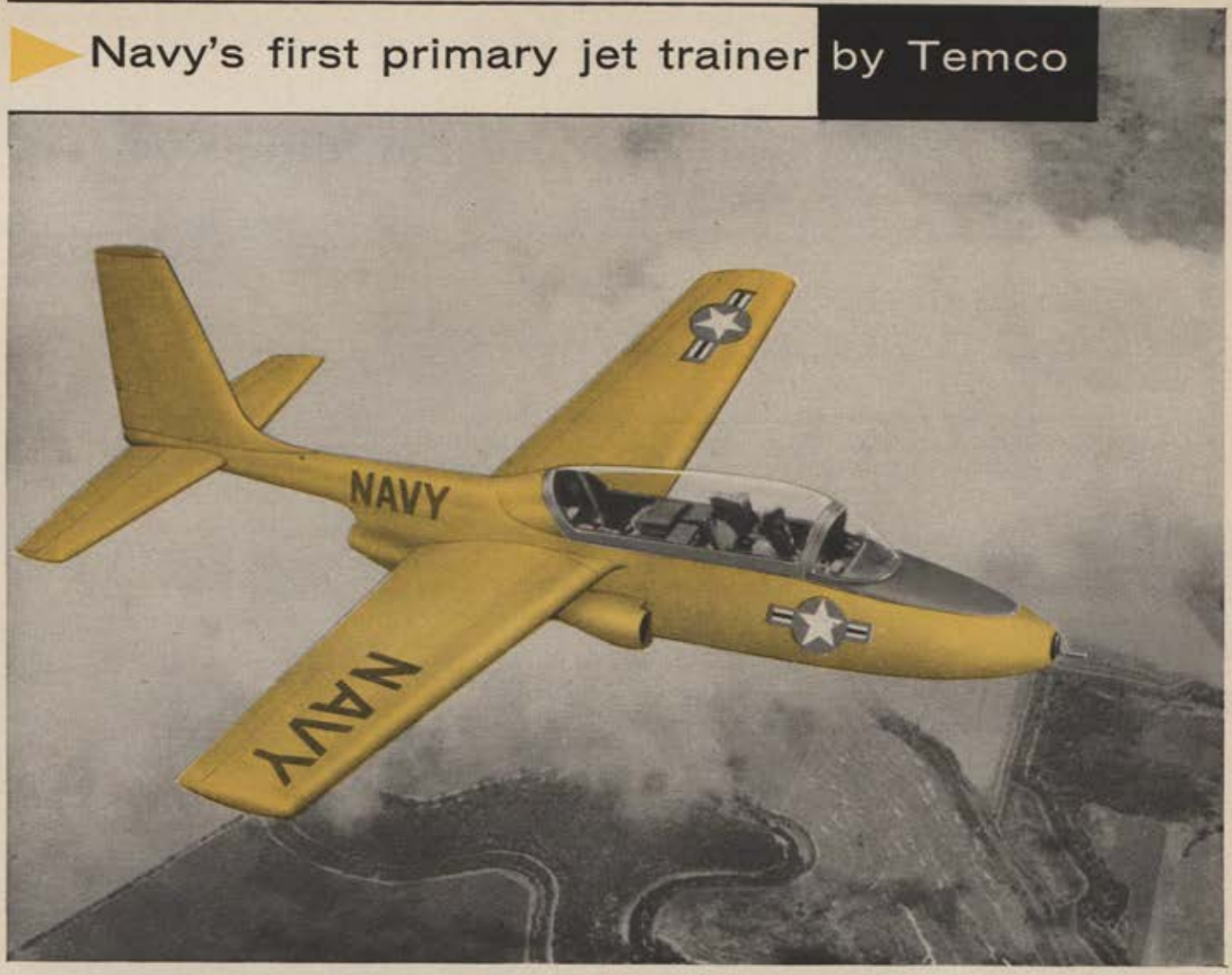
Navy's first primary jet trainer by Temco



Ready today for training tomorrow's jet pilots

Now it's jet training from the ground up!

Temco's two-place jet trainer — the Navy's TT-1 — opens up an entirely new concept in military flight training. Now, student pilots can actually begin their training in a jet aircraft.

Temco developed its fighter-type trainer to give fledgling pilots jet wings at the very start . . . to shorten the number of hours required for military flight training programs. Outstanding safety features, ease of handling, plus the flight characteristics of true jet performance make the TT-1 today's most efficient answer to the needs of military training commands.

The TT-1 will be a "new" aircraft tomorrow and for years to come, thanks to its carefully engineered growth factor. Temco designed its rugged trainer to permit important up-to-the-minute changes with only minor modification.

Proving its worth in competitive flight evaluation tests at the Patuxent River Air Test Center, Temco's jet trainer won its Navy wings in June to bring closer the day when a cadet flyer's first solo will be jet-powered.

Engineers: Openings in all phases of aircraft design and development; write to Joe Russell, Engineering Personnel, Temco Aircraft Corporation, Dallas, Texas.

TEMCO

AIRCRAFT CORPORATION, DALLAS

SHOOTING THE BREEZE

WITH THE EDITORS OF AIR FORCE MAGAZINE

On or about the first of the year, the Air Force Association plans to announce the formation of its Airpower Book Club. The Club is designed to serve two purposes:

First is to make available to Club members the best in airpower literature at minimum prices, with discounts of up to forty percent from retail prices.

And second is to stimulate a new and significant reservoir of airpower books by establishing a new and dependable market for such literature.

The tentative operating plan for the Club provides that members will be offered a minimum of six titles per year at $3 each, plus shipping charges, or a Club membership payable in advance at $18 annually, with no charge for shipping. Book Club selections will be made by a committee of nationally known specialists in various fields of airpower activity.

Club membership will not be restricted to AFA members, although consideration is being given to a plan that would give AFA members added Club benefits.

The Air Force Association has assumed responsibility for organizing and managing the Airpower Book Club at the request of the Air Force itself. To explain how this came about, some background information may be helpful.

Some time ago, Gen. Curtis LeMay surveyed the SAC career officers who were stationed at Offutt AFB to see how many would join an Airpower Book Club if it involved an expenditure of up to $25 annually. Seventy-six percent of the officers indicated positively that they would join such a club. The Club idea was then suggested to the Air University, Maxwell AFB, Ala., as a possible project.

Air University conducted an Air Force-wide survey, which revealed that thirty-six percent of Air Force officers and sixteen percent of the airmen said they definitely would join an Airpower Book Club.

Further, forty percent of officers and thirty-one percent of airmen would probably join.

The Air University then investigated ways and means of beginning the Book Club, including soliciting bids from commercial book club management firms.

Further study led USAF Headquarters to conclude:

- That an Airpower Book Club was desirable and would succeed.
- That is was not feasible for the Air Force to attempt to manage the Club.
- That it should not be turned over to a commercial firm, but, rather, that the Air Force Association, a nonprofit organization, be asked to take on the Club as a project.

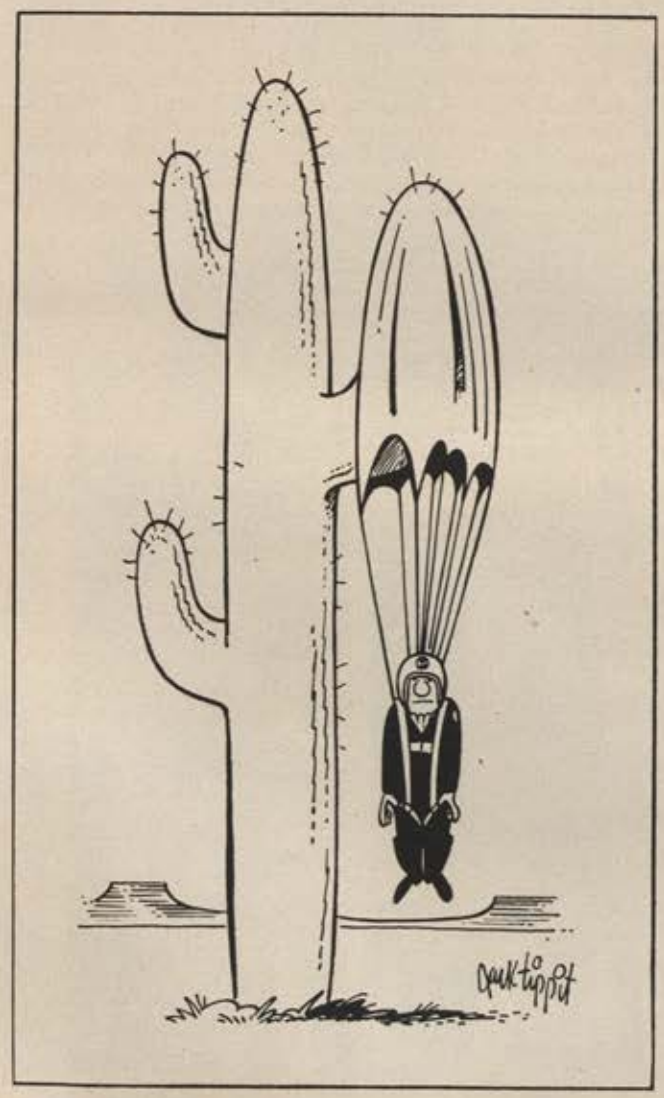
Headquarters USAF subsequently endorsed these conclusions, and the Air Force, in a letter from the Vice Chief of Staff, assured the Air Force Association of "wholehearted Air Force cooperation and assistance." The Air Force Association agreed to take on the Club, incurring substantial financial risk thereby.

But in the last analysis, readers of AIR FORCE Magazine are the people who can help make this Club successful. We solicit your suggestions, and will appreciate your help.

(Continued on following page)

Terry Gorman is our "Shortcake" girl for November. She's certain to become a candidate for our regular "Breezecake" in the future. At the moment she is concerned with a quarter-scale model of the Aerobee-Hi, a high-altitude sounding rocket that is probing the outer reaches of space to gather secrets that will be used during her rocket-age life. Terry lives in New York City where she visited the New York Coliseum to see the displays of the Instrument Society of America. In less time than it takes to blast off an Aerobee, she was crowned "Little Miss Vanguard of 1956," by the Aerojet-General Corp. and placed in their attractive display. Before the "count down" had reached zero, she was acquainted with the fact that more than 150 Aerobees have been launched by physicists to gather data on high-altitude flight. Their findings will play an important part in the earth satellites to be launched during the International Geophysical Year starting late in 1957. The left background of the display shows an artist's conception of the Vanguard satellite as the first-stage engine drops off and the second-stage powerplant thrusts the satellite-carrying rocket still farther into outer space. Aerojet-General is developing the second-stage rocket motor for the program. Our little "Shortcake" girl orbited the display with delight.

A kiss for daddy's line chief, M/Sgt. Leonard Loomis, from Susan Ann, daughter of Lt. Col. Philip Loring, CO of ADC's safety-award-winning 48th F-I Sqdn. (see text).



Two years of accident-free flying is a remarkable record, and the 48th Fighter-Interceptor Squadron at Langley AFB, Va., can be proud of their new title of flying safety champions of the Air Defense Command. As of last month, this squadron had logged 18,000 hours of accident-free flying, mostly in Lockheed F-94C Starfires. Lt. Col. Philip N. Loring, squadron commander, and M/Sgt. Leonard W. Loomis, the line chief, jointly accepted the USAF's Flying Safety Award (*see cut*) **from Brig. Gen. James A. McCauley, acting commander of Eastern Air Defense Force, at a ceremony at Langley AFB.**

☆

News comes from England that the St. Clement Danes Fund has received a total of $20,177.30 for the memorial organ to be installed in the historic St. Clement Danes Church in London. Our August and October issues carried an appeal by Maj. Gen. Roscoe C. Wilson, Commander of the Third Air Force in England, for a total sum of $75,000.00 to pay for an organ for the church to serve as a memorial to USAF airmen who died while serving in Britain. General Wilson, who spearheads the drive for funds, tells us that receipts are coming in daily, but the fund stands at less than one-third of the goal. We have received and passed some contributions on to the Fund, and we will be pleased to continue to do so. Send your donations to: St. Clement Danes Fund, Air Force Association, Mills Building, Washington 6, D. C.

☆

Our local paper the other day carried a wire service photo of Mrs. Alfred Ellis, "Mrs. US Navy," complete with helmet, goggles, and a big smile. The caption described her as "the first woman passenger to break the sound barrier." This probably should have said "first Navy wife passenger to break the sound barrier" (her husband's stationed at Norfolk), since our DelVina Wheeldon—see "What I Learned by Flying Faster Than Sound," AIR FORCE, August '56—has a firm claim on this title. DelVina's Mach-breaking flight of 830 mph in a Lockheed F-94 Starfire was made last May 12. For more on why DelVina made the flight, and what she's done since, see "Air Mail," on page 6 of this issue.

☆

A well known, beloved figure in aviation and newspaper circles, Wayne McIntire Weishaar, died late in September in Washington. He was sixty years old. A native of Rhodes, Iowa, Mr. Weishaar was secretary-treasurer of the Aeronautical Training Society at the time of his death. He began his newspaper career as a reporter for the Des Moines *News* in 1919. After working for the Associated Press, Des Moines *Evening Tribune*, and the Des Moines *Register*, he became aviation editor of the New York *Herald Tribune*, a position he held from 1929 to 1935. He joined the Aeronautical Training Society in 1943 as information director. He is survived by his wife and one son.

☆

CBS television's new program "Airpower," billed as "the story of flight and Twentieth Century man," will make its debut on November 11 at 6:30 p.m., EST. According to CBS, "Every advance in aviation reflects the changing times and the changing world. The heroes of aviation are here: Rickenbacker, Doolittle, Lindbergh. But the heroes of history are intertwined in the story of 'Airpower':

(Continued on page 38)

THIS IS

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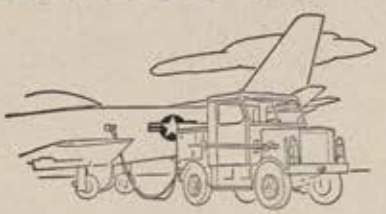
GROUND SUPPORT !



To meet the vital jet age needs of ground support, Consolidated has devoted its fullest resources developing both single and multi-purpose units . . . proven efficient . and now in active service. Typical of these units is the Consolidated Model 2001 (U.S.A.F. MA-1). This highly compact self-propelled vehicle combines in a single unit all requirements for towing, testing, servicing and starting jet aircraft.

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- **A.C. POWER . . . 30 KVA, 400 cycles, 3 phase and 10 KW 1 phase, close regulated.**
- **D.C. POWER . . . 28.5 volts, up to 2250 AMP. For Split or single bus start and servicing.**
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- **TOWING . . . All-wheel drive vehicle with mechanical or torque converter transmission, as desired.**

IN ACTIVE USE WITH U.S. AIR FORCE, NAVY AND MARINE UNITS . Other models of single and multi-purpose ground support equipment are available with any combinations of . . . AC and DC power . . . high pressure air, hydraulics, and low pressure air . refrigeration and heating.

CONSOLIDATED'S resourcefulness in solving the most challenging problems in the design and manufacture of ground support equipment attests to its ability to develop specialized units to fit your individual needs.

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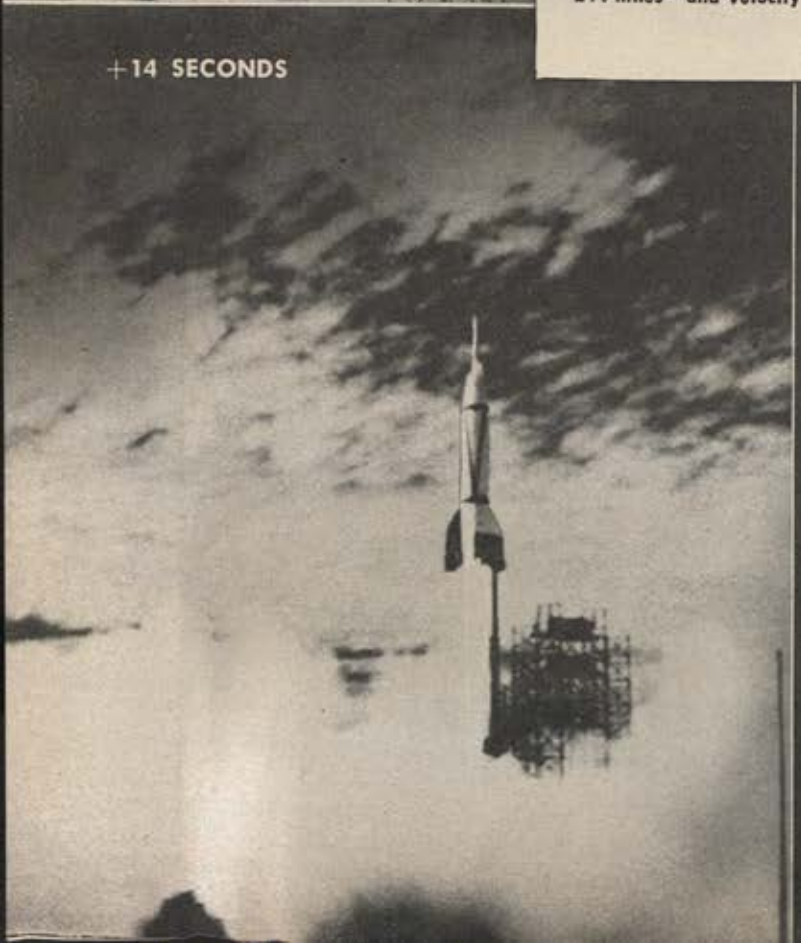
How General Electric Experience

1949—PROJECT BUMPER—The fifth of these two-stage rockets, fired by General Electric in 1949, established new records of altitude—244 miles—and velocity—5150 mph.



Advances Missile Technology

General Electric's Project Bumper established new records of altitude and velocity. But far more important is the valuable research data compiled in the successful completion of the Bumper project. Many problems were overcome with Bumper—problems in temperature, telemetry, separation, and aerodynamics. Bumper helped solve the problems of communicating with missiles at extreme altitudes, and was a major preliminary step in the development of a satellite. In solving these and other problems, General Electric has contributed a wealth of research data to the missile industry—information that is being utilized on the nation's top priority ballistic missile project.

General Electric's Special Defense Projects Department presently is working on an Air Force prime contract to develop the ICBM nose cone. Programs are being carried out in such varied fields as communications, hypersonics, metallurgy, mathematics, and thermodynamics to support this nose cone contract.

General Electric has formed the Special Defense Projects Department to act as a Company focal point for large, highly complex missile projects. Scientists in the new department, backed up by the vast resources of many General Electric operating departments and laboratories, are currently working to solve the perplexing problems associated with the ICBM nose cone and other missile projects.

By focusing this wide range of specialized talents of General Electric personnel on highly complex defense system problems, the Special Defense Projects Department is making significant contributions to America's defense program. Section 224-5, General Electric Co., Schenectady 5, N. Y.

ENGINEERS: G.E.'s Special Defense Projects Department is currently expanding its staff of highly skilled engineers and scientists. If you have a background of successful creative engineering, send your qualifications to: Mr. George Metcalf, General Manager, Special Defense Projects Department, General Electric Co., 3198 Chestnut St., Philadelphia, Pa.

TODAY—**CONTINUED RESEARCH AND EXPERIMENTATION in advanced missiles and missile systems is helping solve such advanced problems as development of the ICBM nose cone. Headquarters for General Electric's participation in these programs is the Special Defense Projects Department in Philadelphia, Pa.**

MR. ROBERT P. HAVILAND, Flight Test Engineer at SDPD, directed Project Bumper and other advanced programs, gaining valuable experience which he is currently applying to present missile programs.

DR. YUSUF A. YOLER—widely known for research in hypersonics—is currently engaged in the design and development of wind tunnels, shock tunnels, mass accelerators, and other facilities for continued progress in missile systems.

Progress Is Our Most Important Product

GENERAL ELECTRIC

RENDEZVOUS

Where the Gang gets together

MEDAL OF HONOR MEN: The Congressional Medal of Honor Society of the United States, Inc., is holding its first National Convention in Lakeland, Fla., during the period November 9-14, 1956. Lt. Gen. Leon W. Johnson, USAF., President of the Society, and the Board of Governors accepted the invitation of Gov. LeRoy Collins of Florida and Mayor Mac Cunningham of Lakeland to hold their Convention in the Sunshine State.

Membership in the Society is restricted to persons who have been awarded the Congressional Medal of Honor by the Congress of the USA, and one of the organization's principal objectives is to "assist the recipients of the Congressional Medal of Honor, their wives, and the families of the posthumously awarded Medal of Honor recipients, by sponsoring educational opportunities and providing counsel to all of them."

The city of Lakeland has invited to be guests of that city not only members of the Congressional Medal of Honor Society but all holders of the Medal and their wives, or one member of their immediate families. This invitation includes complimentary hotel accommodations, meals, and entertainment provided by the city.

Richard W. O'Neill, Executive Director of the Society, has been appointed the Convention Chairman and has issued Convention notices and invitations to all Medal of Honor holders. The Society has experienced some difficulty in contacting Medal of Honor holders other than those who are members of the Society because of the absence of a central locator file which maintains address changes on the winners. It is urgently requested that every recipient of the Medal who has not received correspondence inviting him to the Convention contact *Mr. Richard W. O'Neill, 36 West 44th St., New York 36, N.Y.* Other queries may be referred to *Lt. Gen. Leon W. Johnson, Rm. 2E924, The Pentagon, Washington 25, D.C.*

389TH BOMB GROUP: I am anxious to get in touch with former members of my old outfit, the 389th Bomb Group, stationed in England in 1943. *Capt. Morton B. Sherwood, USAFR, 18 Autumn Lane, Hicksville, L.I., N.Y.*

SALVO AT 40,000

This split second in the RCAF's radar-controlled lead collision course attack technique demonstrates the most powerful weapon in air defence. Automatically released, a salvo of rockets from the Avro CF-100, packing the punch of a destroyer, *boxes the target in a lethal concentration of fire power.* Interceptor squadrons of the RCAF being equipped with the Mk. 5 variant of the CF-100 . . . capable of operational performance at high altitude . . . practice rocket firing day and night, as part of their round-the-clock alert.

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Cessna T-37 designed for Jet Training

To meet jet age demands, the U. S. Air Force requires a jet trainer that makes it easy for cadet-pilots to master first-line combat airplanes.

The Cessna-developed T-37 introduces the cadet to all combat jet airplane characteristics while training on this safe, easy-to-fly jet trainer.

It is designed to provide the Air Force with a jet trainer that can be operated at substantial savings and cover the most important and longest phase of the cadet-pilot's jet training.

It is a privilege for us here at Cessna to team with the Air Force in its forward-thinking plans for the jet age. CESSNA AIRCRAFT COMPANY, Wichita, Kans.

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T-37 take-off, a safe, easy move into first-line jets for Air Force cadet-pilots.

Be an Aviation Cadet. Inquire today about the future your Air Force offers from your Air Force Recruiting Office.

An Editorial

A MILITARY HOUSE DIVIDED

What the AF agreement to accept six-month trainees means

MILITARY Washington is a house divided against itself. If the old adage of "divided we fall" holds true, the situation is ominous, indeed.

The article "What Kind of War?" on page 43 takes up the issue directly in terms of service desires vs. the national need. "The Ready Room" on page 92 does not mention the problem specifically, but nonetheless is part and parcel of it.

This report tells that the AF has accepted a quota of 2,500 young men in this fiscal year to serve six months of active duty and then be mustered out for 7½ years of service in the AF Reserve. This, in itself, seems innocuous enough. And the fact that the AF has committed itself to accept some 4,000 more six-months' trainees during the next fiscal year does not seem to be earth-shaking.

But this action by the Air Force represents an approach to the military manpower problem which is not only archaic but in the long run potentially dangerous.

On behalf of the Air Force, it must be said that the agreement to accept six-months' trainees, whatever the number, was reached only after many months of all-out opposition to such a plan, months of hard and relentless pressure from the Department of Defense, represented by one of its many Assistant Secretaries, Carter L. Burgess.

It's also true that the six-months' trainee plan was dangled as bait before the AF with the implied threat that if they would be "good boys" and knuckle under on this, it would be easier to achieve some of the personnel requests of interest to the Air Force, which were being pigeon-holed in the Defense Department. Chief among these was the Air Technician Program—of major importance to the progress of the Air Force Reserve.

Back in our April issue we commented on this bit of blackmail. This article by Edmund F. Hogan, our Reserve Affairs Editor, concluded: "We hope the AF holds tight and refuses to make a 'deal' in order to get air technicians despite the obvious need for them. Once it becomes party to gangsterism, there'll be no end to it."

Gangsterism doesn't look any better to us today than it did then. Now that the Air Force has become party to it, we can only deplore the AF decision and reaffirm our opposition to the Defense Department's supposed cure-all to our manpower ills.

In so doing, we hardly expect to be heard above the drum-beating that has been going on to sell the six-months' military training package to the nation. Every promotion trick in the book has been applied to this one in what a national commentator has referred to as the most extensive propaganda campaign in many years.

Despite all this, the National Security Training Commission recently released a report indicating that the Fancy-Dan recruiting campaign has been something of a flop. Army spokesmen have replied that it is not as bad as all that.

Whatever the case, we can't overlook the prevailing philosophy behind the program or the so-called military requirement on which it was based.

The Air Force Association minced no words on these matters in its testimony on March 3, 1955, before the House Armed Services Committee, concerning the National Reserve Plan, which provided for the six-months' training program. The testimony was presented by AFA's Executive Director, James H. Straubel. For the record, here are a few excerpts from this testimony:

"The question of equity is a huge one and can be easily over-simplified. Certainly, there is an *equity of obligation* to help defend this nation on the part of every citizen, but it need not follow that this means *equity of service*. The first is inherent in our way of life. The second should be dependent upon the military requirement. . . .

"Testimony on this bill indicates some lack of understanding of the Air Force's manpower requirements. For example, take the Air Force requirement for a minimum four-year tour of duty. One major proponent of the National Reserve Plan, during testimony, in questioning the stated Air Force requirement, noted that the first World War 'was won by men who had not been in two years, because it didn't last that long.' . . . There appears to be more than a little World War I thinking behind this legislation. If we gear our thinking to World War III, and ways to prevent it, and if we logically start with the military requirement, we run headlong into the needs of the active Air Force establishment. . . ."

That was the situation as AFA saw it then, and we find no reason to see it differently now. Indeed, with our new knowledge of Russia's vast educational program to build up its scientific and technical talent, we find more reason than ever for a different national approach to the military manpower requirement.

Meanwhile, in a military house divided against itself, our policy-makers continue to take off in various directions.

One of the major manpower issues now up for decision in the Pentagon is a new salary plan for airmen technicians. The AF has presented the need, and quite adequately, we believe, for a new pay scale based on priority skills. The subject is being investigated by the Cordiner Committee. And we understand that in the inner circles the AF proposal is being strongly opposed because it does not meet the needs of the surface forces, which have far less of a requirement for skilled technicians.

If experience is any teacher, this will be cause enough to scuttle the new pay scale program. If that happens, it will be one more barrier against solving the nation's manpower dilemma—and one more reason why we could lose a war of tomorrow in the classrooms of today.

Six months of military training—as the prerequisite for service in the Air Force, either the Regular or Reserve establishment—is an insult to one's intelligence in this air-atomic age.—END

Sketch by Caniff of his friend Brig. Gen. "Casey" Vincent.

Cartonist Milt Caniff (right) with his longtime friend, Col. (later Brig. Gen.) Clinton D. "Casey" Vincent, who died in July 1955 and for whom Yuma AFB has been renamed (see "Airpower in the News," page 19). This picture was taken in 1943, the year Caniff first introduced the character of "Vince Casey" into "Terry and the Pirates," the comic strip he was then drawing. "Vince Casey" appeared in "Terry" during the rest of the war, and this year the cartoonist again drew on the character of General Vincent to create "Gen. Shanty Town," in "Steve Canyon." Like his real-life prototype, "Shanty Town" worked himself to death. When the question was raised about the need for such drive in peacetime, Caniff pointed out that "Pearl Harbor wasn't important either—until December 7, 1941."

Winston Churchill, Franklin Roosevelt, Dwight Eisenhower. The different moods of the Twentieth Century history are here: World War I, World War II, the Cold War. But the daffiness of the Twenties, the despair of the Thirties, the triumphs of the Forties, the problems of the Fifties, these are reflected in 'Airpower,' too."

In announcing the beginning of the twenty-six-week series, CBS says (and we agree), that "man's conquest of the air is the most dramatic—and in many ways the most significant—achievement of modern civilization." The series, produced by Perry Wolff, will be narrated by Walter Cronkite.

☆

A story in the Houston *Chronicle* is encouraging in these days of "doom and gloom" on the scientific manpower front. According to the *Chronicle*, two Mobile, Ala., teen-agers, Bruce Keenan and Teddy Panayotoff, built a rocket engine from spare odds and ends. Keenan is in his first year at the University of the South, Sewanee, Tenn., and Panayotoff is a science student at Murphy High School in Mobile. Panayotoff said, "The motor body was an old, compressed-air cylinder my sister found, and we got the ten feet of copper tubing for around the motor from a junk company."

"They also bought the fuel cylinders," the story continues, "one for butane, the other for compressed oxygen, from junk companies, and used an induction coil from a Model-T Ford to give the spark. Power is supplied by four six-volt batteries."

As a result of their work, the two boys will probably receive an invitation to the Redstone Arsenal at Huntsville, Ala., where their engine could be tested in an airframe.

☆

Somehow along the line we forgot to mention that we were the recipient of a left-handed sort of award during the past summer. Based on artist Gil Walker's sketches of the San Francisco convention in our October 1955 issue, the Art Directors Club of Metropolitan Washington gave AIR FORCE Magazine and Mr. Walker its Distinctive Merit Award for black-and-white illustration.

☆

We felt the following excerpt from a speech by AF Secretary Donald A. Quarles in Los Angeles last month was worth repeating as a footnote to all the talk about the nature of deterrents and their role in so-called "limited" wars.

"A deterrent," Mr. Quarles said, "that is effective in preventing global war can also be effective against limited war. If we examine the factors which characterize an effective deterrent, we find they are the same whether you apply them at one end of the scale to deterring global war or at the other to deterring local war. These are the same factors which deter any kind of anti-social action.

"First, a deterrent must be *sure;* it must work every time. Second, it must be *quick;* one which delays too long may be too late to be effective. Third, it must be *decisive,* allowing no residual gain to the aggressor. And, fourth, the existence of the deterrent, and its capabilities, must be *known* to the potential aggressor. A deterrent which is hidden from the aggressor is no deterrent at all, for it will not keep him from committing aggression and, in the case of nuclear attack, from precipitating wide-scale devastation."—END

Bendix Leader in All Types of Ignition . . .

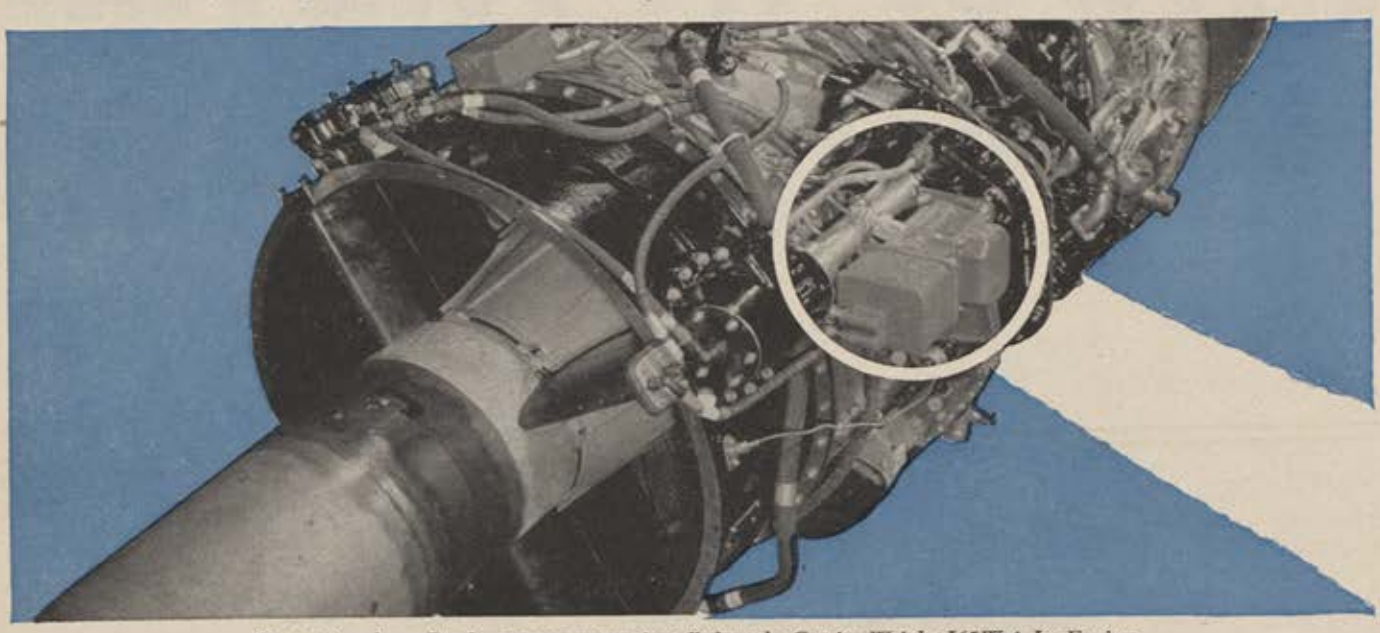
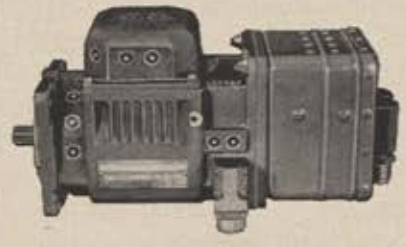


Illustration shows Bendix TMGLN *system installed on the Curtiss-Wright J65W-4 Jet Engine*

Offers the first self-contained JET IGNITION SYSTEM



This TMGLN *jet ignition system has been performance proven and is currently in production on Curtiss-Wright J65W-4 Engines for carrier based aircraft.*

Bendix* proudly announces the first self-contained jet engine ignition system. This system generates within itself the electrical energy required to fire the engine igniter plugs. This unique system, known as the TMGLN jet ignition system, employs a magneto type alternating current generator which allows the ignition system to operate independently of an outside source.

Here is just another example of the ability and versatility of Bendix to come up with the best solution to any and all jet ignition problems.

Whether your requirements call for the TMGLN self-contained system or the conventional battery energizing type of jet ignition, you'll do better with Bendix—The Most Trusted Name in Ignition.

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Early proof of an engine's in-flight performance is made possible by the use of flying test beds—aircraft specially modified to accommodate the new engine. Test-bed aircraft were successfully used in developing the P&WA J-42, J-48, and J-57 turbojets, as well as turboprop and piston engines. Extensive operation at actual altitudes and speeds supplements and corroborates data secured in engine test cells and laboratories . . . and is vital if the performance of a new power plant is to be explored fully, and its reliability completely proved.

A major contribution to U. S. aviation, the J-75 turbojet will continue Pratt & Whitney Aircraft's leadership in the design, development, and production of both military and commercial aircraft engines.

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A J-75 TURBOJET ENGINE flies regularly beneath this special North American B-45 test-bed in its current exhaustive flight development program. The pod-mounted engine retracts into the bomb bay when not in operation. The J-75 has been announced as the engine for the Air Force Republic F-105 and the Navy Martin P6M.

The C-123 can't land on a postage stamp . . .

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On almost any clearing – almost any field – you can safely land the Fairchild C-123 assault transport.

Actual short-field tests have demonstrated that the rugged C-123 is able to take off and land from *deeply eroded, sandy fields;* that it can work from unprepared clearings *under downwind conditions;* that it is capable of mass landings into ungraded "combat zones" . . . *at 8-second intervals.* And literally thousands of flights have proven that the C-123 requires *no more than 700 ft. for takeoffs and landings.* During these strenuous tests, no C-123 was lost, none was damaged.

What better proof of the C-123's near-universal assault and logistics capability?

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. . . WHERE THE FUTURE IS MEASURED IN LIGHT-YEARS!

AIR FORCE
NOVEMBER 1956

What Kind of FORCES

For What Kind of WAR?

We cannot let over-preoccupation with the wrong kind of little war jeopardize our ability to deter or win the big one

By John F. Loosbrock
MANAGING EDITOR

O TRUE believers, take your necessary precautions against your enemies, and either go forth to war in separate parties, or go forth together in a body."

The above quotation, frankly taken out of context, is from the Mohammedan Koran. It was written many centuries ago. Yet in many ways it is pertinent to the situation in the Pentagon today. For as one reads the statements of the protagonists of the various services, it might appear that they have not yet made their choice between going forth to war "in separate parties" or "together in a body."

Nowhere is divergence of opinion so evident as in discussions of the so-called "little war." There is quite general agreement that the best way to win the "big war" is to avoid it altogether. And likewise there is little quarrel nowadays with the thesis that the best way to avoid it is the maintenance of a deterrent striking force of such strength that no aggressor can see profit in beginning hostilities. Whether we are actually maintaining such a force is a matter of considerable dispute, but the argument is one of degree rather than general principle.

Much of the current discussion hinges on the thesis, proposed by some, that we somehow can simultaneously be strong enough to deter or win the "big war" but not strong enough to deter or win the "little war."

Mr. Quarles, the Secretary of the Air Force, touched on this briefly in an October speech to the National Guard Association. He said, "It seems logical if we have the

(Continued on following page)

strength required for global war we could handle any threat of lesser magnitude. Nevertheless, the very fact that total war has been deterred so successfully has served to spotlight the threat of local or peripheral conflicts."

Certainly there has been considerable preoccupation with the little war of late—in public speeches, in the press, in testimony before Congress, and in Joint Chiefs of Staff meetings in the Pentagon's E-Ring.

But few of these discussions—the public ones, at any rate—are getting to the heart of the matter. Allusions to the threat of peripheral conflicts have been largely quite general in nature, seldom touching on precisely where these conflicts are mostly likely to occur, what form they might take, the amount and kind of warning we might expect, or the type and scale of operations we should be prepared to counter.

But despite the absence of such specifics, too many persons are drawing from the little-war discussions some conclusions that are neither supported by fact nor by logic. If the threat of local conflict is, in fact, increasing, the growing credence being given these home-grown conclusions merits more examination and explanation than it has thus far received.

The Air Force view has been quite well outlined by Mr. Quarles, in the above quotation and in an address before the National Security Industrial Association. In the latter he said:

"From now on, potential aggressors must reckon with the air-atomic power which can be brought to bear immediately in whatever strength, and against whatever targets, may be necessary to make such an attack completely unprofitable to the aggressor.

"One occasionally hears the fear expressed that this strategy applied to limited war would lead, step by step, to total war. Let me say that I certainly share the view that limited war might graduate into total war. This is the main reason why we should exert every effort to prevent war in any form. But, if limited war is thrust upon us, the best way to keep it from graduating into total war is to end it quickly. United Nations forces had been fighting in Korea without atomic weapons for five months when that conflict was expanded and aggravated by the appearance of Communist Chinese forces. Obviously, not using atomic weapons is no guarantee against an expanded war."

The implication of Mr. Quarles's statement is an unexpressed fear of our becoming overly preoccupied with the little war, to the extent that our deterrent capability in terms of all-out conflict is in danger of erosion through increasingly heavy budgetary demands for organizations and equipment which contribute little or nothing to our basic deterrent posture. Like Dodger pitcher Don Newcombe, it could avail us little to win decision after decision in the global pennant race only to lose the "big one" when the blue chips were down.

The argument that local wars can best be won with conventional means (*i.e.*, non-nuclear weapons and surface forces), is a convenient one for those services and individuals who even now are faced with ever-shrinking roles and missions. But is the basis for such thinking militarily sound, or largely a product of emotion and tradition?

Certainly, the military principle of economy of force requires that we be prepared to use our best weapons to the best advantage. Even the ancient code of dueling permitted the challenged party the choice of weapons. And if he were an expert pistol shot, if the pistol were his best weapon, it was most unlikely that he would choose the rapier. It would be equally unwise for us, as a nation, to renounce the use of our best weapons, even though they may not be conventional in the traditional sense. For that matter, the English long-bow was not a "conventional" weapon, but the French knights could take little solace in this knowledge as English arrows mowed them down at Crecy, Poitiers, and Agincourt.

Even more important, so-called "conventional" warfare is wasteful of human life—a precious resource in the Free World but expendable in the thinking of the Iron Curtain crowd. By now, it is almost a cliché to say that we cannot match the Soviets man for man. But the point is not can we so match them, but need we?

And there is yet another danger. If we delude ourselves that little wars call for little weapons, we may well be extending an engraved invitation for aggression. No nation, large or small, is likely to deliberately begin a fight in which the potential penalties to the aggressor far outweigh the potential gain. Today's nuclear weapons, coupled with our determination to use them if needed, can take the profit out of aggressive war, big or little.

How, then, has the thesis that we may need conventional arms for small wars developed? It appears to have grown out of another unproved conclusion—that the use of nuclear weapons in a local situation will automatically trigger a global atomic holocaust. This is another way of saying that the deterrent doesn't really deter, that a tactical nuclear weapon exploded over a Communist troop concentration in Southeast Asia would bring down hydrogen bombs on New York.

History furnishes no specific clues in this matter, for nuclear weapons have never been used in such a role. But if our possession of nuclear weapons combined with the ability to deliver them now deters a major war, it is difficult to see how this advantage could be erased in a twinkling merely because some of the weapons were used on a local target. Either our deterrent is powerful enough to deter, or it isn't. And if it isn't, all the "conventional capability" we might muster will not save us from the nuclear fireballs.

As Mr. Quarles pointed out, we have had a taste of the "conventional" little war in Korea. It cost us nearly 150,000 casualties. It dragged on to indecision after years of fighting. And our renunciation of our best weapons did not keep the war from being expanded by the Red Chinese forces. There is a large and not unrespected body of military opinion which holds that judicious employment of nuclear weapons, or at the very least the evident will to employ them, would have made the Chinese Communists think twice about widening the conflict. And we would have had a better than even chance of stamping out the brush-fire on far more favorable terms than the present indecisive stalemate.

Another concept about little wars, put forth persuasively by Army spokesmen, is that the ground-fighting must be done by US Army troops. This is a handy package. It calls for a larger and vastly more mobile Army and, in so doing, furnishes a convenient stick with which to beat the Air Force for alleged deficiencies and lack of interest in Army airlift. It conveniently ignores the some 200 ground divisions of the Free World which we are helping to train and equip. And it baldly overlooks the combat capability of that grand American institution, the United States Marine Corps—a force of some 200,000 men specifically trained and equipped for brush-fire duty.

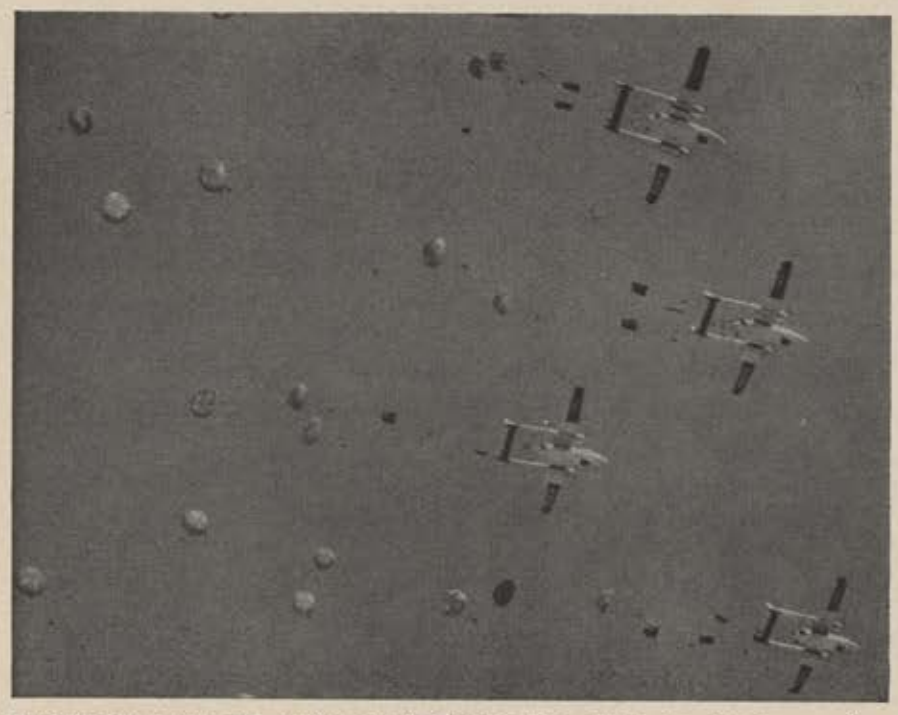
Herein lies the nub of the matter. For the danger is not so much that we have not made clear decisions as to precisely how to fight and win the little war. The real danger lies in overemphasis on special preparations for little war at the cost of our general-war deterrent capability.

(Continued on page 46)

Australian infantrymen board transport for Japan leave from Korea—non-US Army veterans of a non-nuclear war.

A unit can be air-transportable without necessarily being "airborne."

Army's 175-mm. (above) fires atomic shell but is hard to fly. New machine gun (below) is a late answer to mobility.



Parachuting men and equipment is hitting the target the hard way. Few question paratroop bravery. Many question tactical and strategic utility.

For, if there is one unavoidable military fact of life, it is that we must achieve the highest order of military capability available within definite ceilings on both money and manpower. Lacking both the money and the men to be completely prepared for every conceivable eventuality, it becomes a cold-blooded matter of first things first. And the competition for high-priority missions becomes exceedingly keen.

Nowhere is such competition more hotly debated at the moment than in the matter of airlift. Now, when the Army says "airlift," it means "Army airlift." And when it says we are short of airlift, it means that we do not possess the kind nor the quantity that the Army thinks it needs for its own self-imposed, self-determined mission.

The main element in this self-imposed, self-determined mission is the airlift requirement that the Army says it needs for a "little war." Admitting, in testimony on Capitol Hill, that their airlift needs foreseen for a general war could be met by the Air Force, Army spokesmen go on to say that, while they are not sure what their specific requirements are, the Air Force cannot fulfill the Army's little-war needs of a US division in an area such as Southeast Asia. But they fail to prove either the need for a division-size force or, should this be so, the need for such a division being American.

Moreover, airlift is not a parochial requirement. We need airlift for the Army, we need it for SAC, for TAC, for many missions and many requirements. It becomes a national resource, like men and nuclear weapons. In terms of the over-all mission, it is a scarce resource, one to be parceled out prudently in terms of the nation's needs rather than on an individual service's desires.

Such decisions are the responsibility of the Joint Chiefs of Staff. Hence it would seem logical to look at the JCS estimate of Army airlift requirements. Let's turn once again to Mr. Quarles's speech to the National Guard Association, in which he said:

"The Joint Chiefs of Staff have appointed certain airlift requirements which the Air Force is expected to provide to the Army. *The Air Force is equipped and prepared to meet these requirements.* Moreover, we are developing and procuring more modern and higher performance aircraft especially designed for Army assault airlift, and we will make a determined effort to meet the future airlift requirements of the streamlined Army divisions as they evolve."

As the song says, "Who could ask for anything more?" Answer—Army enthusiasts. *Army* magazine, official journal of the preponderantly active-duty Association of the US Army, said in a staff report in its issue of August 1956:

"For many years the Army has pursued the avowed objective of making its divisions air-transportable. The reorganized 101st Airbone Division will come closest to this objective. But in view of the shortage [*sic*] of air transport, and the lack of a program [*sic*] to remedy the deficiency it can be wondered if this air-transportable objective makes much sense."

How can it happen that the Joint Chiefs are satisfied with the Army's airlift while Army proponents are dissatisfied? One answer lies in the indiscriminate use of the terms "airborne" and "air transportable." The newly activated 101st Division at Fort Campbell, Ky., is specifically designated "airborne." Yet in terms of over-all goals the Army has had "the avowed objective of making its divisions air-transportable."

There is no quarrel with the need for an air-transportable Army and, within the Joint Chiefs at least, little doubt that this requirement can be met in terms of any realistic war plan. Particularly if the Army pursues its streamlining in earnest, especially to the end of devising equipment that can be carried by air.

But *airborne* forces, with heavy emphasis on paratroopers and air-droppable equipment, is another story.

Number one (and this is like attacking motherhood), the tactical and strategic value of paratroops during World War II remains highly debatable. It is difficult to find a single campaign in which airborne forces, as such, played a *decisive* role, although they fought gallantly and well.

Number two—it is extremely unlikely that paratroop-type airborne divisions would be needed in the decisive stages of an all-out war. Certainly they could not be used until the air battle had been won.

Number three—a clear-cut need for *airborne* forces in a local war has never been established. The need under such conditions is to get forces to the scene quickly, but this does not mean they need to be air-dropped. Even in undeveloped areas a surface logistic system would be necessary for sustained operations. No one, even in the Army, has argued this point.

Number four—airborne divisions do serve the Army purpose of generating an unrealistic requirement for airlift. Airborne forces (not "air-transportable forces," mind you) require continuous jump training. This in turn requires Air Force troop carrier aircraft to be available on a near-continuous basis. Air transport training is not nearly so demanding. It is primarily a matter of furnishing transport aircraft on a periodic basis in order to maintain proficiency.

Thus when an *air-transportable* Army becomes equated with an *airborne* Army, a requirement is generated which neither the Air Force nor the nation can hope to satisfy under foreseeable fiscal and personnel ceilings.

Anyone who examines the matter from a practical standpoint realizes that a vast increase in our transport resources cannot be achieved within a military budget of between $36 billion and $40 billion and with manpower resources in the neighborhood of 2,750,000. At least, not without seriously crippling our deterrent posture.

What the Army wants, of course, is its own organic airlift. And if this would solve the problem, few would stand against it. But the problem would rather be aggravated. A completely new maintenance system would require added millions of dollars and added thousands of the kind of men who are already in woefully short supply. A new aircraft procurement organization would be another costly adventure in men and money. A vast new training establishment would be needed. Not to mention a new load on an already dangerously over-burdened base system.

It is to be hoped that the Army continues its streamlining program. Already it is agreed among the Joint Chiefs that if all divisions could be cut to the 11,500-man size of the new 101st Airborne, Army airlift requirements could be halved. It would appear that this is a most fruitful field for Army research and planning, rather than attempting to build its own Air Force. It is easier and cheaper to try to fit the Army into present and programmed airlift than it is to try and wrap unbuilt, unprogrammed airlift around a cumbersome Army.

But let us not forget, in summary, that Army querulousness over airlift is merely a symptom. The overriding consideration, involving slicing the taxpayer's dollar, is what kind of war we are preparing for.

Are we strong enough to deter the big war and to win it should deterrence fail?

Is the little war the real threat that lack of clear-cut thinking is making it?

A little war where?

Under what conditions? Fought by whom?—END

Does the AIR FORCE need its own ARMY?

By William V. Kennedy

AIR BASE defense is a headache. It is a headache because our enemies have the time and the means to scout our installations almost at leisure. They can choose the point of attack that suits them best.

There are two possible cures to this headache. We can give up, admitting that the enemy advantage is so great as to overcome any protective measures we might be able to take. Or, we can establish a defense that will minimize or eliminate entirely our losses in the event of enemy attack.

A great portion of the future of the United States is already invested in our air base system. That investment is due to grow even larger. Obviously, then, the first "cure" is absurd.

We have chosen to defend our bases on the ground as well as in the air. In doing so, however, we have left a gap so large that it threatens to negate all the progress made to date.

It is my purpose here to describe

(Continued on following page)

A special force beside the air police is needed to guard planes against sabotage on the ground.

the dimensions of this major deficiency and to recommend the organization of a small, mobile armored unit capable of filling the gap.

During the past ten years, a vast improvement has been made in protection of our air bases both at home and overseas. The efforts of the Office of Special Investigation and the air police have paid off in a security organization capable of dealing effectively with the individual traitor, the saboteur, the enemy agent who strikes alone, by subterfuge and stealth. It is not yet capable of dealing with native or foreign agents employing small unit tactics and willing to shoot their way through our defenses if forced to do so.

This is not intended as criticism of the air police. The APs have made a determined effort to meet all the demands of air base defense. One look at the forces and the equipment available to them, plus the multitude of routine police duties for which they are responsible, should be enough to show why their efforts have fallen short.

The principal item of air base defense available to the air police is the M-20 armored car, two per air base. Aside from the fact that this vehicle has been out of production for a number of years, it possesses severe limitations affecting its ability to maneuver rapidly and to negotiate difficult terrain.

Wherever possible, the air police have established a "mobile striking force," designed to move rapidly to any part of the air base threatened by enemy attack. This force is mounted in commercial-type pick up trucks. Its firepower consists of rifles and a few automatic weapons.

The chances of the "mobile striking force" being decoyed to a remote corner of the base and immobilized by a diversionary force are altogether too good. Once off the road, the striking force becomes simply a reinforced infantry squad without support of any type. Pinned down by the fire of a few riflemen and cut off from its vehicles, the striking force would be unable to redeploy rapidly enough to deal with the main enemy effort.

The remaining ground defense force immediately available to the air base commander—the operating personnel of the base—is the weakest reed of all.

Air Force basic training has been reduced far below the minimum necessary to train an effective ground combat soldier. With the exception of the air police, few airmen have participated in a realistic air base defense problem. Air Force officers skilled in platoon and company tactics are scarcer yet. To attempt to maneuver such a force at night against a well trained enemy guerrilla unit would be folly.

What is worse, the use of mechanics, air crews, and other technicians in ground defense would be to hand the enemy a partial victory, for the combat effectiveness of the base involved would be automatically reduced.

We can conclude that some means must be found to provide an effective air base defense that will, at the same time, permit the operating force of the base to carry on with their normal duties.

In planning such a force our primary consideration must be the nature of the enemy threat. J. Edgar Hoover of the Federal Bureau of Investigation has announced that there are some 20,000 "hard-core" Communists at large in this country. Sympathizers and fellow travelers, we can assume, total several times that number.

From the days of Lenin, the world Communist movement has stressed the value of guerrilla warfare, an emphasis that has paid huge dividends in China, Indo-China, Malaya, and Russia itself. There is no reason to assume that American Communists, many of them war veterans, are any less expert bomb-throwers than their comrades abroad. Our Strategic Air Command base system would be the logical prime target of a native guerrilla attack.

Allowing a minimum of twenty men per base, the American Communists have more than enough manpower to do the job. Transportation is a simple matter of private automobiles. Arms and ammunition can be procured from hundreds of sporting goods stores throughout the United States. Commercial dynamite sufficient to wreck every B-47, B-36, and B-52 in existence is also readily available to the Communists and their sympathizers.

The Kremlin has, then, a potential guerrilla force already deployed in the United States. We would be fools not to take it for granted that that force is set to go into action just prior to or during the progress of a major Soviet air attack.

Overseas, the Communist threat is magnified by an even larger percentage of native Communists and by the possibility of direct attack by regular Soviet forces. In Alaska and in the crucial Northeast Air Command, there is a very real danger from Soviet paratroopers and from Soviet troops landing from pre-positioned submarine and surface naval units.

Guerrilla or regular, these forces can be expected to strike during the hours of darkness. At least some of the attacks will be carried out under cover of the mass confusion produced by a nuclear attack. They provide the Soviets with a powerful secondary means of knocking out those bases not destroyed from the air.

The men making the attack will be tough, disciplined, fanatic fighters. They will know every detail of the terrain. Training, coordination, planning, and determination will more than make up for their smallness in numbers.

There can be no "airtight" defense against an attack of this nature, any more than we can establish an impregnable defense against the threat from the air. What can be done is to minimize the effectiveness of guerrilla attacks so as to prevent them from crippling our air defense and retaliatory power.

The air base defense force capable

(Continued on page 51)

Air police study the M-1 carbine. More classes like this, with better weapons, are needed if air base problems are to be solved.

Fire control radar tells... / WHERE TO AIM WHEN TO FIRE!

All-seeing radar pinpoints the target for these Air Force planes. Whatever armament they carry—guns, rockets or missiles—fire control radar tells them *where* and *when*. It provides the far-sighted vision necessary for modern long-range combat operations.

Today's modern fighter plane is an electronic wonder, with fire control radar-computer systems supplying a continuous flow of information about target position in terms of range and rate of closing.

RCA is a major supplier of airborne fire control equipment to the Armed Forces. Its activity in developing and producing these systems requires a close working relationship with the airframe industry and the Department of Defense, a "partnership" vital to the success of any weapons system.

Defense Electronic Products

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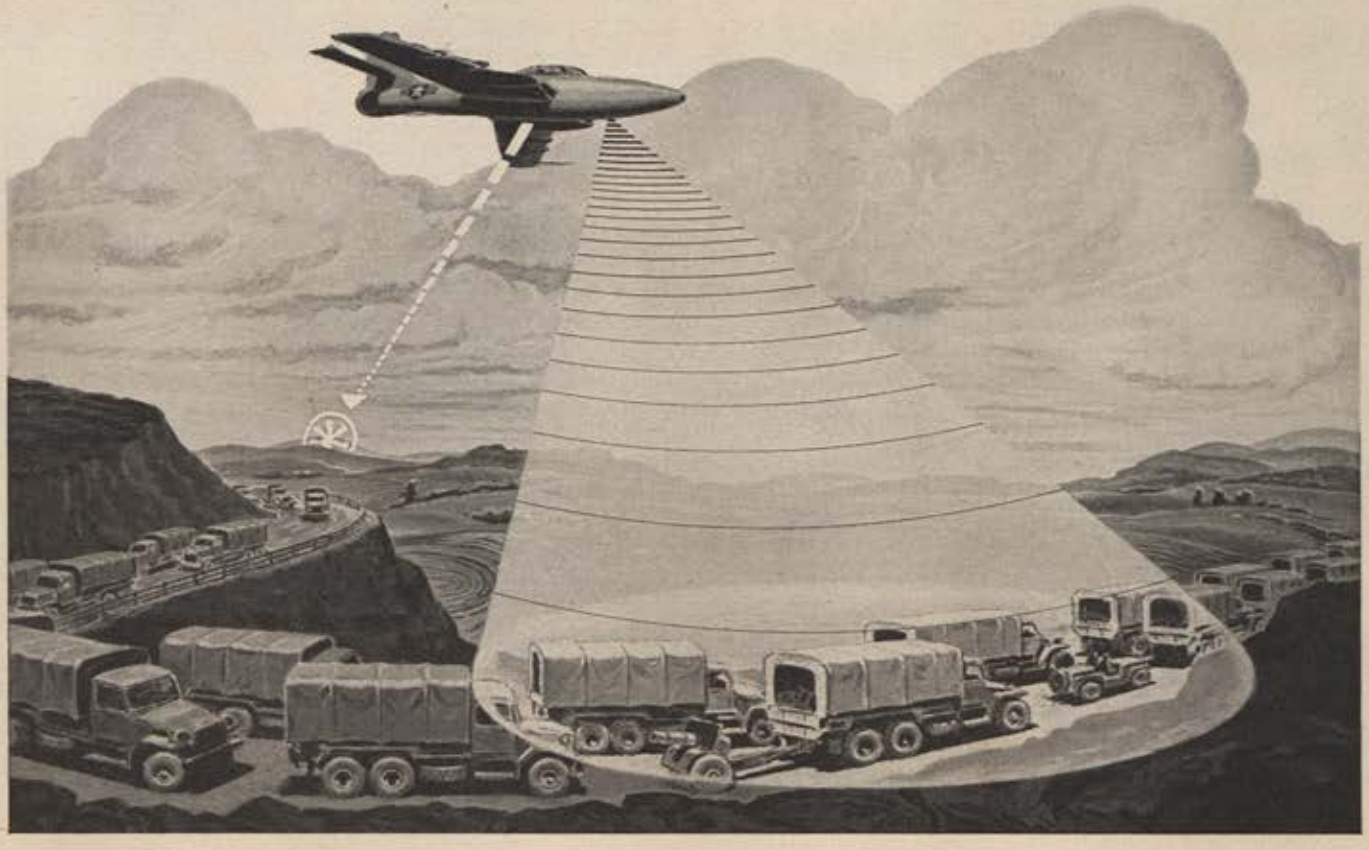
Air Force "Super-Snooper" SEES ALL . . . TELLS ALL



Reconnaissance television moves GHQ directly over any target zone

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Four of these M-59 armored utility vehicles, with a trio of tanks, two rifle squads, and a pair of eight-one-mm. mortars would form the armored cavalry squadron for air base defense.

of accomplishing this objective must do so with the smallest number of men possible. It must be capable of reacting instantly to an enemy attack, of preventing such an attack from reaching vital fuel storage and flight line areas, and of redeploying rapidly to meet additional threats as they develop. It must have sufficient firepower to destroy small groups of an enemy within minutes.

In short, the air base defense unit must possess a high degree of mobility, firepower, and shock action. When you speak of those elements in land warfare, you are speaking of armor.

In addition to the characteristics already mentioned, the air base defense unit must be able to conduct fast, aggressive, and continuous reconnaissance throughout the countryside adjacent to the base. Its commander must be familiar with the road net, the terrain, and any man-made feature which a guerrilla unit could use as an avenue of approach or an assembly point.

By using the intelligence made available to him by the various national security agencies and by close coordination with the local police and the local population, the air base defense unit commander must be ready to strike at a guerrilla concentration the moment it is detected. The further away from the air base that such a concentration can be detected and destroyed the better.

We have here a requirement for an armored unit equipped and trained for reconnaissance, security, and short, violent combat action. A force possessing these characteristics is known today as armored cavalry.

The armored cavalry regiments of the United States Army and the Army National Guard are at present the most suitable units for air base defense. However, to tie down such a unit, with all its command, communications, artillery, medium gun tank, and service elements, to air base defense alone would involve a waste of combat power badly needed elsewhere.

The job can be done much more efficiently and economically by an armored cavalry unit organic to the Air Force. Such a unit could be made up only of those elements of the present armored cavalry reconnaissance company most essential to the task of air base defense.

The unit recommended would be designated the armored cavalry squadron. One such squadron would be assigned to each base of the Strategic Air Command and to such other installations as might be deemed necessary. It would consist of a headquarters troop and two line troops.

The principal fighting strength of the squadron would be three M-41A1 light-gun tanks, four M-59 armored utility vehicles, two rifle squads, and two eighty-one-mm. mortars.

Each of the tanks is armed with a seventy-six-mm. high-velocity cannon, a .50-caliber machine gun, and a .30-caliber machine gun. In addition to the pistols carried by individual crew members, an M-3 submachine gun, an M-1 carbine, and a supply of hand grenades are carried in the fighting compartment of the tank.

Each of the M-59s also mounts a .50-caliber machine gun fired by the driver. These weapons provide the rifle squad with fire support and the mortar squad with protective fire. The mortars provide an essential element of fighting by means of powerful, indirect fires.

The rifle squads provide firepower and serve as a mopping-up force against the enemy guerrilla unit. Their M-59 armored utility vehicles enable the riflemen to accompany the tanks at high speed, over difficult terrain, and in the face of small arms and machine gun fire from the enemy.

The two scout sections with two jeeps each provide the long-range reconnaissance element of the squadron. One jeep in each section carries

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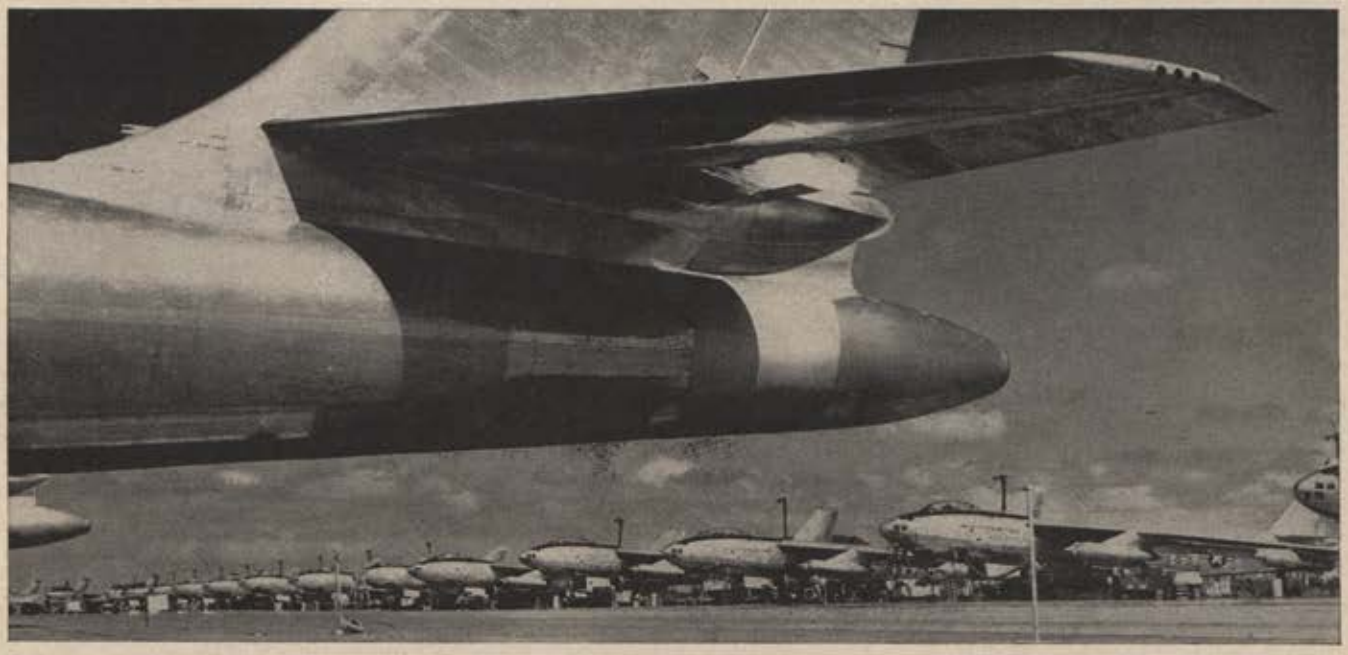
SAC has taken the lead in the AF in such matters as judo training. But such efforts go only part way toward solving the problem of defending bases.



B-47s. No matter how powerful the plane may be in the air, grounded it's our most vulnerable engine of war.

a .30-caliber machine gun on a stanchion mount. The other jeep carries a 3.5-inch rocket launcher.

The jeep is carried in the present armored cavalry table of equipment in preference to the armored car. It is felt that the unlimited visibility afforded by the jeep, its maneuverability, and the relative ease of dismounting from it provide advantages over the armored car in reconnaissance work.

Personnel totals three officers and sixty-four enlisted men. Considering the amount of firepower at their command, the wide area they will be capable of covering, and the value of the prize they will be protecting, the manpower investment will be a profitable one, indeed.

Such an organization is flexible enough to permit the substitution of special items of equipment that might be required by climate or the enemy situation. In the Arctic, a lighter, weasel-type vehicle might be substituted for the jeep, the tank, and the armored utility vehicle. In areas exposed to attack by enemy armored patrols, a heavier gun tank could be substituted for the M-41 with no change in personnel and little change in training requirements.

In addition to maintaining a twenty-four-hour alert over flight line, fuel storage, and weapons facilities, the armored cavalry squadron could provide air base defense training for the remaining personnel of the base. The objective here would be qualification of all personnel in their individual weapons and the establishment of an effective point defense system.

Mess facilities for the armored cavalry squadron could be provided by the base food service squadron. Fuel and lubricants could be drawn from the base motor pool. The armored troopers themselves would be trained to perform most of their own vehicular maintenance, with track, turret, and radio specialists all being provided.

The armored cavalry squadron would replace the present air police base defense forces. It would be dependent, however, upon air police patrols and perimeter guards for early warning of enemy approach.

This last function is the key to a successful air base defense.

The small size of the proposed cavalry squadron makes it essential that the unit be kept concentrated. The only exception to this principle would be the dispatch of the sections of the cavalry squadron to a distant reconnaissance.

The ability of the armored unit to react in time would depend, then, on an efficient, radio-equipped patrol on guard at the base perimeter.

A most heartening development in this regard is the recent introduction of sentry dogs at SAC bases. The combination of an alert animal working with an equally alert, thoroughly trained airman provides an early warning system that no combination of fences, electronics, and searchlights can equal.

The principle of concentration will not prevent the establishment by the armored cavalry squadron of a constantly shifting system of strong points around the most sensitive areas of the base. Thanks to its mobility and its excellent radio communications, an armored unit can deploy over a considerable extent of ground while retaining the ability to strike as a unit, at a moment's notice, in any direction.

Important as it is that the proposed armored unit work closely with the air police, it is equally important that such a unit be organized outside the air police structure.

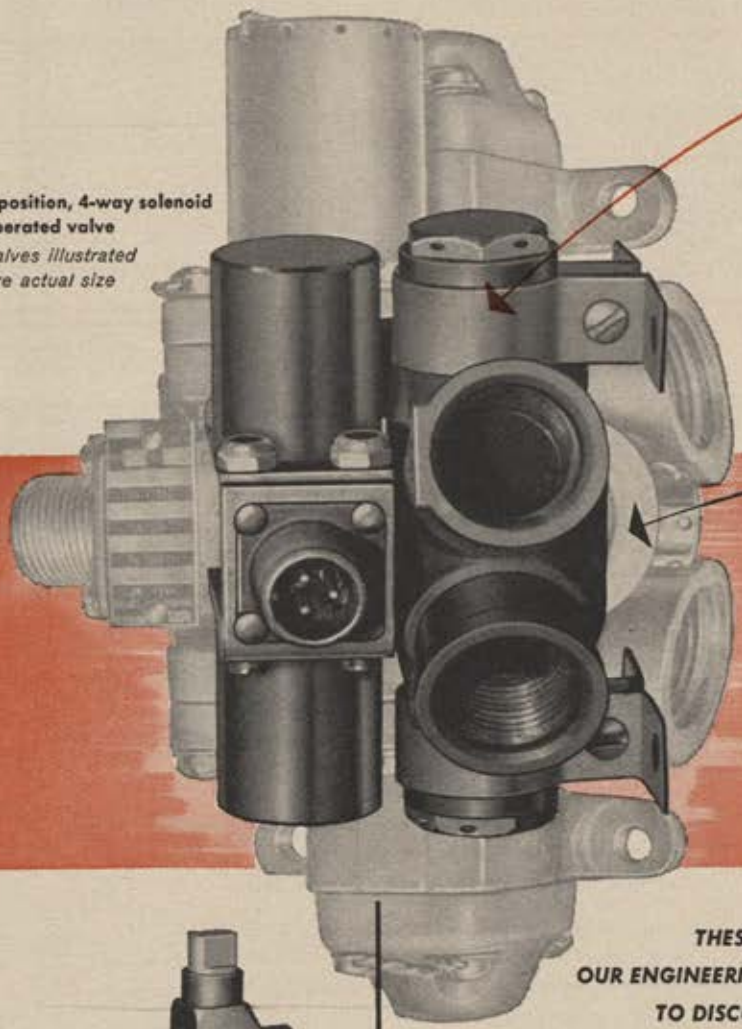
Every moment in the life of the air armored cavalry trooper must be dedicated to one purpose and one purpose only—the destruction of enemy guerrilla and regular forces before they can close on the flight line. From the very nature of their over-all duties, the air police are not able to adopt this singleness of purpose.

To be effective, the armored cavalry squadron must be organized and trained as a unit, in its own environment, under its own officers. Every effort must be made to develop a distinct esprit de corps.

Use of the title, "armored cavalry squadron," and substitution of the word "trooper" for "airman" in the rank of the lower four grades are small things in themselves. They can serve, however, to identify the proposed armored unit with the heroic tradition of the former United States cavalry.

(Continued on page 57)

Now! ADEL offers a new line of HIGH TEMPERATURE MINIATURE VALVES



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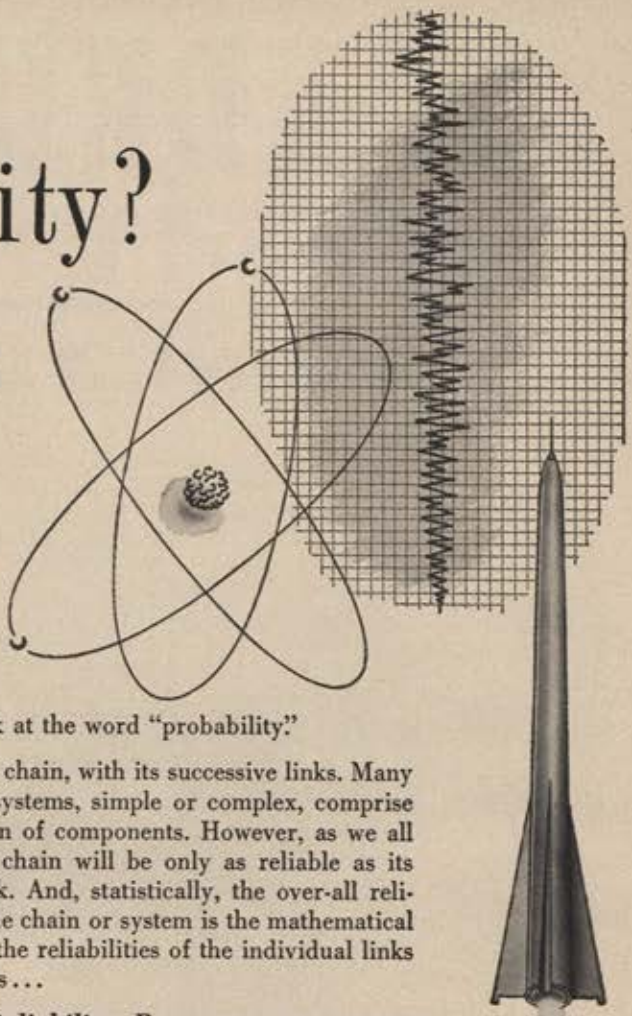
FIRST OF A SERIES

What is reliability?



Industry in the United States is becoming more and more complex... we're getting automated ... computers are computing... the missiles are flying... the digits are digitizing...

And the word "Reliability" takes a new and different meaning... what does it mean to you?

It's time to stop and take a look! Ask three of your friends how they define "reliability." You'll be surprised at the different answers you receive. And when you quiz them further on how much reliability is needed in a particular product... how they would control the design and manufacture of that product to obtain the amount of reliability they want... you'll be even more surprised by the variety of the answers.

So... let's define reliability. Let's start off with a definition that is gaining the most acceptance in the technical field...

The reliability of a particular component or system of components is the probability that it will do what it is supposed to do under operating conditions for a specified operating time.

Looks simple enough!

But what hazards it presents! The first important challenge is that word "probability"... it takes you seriously into the field of data collection and statistical analysis. Then you check into the phrase "do what it is supposed to do"... someone must define these objectives. And, look at the "operating conditions"... pause briefly and reflect on the many different conditions under which products operate. And, finally, note the phrase "for a specified operating time"... does one normally, consciously, define reliability in terms of time?

These considerations pose problems for all of us... the manufacturers of components, those who assemble components into other products, systems personnel, designers, industrial engineers, production workers, purchasing agents, quality control... *and users!*

Let's look at the word "probability."

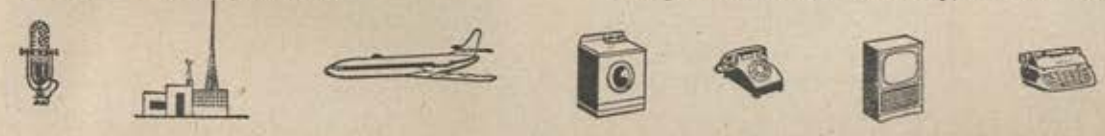
Picture a chain, with its successive links. Many of today's systems, simple or complex, comprise such a chain of components. However, as we all know, that chain will be only as reliable as its weakest link. And, statistically, the over-all reliability of the chain or system is the mathematical product of the reliabilities of the individual links expressed as...

Over-all Reliability, $R_0 = r_1 \times r_2 \times r_3 \ldots r_n$

As an example, assume a product has a chain of 100 components in which each component has a reliability of 99 per cent... which assumes that only one out of a hundred units of each component will fail. These are relatively high standards established by past practices. But what happens? Multiplying .99 by itself one hundred times ($.99^{100}$), note that our chain of components will have a reliability of only 36.5 per cent! Two out of three of our chains would probably fail!

As another example, let's look at contacts in a multi-contact electric connector. If, for instance, we are to assemble connectors containing 25 similar contacts from a 1% defective contact population, we can expect 22% of the connector assemblies to contain one or more defective contacts! See how the multiplication of probabilities presents a major challenge to both designer and manufacturer?

But all is not lost! There is another side of the picture. With proper care, analysis, and control, our organization at Cannon has actually achieved, in special "missile quality" contacts, a known level of only 2.85 x 10^{-3}% defective... or one defective part in 35,000! Naturally, we don't achieve



that with all our contacts . . . but we do try to design and manufacture the utmost in reliability required for specific applications.

However, to return to your problems and to go a step further in demonstrating "probability" of uncontrolled contacts . . . and the challenges it poses to you and to us . . . consider the case where we have three groups of contacts, each group with contacts of different sizes. Let us assume, also, that each group has different percentage defective populations and that the three groups are assembled in a 90-contact connector as follows:

50 No. 16 contacts with a population reliability of .59;
25 No. 12 contacts, reliability .60; and 15 No. 8 contacts, reliability .64.

Then . . .

$$R_c \text{ (90 contact connector)} = r_{\#16} \times r_{\#12} \times r_{\#8}$$

or,

$$R_c \text{ (90 contact connector)} = (.59)\ (.60)\ (.64) = .23$$

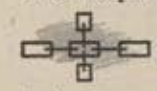
It is apparent from the above that connector contact populations must be maintained at extremely low values of percentage defective. This is of extremely vital importance if we are to produce connector assemblies which will perform satisfactorily in systems utilizing series circuitry, where the failure of one contact pair can cause failure of the entire system.

We have been talking only about *a contact* . . . just one of the many different materials and parts (such as contact pins, insulators, shells, and couplings) going into the more than 20,000 different connector and electrical items we manufacture. Think of the "product of reliabilities" rule in systems comprised of tens, hundreds, or thousands of electrical components connected by connectors such as ours. Regardless of whether they design, manufacture, sell, or use washing machines or guided missiles, everyone faces the same problem. That's why we're taking some of your valuable time to present the important subject of reliability here.

*

All of us, when we specify materials, parts or components must constantly keep in mind the (a) "probabilities," (b) what the part is supposed to do, (c) the operating conditions, and (d) the time it must operate satisfactorily. Let's see what we can do to increase reliability in relation to these four factors:

(a) Probabilities. To increase the reliability of any component, and thereby the system as a whole, it is necessary to think in terms of statistical distribution of important physical properties. From field reports of failure and laboratory test results, we must first isolate those properties which most frequently cause trouble. It is then necessary to determine whether poor performance is due to lack of process control to keep the product within specified tolerance limits, whether the dollar sign has entered into the picture too far—cutting reliability down for the sake of a few cents here or there—or whether the design itself is inadequate for an end-use application. In any case, the use of the statistical approach to problem solution offers a positive method of obtaining known levels of reliability.



(b) Definition of Function of Product. Each component and each system . . . both civilian and military . . . in each different field of endeavor, in each product produced, has different functions. None of us should "overbuild" . . . nor should we "under-build." We should look at our specifications closely.

(c) Operating Conditions. Temperature and pressure, humidity, corrosive atmospheres, stray electric and magnetic fields, low and high frequency noise, shock and vibration . . . all must be considered plus conditions prior to product use.

(d) Operating Time. This varies both for different products and different fields of application. Have you set reasonable lengths of operating time for your product or system, from the viewpoints of both usage and economics?

*

We at Cannon Electric are proud of our historical emphasis on quality and reliability. Since our inception in 1915 we have consistently adhered to a design philosophy embracing the highest quality and reliability in each Cannon Plug for the specific application for which it is to be used. *If we cannot design to that principle, we don't make it!* In manufacture, we are proud of our know-how in depth, proud of our fine quality control systems, proud of our personnel, and proud of our reliability control group. The "Cannon Credo" . . . part and parcel of the everyday life of each Cannon employee . . . is posted in all offices and all departments of all eight Cannon plants around the world. Three of its sections read as follows:

To develop an organization of exceptional people possessed of respect for the dignity of the individual and imbued with the spirit of the team.

To provide a facility with which we can produce to our utmost in an efficient and pleasant environment.

To develop and produce products of such quality, and render such service, that we may always be proud of our efforts.

*

Whenever *you* have an electric connector reliability problem . . . in design, engineering, production or prototype phases . . . we would welcome the opportunity of discussing it with you.

Cordially,

Robert J. Cannon *President*

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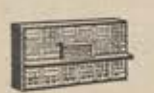

Please Refer to Dept. 429

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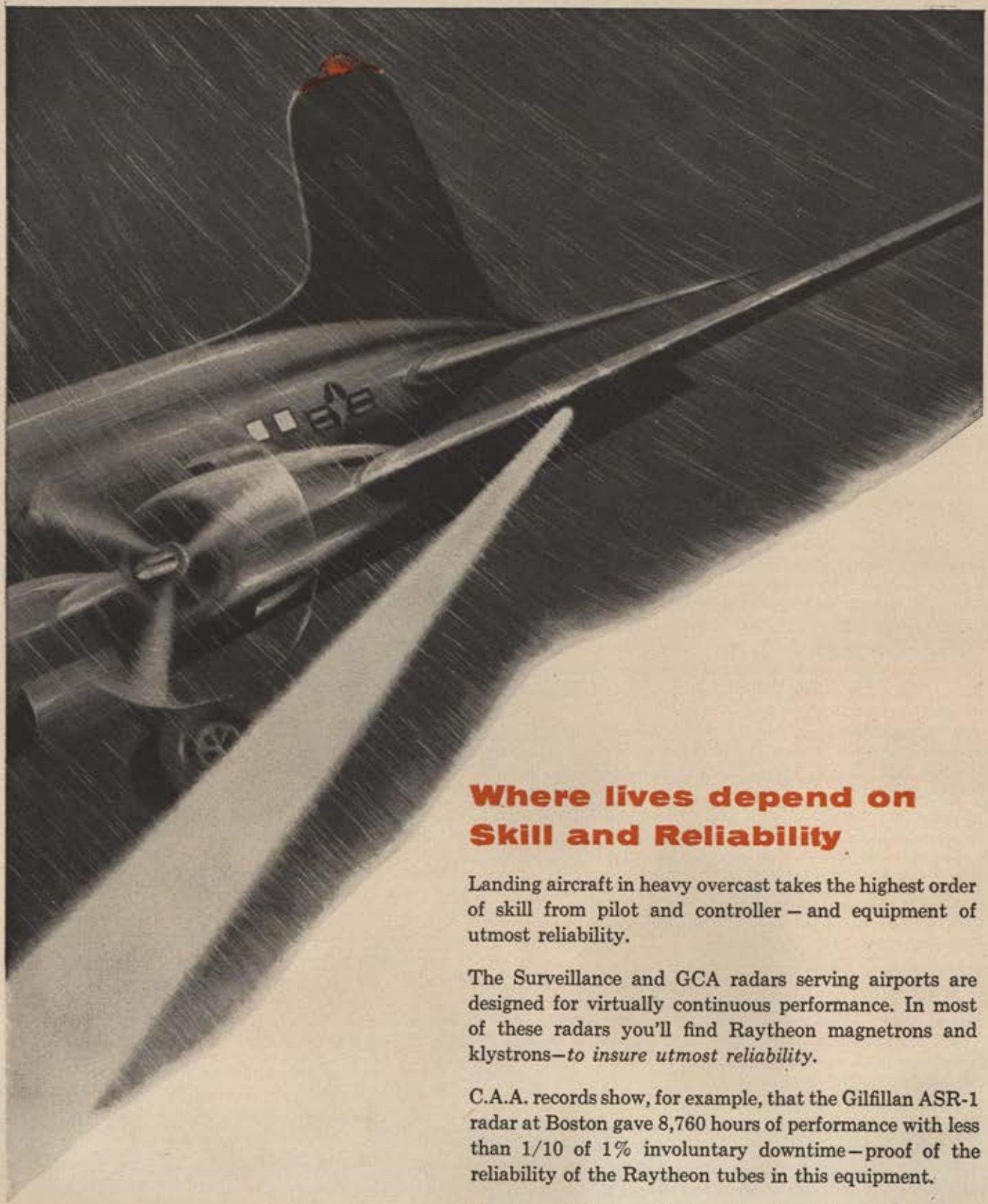

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AIR FORCE ARMY—CONTINUED

Indeed, the only difference between the force outlined here and the cavalry of Stuart and Custer is that the newer force would be mounted in armored vehicles rather than on horseback. The mission and the concept are identical.

The means to create an armored air base defense force are at hand. Cadre for an experimental squadron can be trained at the Armor School, Fort Knox, Ky. Any one of a dozen standby Army installations could be used as a training site, complete with firing ranges, and vehicle driving and maneuver areas.

Lessons learned from organization, training, and testing of the experimental squadron could be applied to the establishment of an air armored cavalry center. Working in close cooperation with the Armor School, this center could be assigned the mission of turning out complete, trained armored cavalry squadrons for assignment wherever needed throughout the Air Force.

No matter how powerful the airplane may be once it has risen into its element, it is, on the ground, the most vulnerable of all the engines of war. Our enemies can capitalize on this weakness tonight, and they can do it without importing a single Russian soldier or a single Russian weapon.

Unless action is taken soon to plug this most dangerous gap in our air base defense system, we may find some day that our vaunted power has disappeared in the smoke and rubble of a thousand burning USAF bombers.—END

About the Author

Bill Kennedy, who describes himself as a "free-lance military analyst," spent two years in SAC, as an intelligence officer. A graduate in journalism from Marquette University, he was a reporter on the Harrisburg, Penna., Evening News, *and edited the Mechanicsburg, Penna.,* Daily Local News. *In 1946-47, he was in the AF, serving in Japan, China, and England. He was in the Air Guard before his duty with SAC. Now in the Army Guard, he was graduated last May from the Armor School, Fort Knox, Ky. He now lives near Harrisburg, Penna.*

Robert F. Cook receives his award from Jimmy Doolittle.

Commander of the Air Research and Development Command, Lt. Gen. Thomas S. Power.

AFA FOUNDATION Makes Its First Awards

Aero-medical expert Capt. Terence F. McGuire is honored.

The top award of $300 goes to ARDC's Carlyle J. Sletten.

A HIGHLIGHT of the fourth annual Air Research and Development Command Science Symposium last month was the presentation by the Air Force Association Foundation, an AFA affiliate, of awards to two civilians and an AF officer assigned to ARDC. The three were honored for technical papers they delivered during the symposium. The ceremony marked the first such activity of the Foundation, which has been established to handle educational activities related to airpower. Speaking to the symposium, Dr. Courtland B. Perkins, Chief Scientist of the AF, said the awards are "renewed proof of AFA's continued interest in, and support of, the Air Force's endeavor to achieve and maintain qualitative superiority through an aggressive research and development program." The awards were made in Cambridge, Mass., by Lt. Gen. Jimmy Doolittle, representing AFA.

The top award of $300 went to Carlyle J. Sletten of Acton, Mass., Chief of the Ground Antenna Section, Antenna Laboratory of the Electronics Research Directorate at the AF Cambridge Research Center. His paper—one of thirty-three read during the classified symposium—was entitled: *A New Technique for Obtaining Tri-coordinate Radar Information.*

Second prize of $200 went to Capt. Terence F. McGuire, of Omaha, Nebr., a twenty-six-year-old aero-medical specialist assigned to ARCD's Wright Air Development Center at Wright-Patterson AFB. His paper was: *Cardiovascular Reaction to the MC-1 Partial Pressure Suit Ensemble; Comparison with the MC-3 Capabiltiy.*

Robert F. Cook, an expert on work associated with the problem of helicopter vibrations and noise control in aircraft, won third prize of $100 for his paper: *Criteria for Reversion of Sonic Fatigue in Structures.* He is with the Dynamics Branch of the Aircraft Laboratory at the Wright Air Development Center.

The papers were judged by a board composed of Dr. Courtland B. Perkins, Chief Scientist of the Air Force; Maj. Gen. Ralph Swofford, Director of R&D, DCS/Development, Hq., USAF; Wesley Hurley, until recently Deputy Assistant AF Secretary for R&D; and T. F. Walkowicz, a national director of AFA.

The annual meeting has a threefold purpose, according to Lt. Gen. Thomas S. Power who delivered the opening speech. In his words, these are: "To stimulate and encourage the recording of new scientific knowledge, ideas and experiences, to enhance recognition for scientific achievements, and, finally, to provide a forum for the exchange of mutually beneficial information."—END

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Torque Transmitter	CGC-8-A-7	26.0	100	.5	37	—	—	11.8	200	—	—	—	12	54+j260	12+j45	76.4+j19.6	8°	—	30	7′	14′	1.240
Control Transformer	CTC-8-A-1	26.0	.050	.25	143	24	410	11.8	200	11.8	.090	.23	25	220+j740	28+j110	246+j60		8.5°	30	7′	14′	1.240
Control Transformer	CTC-8-A-4	—	—	—	381	24	410	—	—	11.8	.037	.09	60	508+j1680	67+j270	640+j190	—	9.2°	30	7′	14′	1.240
Control Differential	CDC-8-A-1	—	—	—	36	11.8	200	—	—	11.8	.085	.21	25	38+j122	27+j120	48.6+j13.8	—	9°	30	7′	14′	1.240
Electrical Resolver	CSC-8-A-1	26.0	.039	.43	230	23.2	400	10.6	180	11.8	.084	.27	27	280+j600	38+j136	70+j136	20°	11°	30	7′	14′	1.240
Torque Receiver	CRC-8-A-1	26.0	.100	.50	37	—	—	11.8	200	—	—	—	12	54+j260	12+j45	85.1+j20.4	8°	—	30	30′	30′	1.240

Can We Beat the Russians at Their Own Game?

The challenge facing the United States is not simply how to deal with the Communist conspiracy, but, more important, a question of America's coming to terms with itself in a new balance of military power and ideology

By W. W. Rostow

THE challenge facing the United States is the challenge of preventing Moscow and Peiping from achieving their common purpose. The purpose of the enemy is to drive the United States from power and influence in Eurasia, to isolate the United States on this island continent; and to deal with us in his own good time from the preponderant base which he would then control. That purpose has, in my view, remained constant over the whole postwar period.

In the past year the enemy has made important progress towards this goal. The gap between his military strength and ours has been narrowed. Our air base structure is being undercut politically at many points; NATO is evidently in jeopardy; we have permitted Arab nationalism to be channeled along lines that—soon or late—threatens the continuity of the Middle Eastern oil supply; the United States since the war has never been more dangerously isolated from the governments and peoples of the underdeveloped areas in Asia as well as the Middle East; in Africa powerful forces are boiling up, and we have no policy capable of either controlling them or aligning them with our abiding interests.

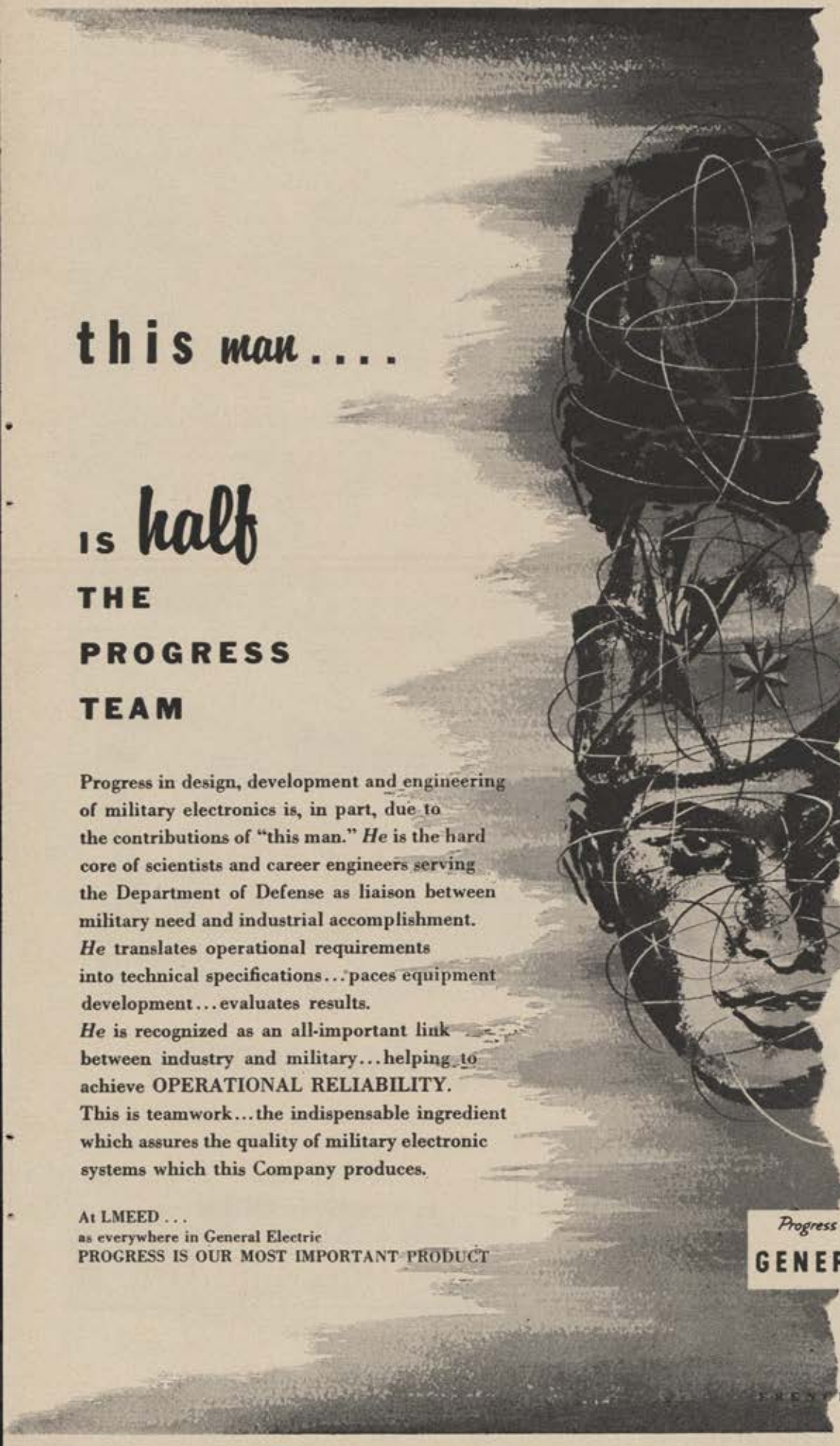
There is, then, nothing in the present situation or in the changes over the past year that would lead me to alter the prescription I have previously offered for meeting the challenge facing the United States. Stripped to bare essentials, what I have previously proposed is the following three-point program:

1. We must continue to outstrip the Soviet Union in the arms race in nuclear weapons, means of delivery, and means of defense against them so that at no time might it ever appear a rational course of action for the Soviet Union to launch a sudden attack on our delivery capabilities.

2. We must develop American capabilities in the general area of limited war. We must round out the spectrum of deterrence down to the level of guerrilla operations. The object of military policy is to force the conflict for power and influence out into the arena of political, ideological, and economic competition, and to keep it there. This we cannot do unless we have the capabilities to fight war limited in objectives, terrain and weapons and the evident will to use them.

3. Having forced the conflict out into the non-military

(Continued on page 63)



this man....

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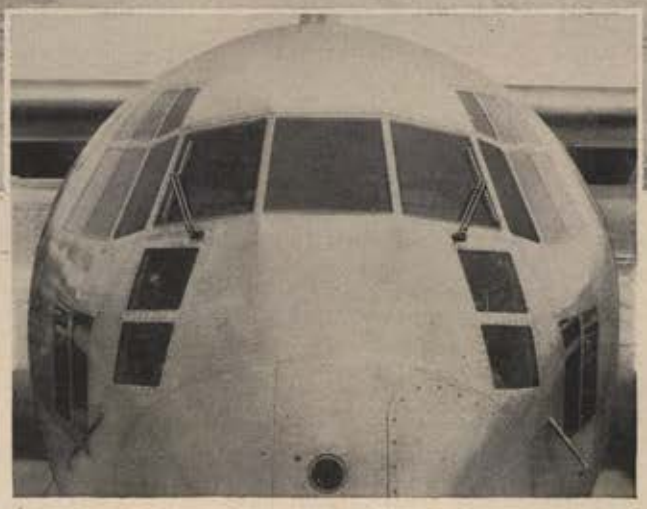

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arena, we need a foreign policy designed squarely to meet and defeat our avowed enemies in the political, ideological, and economic conflict now taking place.

An American policy of this kind, if sustained for another decade, might well lead to a meaningful peace. If the Communist bloc is not permitted further cheap military and diplomatic victories, if it is confronted for another decade with a unified, purposeful Free World, maintaining pace in economic and social progress by democratic means, there is at least a decent hope that the generation of Communist leaders who must take over in the next decade might conclude that the only realistic course of action open to them is to turn—in fact, rather than in gesture—to the great unsolved problems of economic welfare and human liberty within the Communist bloc.

I do not believe we as a nation have yet created a military policy and a civil foreign policy designed to fulfill these three purposes and to exploit the potentials for social and political change favorable to our interest within the Communist bloc.

Assume for a moment that some such program of sustained, vigorous effort in military and foreign policy is the correct course for the United States and that this has been the correct course for at least the past two years.

Why, then, has the United States not followed this course? Why has the gap between American and Soviet capabilities in major war been permitted to narrow? Why have we not faced the issue of deterrence against limited war? Why have we failed to produce an economic, political, and psychological policy that would sustain NATO and associate the United States with the underdeveloped areas of the Free World?

I propose to turn the focus of this discussion inward on our domestic life, on our national style of operation, and on its inadequacies; for, in the end, the challenge facing the United States is the challenge of learning to do some things that we have never done before. In order to overcome our enemies we must learn to master ourselves and to evoke from American society the qualities within it capable of meeting the challenge we face.

Ultimately, the nation's difficulty in formulating and sustaining the kind of military and foreign policy I would propose can be traced back to two characteristics of American society whose roots lie deep in our history.

The first of these fundamental characteristics is that we have been, at least since the 1830s, when the westward frontier push came to dominate our life, a nation given over to action rather than to reflection, to practice rather than theory, to engineering rather than to fundamental science.

The second fundamental characteristic is that we have not yet reconciled, in a stable way, the nation's power interests on the world scene and its sense of moral mission and purpose. This failure of reconciliation lies behind the nation's uncertain grasp on its national interest; and that uncertainty about the national interest makes difficult the formulation and execution of a stable and effective military and foreign policy.

But now the first characteristic and its implications—our frontier origins as men of action rather than reflection.

It is the essence of the challenge we confront that we do not face an immediate, do-or-die crisis. Historically, the United States has thrown its energies into the solution of military and foreign policy problems only when it faced concrete, self-evident dangers.

We went to war in 1917 when German submarine warfare immediately threatened the control of the Atlantic by ourselves or a friendly Britain. We voted Lend Lease in 1941 only after the fall of France, at a time when a hostile power controlled virtually all of Western Eurasia, and its Japanese ally threatened to collapse the fragile balance of power in Eastern Eurasia. We asserted the Truman Doctrine and instituted the Marshall Plan in 1947 only when it was evident that Western Europe was on the verge of an economic and political collapse that would again bring a hostile power to the Atlantic. In 1950 we went to war in Korea only when Communist troops marched openly across a clearly defined frontier, in a self-evident challenge to American power and influence, not merely in Asia but throughout the world.

Under such crisis circumstances it has proved possible to mobilize the nation's resources, creative energy, and idealism to meet concrete, practical threats. In none of these cases, however, did we successfully anticipate danger and prevent its arrival in an acute and dangerous form. In none of these cases did the nation emerge with a clear knowledge of the underlying interest which had led it to act.

The present Communist offensive is being conducted against us with a lively sense of these American characteristics.

Specifically, the Korean war taught the present generation of Communist leaders that, while the United States may be quite vulnerable to actions which gradually reduce its power and capabilities, the United States is a nation dangerous to arouse with a sharp, concrete, direct challenge.

Communist leadership is proceeding in Asia, the Middle East, and Europe, with policies designed to unhinge our key positions, including our SAC bases, step by step, in a new version of what Rakosi (the recently deposed ruler of Hungary) once called "salami tactics." Their evident intent is to confront us with defeat in forms where a convulsive mobilization of American strength will be impossible or ineffective, irrelevant or too late.

They aim now for victory as the cumulative result of small actions and seizures which would disintegrate the Free World and isolate the United States quite as effectively as victory in a major war. And, unwittingly, the cast of our military and foreign policy conspires to assist them in producing this result.

In order to regard what is going on in the world as a dangerous challenge to the United States, one must have some clear abstract concept of Communist intent; one must have some clear abstract concept of the American interest; one must be prepared to regard as real and urgent—as justifying current action—projected trends rather than immediate situations.

As a nation of operators, we find this hard to do; and this is one of the reasons why we jolt along, making policy in response to a series of crisis situations rather than in a steady and sustained effort governed by clear touchstones of the national interest and purpose.

To anticipate, one must work on some theoretical, abstract assumptions. Operators don't like theories. This does not mean that they don't use theories, but that they tend to apply that most arbitrary of theoretical hypothesis—that what is true today will be true tomorrow. And they define today in terms of the incoming cables.

There is a second consequence of this pragmatic bias in our performance. Let me state it bluntly: Our national staff work, at the level of military and foreign policy, is exceedingly weak.

The Joint Chiefs of Staff and the National Security Council are committees of operators, bureaucratic depart-

(Continued on following page)

mental chieftains, rather than men surveying, in a systematic way, the horizons of our national position and formulating policies which effectively bind up and unify day-to-day operations.

Under these circumstances high-level policy tends to emerge in one of two forms: Either as general statements so broad that operators can go on doing what they are doing, interpreting policy statements as they will; or as tough, practical compromises in allocating money or other scarce resources, in which the pattern of policy is much less important to the outcome than the bargaining weight of the negotiators.

The dominant values in our society put a premium on the ability to do something concrete rather than to think in abstract terms. This is, of course, one of our great strengths when confronted with practical problems requiring immediate solution.

But the balance between staff and line, between men of reflection and men of action, which is instinctively built into American institutions, does not meet the requirements of mid-century America.

This does not mean that we Americans are incapable of thinking in abstract terms or that we do not formulate general goals. In fact, we have a marked tendency to formulate general goals in abstract terms.

In this old national habit, I believe, lies the basis for the gap—between broad, loosely defined objectives—as set out, for example, in high-level papers—and the day-to-day reality of military and foreign policy. It is this gap we must seek to fill.

I do not believe that we shall fill that gap until we have created a staff for the National Security Council, made up of the ablest military and civil servants we can mobilize, responsible as a group for examining our national security problem as a whole, with the right to lay before the President and the Security Council as a whole concrete plans and proposals, at their own initiative.

I do not believe we will have a sound military policy until we have effectively unified the services and there is a combined staff that does serious staff planning rather than interservice negotiation.

Staff men should never themselves decide policy. The responsible operators must have their say. We cannot run our nation with eggheads alone. Plans and objectives must, of course, be married to a sober and responsible assessment of operating capabilities.

I am talking now about a shift in the balance of our system, not about a substitution of staff for line dominance. I am talking about a responsible linking of national objectives, precisely defined, and the day-to-day operations which would achieve those objectives.

The third consequence of the nation's acutely practical bent is that we find it difficult to make the most of the nation's resources and talents in the arms race. At its core that race is a technological competition in innovation: that is, in invention and the rapid application of invention.

Historically the United States has been strong in production and engineering, but relatively weak in creative science. Few of the revolutionary breakthroughs which have transformed war-making in recent decades have been made by Americans. This holds for atomic science, electronics, and aeronautical engineering.

In these three key areas—where military technology has a bear by the tail—the race in weapon systems calls for a concentration of creative and imaginative minds on the right issues, in the right sequence and priority.

Generally speaking, our administrative structures are geared to efficient production rather than rapid innovation, to the efficient handling of old problems rather than to finding and promptly applying solutions to new problems. Moreover, the operator is often the wrong man to control innovation. He has a built-in bias for the status quo. His gifts in manipulating masses of men and the large-scale flow of materials are not the gifts required to organize a series of breakthroughs and rapidly to translate them into front-line strength in new weapons.

It is a worrying fact that a nation with one-third of our gross national product is rapidly closing the gap in military technology between us and them and demonstrates in certain fields a greater aptitude for making effective its pool of scarce breakthrough talents.

I turn now to a second and, in the end, more important basic difficulty in meeting the challenge we confront. Its most important manifestation is that, from the highest echelons in our government down to the grass-roots, we lack a consensus concerning the abiding nature of our national interest; but this is merely the reflection of a deeper national problem.

We have not reconciled in an orderly way two legitimate and powerful strands built into the nation's tradition and outlook. One of these strands is the nation's power interests; the other is the nation's concept of itself as a domestic society and, consequently, of its moral purposes on the world scene.

Somewhere within us we know that both factors are real and relevant. In fact, we do not perform well on the world scene unless both factors are in play.

When idealism alone was believed to be the basis for the positions we have taken, the nation did back its play; for example, in the Open Door Policy in China and in Wilson's purely ideological formulation of the American interest at Versailles.

Equally, the nation has not been effective when it was confronted with situations where its power interests were involved but where a persuasive moral basis for American action was not present. A major reason why the United States was ineffective in the Indo-China crisis of 1954 was that it was then extremely difficult simultaneously to deal with the Communist menace and to disengage from French imperialism in that area.

Although, instinctively, in the fact of palpable crisis, the nation has behaved in the past half century as if it required a convergence between its power interests and its idealism in order to move, it has not translated this fact into a positive formulation of its interests sufficiently precise and widely accepted to permit it to deal with the challenges it confronts before they take the form of acute crisis.

Put another way, I believe that in order to have a stable military and foreign policy, capable of anticipating problems, we must, from the National Security Council to the grass-roots, hammer out a consensus concerning our abiding interests more precise than any now widely accepted.

Let me try to apply this broad generalization to two urgent concrete problems of American policy: The problem of limited war, and the problem of national policy toward the underdeveloped areas of the Free World.

The problem of limited war is particularly searching for two reasons. The first reason is that limited war raises, in an unavoidable way, the question of the nation's abiding power interests. Lacking a clear concept of an abiding national interest, we have tended to regard each war in our history as a once-for-all episode.

In the Nineteenth Century this worked well enough. On this continent our power objectives were tolerably clear

(Continued on page 67)

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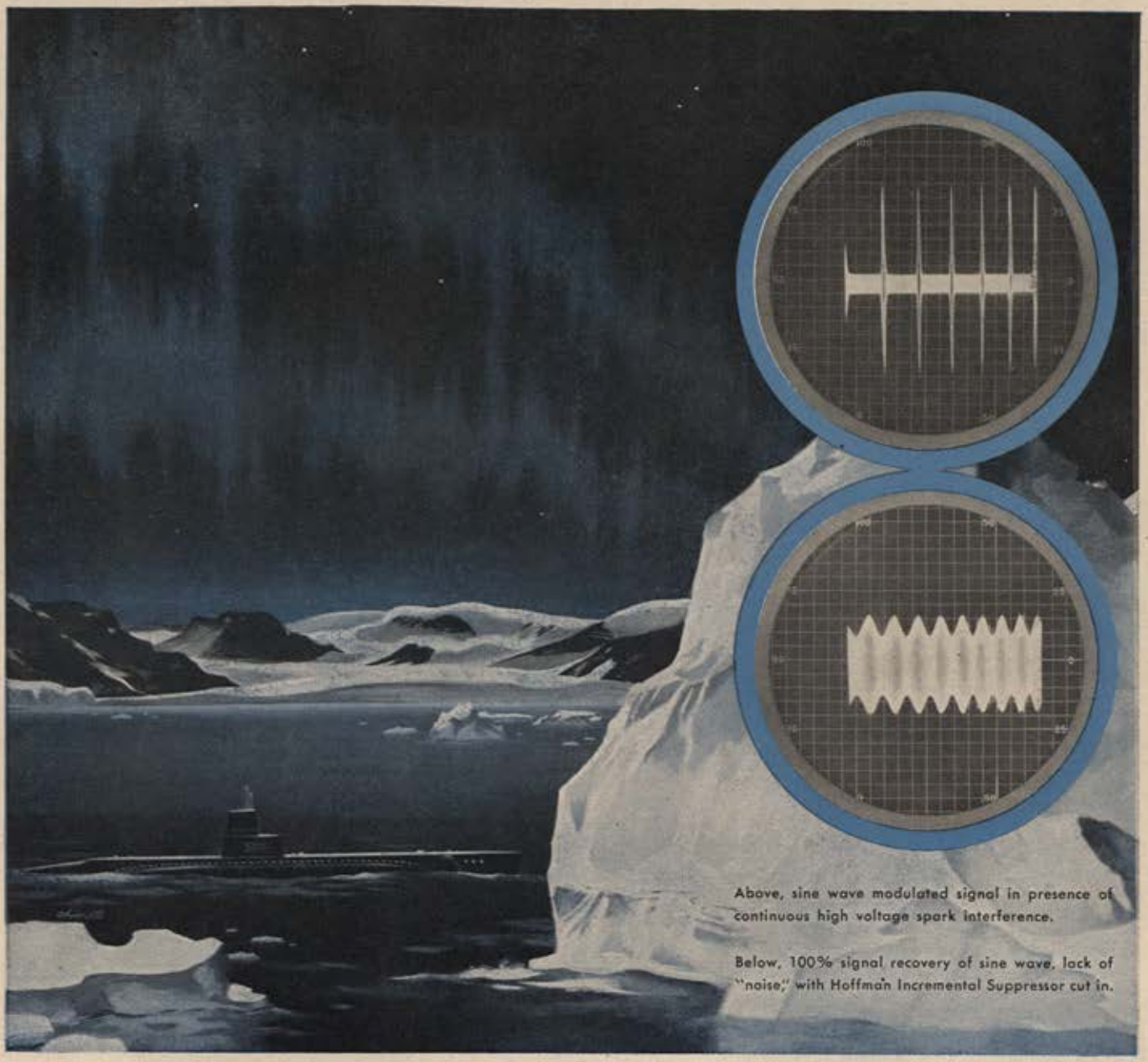

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and widely accepted, and they were associated with the great moral purpose of building and extending the democratic process in North America.

When we fought abroad, however, we acknowledged no such self-evident power objectives. We found it hard to acknowledge that we ourselves were in military peril and, lacking this sense of danger, we looked to our sense of ideological mission on the world scene as a rationale for our efforts.

Why do we have such difficulty acknowledging that war can and must be fought for limited objectives, in which an improvement of the nation's power position may, in itself, be a legitimate goal?

There are many complex reasons in our history for this difficulty which we cannot fully explore here: Our religious sense that power is intrinsically evil; the illusion that our Nineteenth Century isolation and the Monroe Doctrine were achieved without reference to the Eurasian balance of power, by grace of native virtue alone; the abiding sense that we have no serious interests beyond our shores except to see the world peacefully happy, and democratic.

In addition, lacking the long, grueling military history of the Eurasian states, lacking a widespread professional military tradition, Americans do not take easily to the notion that they or their children may have to fight and die for any but the greatest of moral purposes.

All these things and more make us shy away from creating a military force in being frankly designed to deter or to deal with limited war.

As a nation we regard the Korean war as a mistake for precisely the wrong reason: It was a mistake not to have had the forces in being and the evident will to use them, which would have ruled out the invasion of South Korea as irrational; it was not a mistake to frustrate Communist aggression in Korea, to pin down Communist forces in Asia for the better part of three years, and to give Free Asia a chance to get itself on its feet.

The experience of the Korean war has, however, reinforced in the nation the feeling that if we should ever have another war, let it be big and decisive, and it has done so at precisely the phase of history when a big, decisive war is least likely to fulfill American interests.

We have not drawn the more correct conclusion that we must have a full spectrum of deterrence to minimize the risk that limited war might again occur under circumstances where technically or politically we cannot bring to bear our atomic weapons delivery capabilities.

In short, our lack of clarity about the character of our power interests in Eurasia, our historic moral attitudes toward force, and the traumatic effects of the Korean war have compounded to make us, in my view, still vulnerable to important, if limited, military setbacks; and we find it extremely difficult to build a successful SEATO or to formulate an effective policy in the Middle East. Laos and Cambodia flirt with Moscow and Peiping; Chinese Communist troops nibble at Burma; the Baghdad Pact is a rather poor joke.

There is a second reason why limited war is a particularly searching problem for the United States; and, in a curious way, it is the exact opposite of the first reason. The first reason is that we find it awkward to admit we have power interests at a time of peace; the second reason is that we find it awkward to admit we have political interests in a time of war.

When we go to war we go in the spirit of a specialized sport or a mechanical exercise in production. Since we lack a clear sense of our interests outside the United States, we tend to treat war as a quite different exercise than the conduct of politics or diplomacy during peace. We tend to be somewhat technocratic and gadgeteering when we plan or conduct military operations.

Now limited wars are fought not only on the terrain of other people, but also in association with them. More than that, given Communist techniques, such conflicts are likely to have a powerful element of civil war built into them; that is, we will be dealing with situations where the peoples most directly involved will be in conflict not only in a military sense but in a political sense as well. Strategically, the United States is not likely to be effective in such engagements unless we, as a nation, are positively aligned with the hopes and aspirations of the majority of the local people.

And tactically as well, limited war is likely to involve, from beginning to end, a mixture of politics and military operations. Guerrillas are very hard to defeat if the native populations are prepared to supply them with food, as we have discovered from our Philippines experience, a half century ago, onward.

At every level, then, limited war must be a joint, well-balanced exercise in politics and force. And this balanced mixture runs contrary to much in our national tradition, and in our professional traditions of warfare and diplomacy.

Now, finally, I turn to the relevance of the power-ideology problem to the issue of American policy toward the underdeveloped areas.

It is evident that since, roughly, the May massacre in Korea in 1951, the leadership in the Kremlin and in Peiping have been clear that they were most likely to expand their power and influence by simultaneously associating Communism with the positive aspirations of the underdeveloped areas for peace, economic growth, and national dignity in Asia, the Middle East, and Africa, and also projecting to these areas an image of rising Communist military strength, relative to the United States.

Why have we not, since 1951, set in motion a policy designed to align the United States and the West with the forces powerfully at work in the underdeveloped areas? Why is India such a problem for us? Why have we let Arab nationalism be channeled increasingly in directions which run contrary to our interests?

In essence it comes to this: There are serious, dedicated, and able Americans who do not believe that it matters greatly to us whether, for example, India succeeds or fails relative to Communist China in its next five-year plan, and who would hold that the only meaningful touchstone for American policy in India is whether the responsible men in New Delhi are prepared to join us in military alliance.

There are men who believe that our only job in the Middle East is, somehow, to assure the continuity of the Western oil supply, and to keep Soviet military power out.

There is a widely held view that our job of national security is simply and solely to put ourselves in a position where overt Communist military strength, in the form of atomic weapons, cannot be rationally used against the Free World.

I do not believe that we shall have a policy capable of dealing with the Communist offensive in the underdeveloped areas until we achieve a consensus on the abiding character of our national interest which brings into balance and order American power and ideological interests in Eurasia.

I think such a definition must start roughly as follows: It is the duty of American military and foreign policy to maintain an environment for American society in which that society can continue to develop in harmony with the

(Continued on following page)

humanistic principles which underlie it. We must, of course, protect the handsome real estate which is our national heritage; and from that requirement there follows a whole range of balance of power problems in Eurasia which can only be dealt with by the deterrence of force or by force itself.

In addition, however, two things are true. We can lose our power positions in Eurasia without a shot being fired if other societies decide that their positive interests do not converge with ours.

Consider the danger which confronts our bases in Iceland, and the inner questioning going on in the minds of peoples in Germany, Japan, and elsewhere, as to whether or not their interests and objectives and ours sufficiently overlap to justify continued military alliance. An American civil foreign policy which persuasively convinces men that our positive objectives substantially overlap with theirs is essential to the strictly military interest of the United States.

But there is even more to it than that. We are an open society. Our society would lose much of its value and meaning if it were forced back into a continental or even hemispheric garrison, isolated from Eurasia, and this would be true even if we could effectively defend ourselves.

For our society to flourish requires that the bulk of the world outside the United States be organized on some version or other of the democratic principle that the state is the servant of the individual; for with modern means of communication, a garrison life would force us to surrender many of our most cherished individual freedoms, in the interests of brute survival.

This does not require that we seek to install abroad strictly American economic, political, and social institutions. It does require that we use our margin of influence to help other societies develop around their own versions of the proposition that the state is the servant of the individual.

Our job in Eurasia is to seek to maintain not merely a military balance of power but an ideological balance of power; and in turn this requirement flows from a definition of our national task as not merely one of protecting our island real estate, off the threatening shores of Eurasia, but also one of protecting a form of society to which we are attached.

The requirements of protecting the military balance of power and developing the ideological balance of power will not always converge. Foreign policy, like life itself, is full of painful choices. But there are many more points of convergence that we are not exploiting; and I am confident that if we honestly faced the dual character of our national interest, as a democratic island off a potentially threatening Eurasian mainland, we could fashion a policy that would protect and sustain the quality as well as the existence of our nation's life.

If I am right, then, the challenge facing the United States in late 1956, is not merely a problem of dealing with the Communist conspiracy in a specific phase of its evolution and of its tactics. At a more fundamental level it is the challenge of America coming to terms with itself in a new balance, somewhat different and more mature than any we have known in the past.

To a degree we must balance up our frontier heritage of operational vigor and pragmatism with a new reflectiveness, a new awareness of the abstract ideas which, whether we are conscious of them or not, determine in fact how we look at things and what we do about them. And this balance must be operationally linked into our military and foreign policy in such ways as to permit us courses of action which anticipate crises, which yield us a rational organization of our security affairs, and greater effectiveness in the arms race.

In addition, we must bring into a more mature balance the role of power and of ideology, as they mutually affect and determine the nature of the American interest; for only on this basis can we round out the spectrum of deterrence, force the conflict for power out into the fields of political, economic, and ideological competition, and win the battle on those relatively safe grounds.

Are we capable of this new measure of maturity? Reviewing as I have had to do in the past fifteen months the history of our nation in this century, I feel there are solid grounds for optimism.

In both political parties there are men who are not complacent and are struggling to find and to articulate the policies that would deal with the challenge facing the United States.

In the past twenty years the nation's scientists—in both the physical and social sciences—have moved toward intellectual maturity and are making contributions at the conceptual frontiers of science on a scale new in American history.

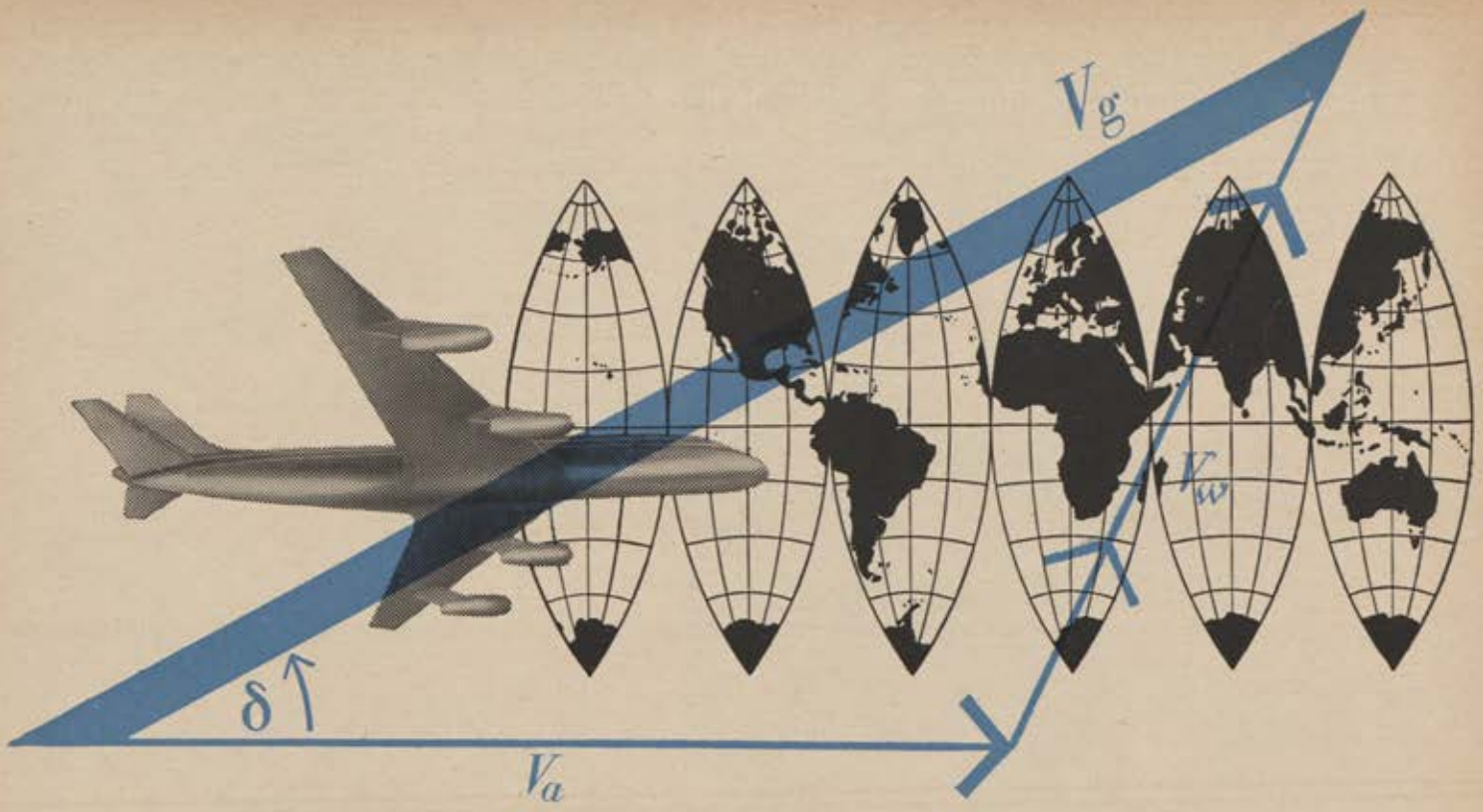
Moreover, in our domestic life we have moved into a phase of maturity and of consensus different from anything we have yet known, at least since the end of the Civil War. Both our political parties are committed to similar, if not identical, ways of reconciling political and economic freedom with the general welfare, by means we have thrashed out over the past ninety years.

Above all, I believe there is still in our society a well of spiritual energy to be evoked, a will to continue the unique American tradition that we are a society with a mission which transcends our borders, a will to resist the role of the progressively isolated observer of the world scene which Moscow and Peiping have marked out for us in this tactical stage of their plans.

We have the domestic base, the energy, resources, and idealism to cope with the challenge facing the United States; we have the foundations for the new maturity our situation demands; but we must move fast, for the devil is at our heels.—END

About the Author

The preceding article appeared in the September 23 issue of the Washington, D. C., Sunday Star, *and appears here with special permission. W. W. Rostow has been a professor at the Center for International Studies at Massachusetts Institute of Technology since 1951. He is director of a Carnegie-financed study of the interplay of US domestic society with our military and civil foreign policy. A Rhodes Scholar, he earned his Ph.D. from Yale in 1940, later studied at Oxford and Cambridge in England. In World War II, as an Army major, he served in the O.S.S. from 1942 to 1945.*



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The navigational needs of high-speed, fuel-hungry jet aircraft—civilian and military alike—were anticipated long in advance by the Air Force and General Precision Laboratory. Almost nine years ago, GPL began research on this problem in conjunction with Wright Air Development Center, ARDC. As a result, GPL has had in actual production for the Air Force for more than a year the most advanced air navigation system in operational use.

This GPL System guides an airplane to its destination under any conceivable conditions, anywhere in the world. It reports continuously and automatically — and with unprecedented accuracy—where the plane is and the distance to its destination, together with the direction the plane must fly to reach it. Completely self-contained within the plane, it needs no ground guidance, no search radar, no optical observations. In millions of flight miles in Air Force and Navy bombers, transports, patrol craft and hurricane hunters, this GPL Doppler System and its variations have demonstrated the best systems accuracies ever achieved by global navigators. When adapted to civilian use, they will be guiding commercial jet planes to the remote corners of the world and make far-reaching contributions to fuel economy, passenger convenience, safety, and efficient use of limited air space.

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A SUBSIDIARY OF GPE

Gourmets will shudder at the thought of sipping a full-course dinner through a tube, but if you're high enough and hungry enough, almost anything is good.

The men who design high-altitude flying gear evidently go along with P. T. Barnum and his "never give a sucker an even break." Above is how the Air Force solves a feeding problem.

MRS. HUBBARD'S GIANT CUPBOARD

It's far from bare, and a good thing, too, for out of it the Air Force's dieticians must pluck 1,800,000 balanced, nutritious, and palatable meals each day, for airmen from Turkey to Alaska

By Jim Winchester

Baked chicken, before and after. Nutrition experts still aren't satisfied, want to get an entire meal into a seltzer-sized tablet.

THE AMERICAN housewife—beset with menu and budget problems—would never complain if she looked at Mrs. Rachel Hubbard's job.

Mrs. Hubbard, who prepped for her present assignment by whipping up meals for male students at the Universities of Indiana and Michigan, is responsible for planning menus and ration factors for the United States Air Force around the world.

As Chief of the Food Technology Section of the Food Service Branch of the Air Force Services Division of the Air Materiel Command—a man could starve to death before he gets through *that* title!—it's her task to see that some 600,000 Air Force people get 1,800,000 balanced and nutritious meals every day. And she has to make sure they like them as well!

This isn't easy, particularly when—because of supply, storage, and distribution problems—menus have to be planned as far as eighteen months ahead. For instance, if your hitch isn't up by then, here's what you'll be eating in Air Force messes from Turkey to the Aleutians come January 1, 1958:

BREAKFAST

Chilled orange juice
Ready-to-eat cereal — Fresh milk
Griddle cakes with hot maple syrup
Bacon — Toast — Butter — Jam
Coffee—Tea

DINNER

Tomato juice with crackers
Baked ham with mustard — Candied sweet potatoes
Buttered green beans — Peach-pear-pineapple salad
Bread — Butter — Chocolate sundae
Coffee—Tea

SUPPER

Chili con carne — Steamed rice — Buttered broccoli
Lettuce wedge with Russian dressing
Bread — Butter
Spice cake with Penuchi icing
Coffee—Tea

While basic menus are planned world-wide, the chief surgeon in any given area is the final authority on nutritional needs. In such cold-weather posts as Greenland and Labrador, for example, basic menus are beefed up by 1,000 calories or more. An airman performing normal work

(Continued on page 73)

They can put almost anything into a can, except a scotch-and-soda, and some day it might even come to that.

Here's AF's top menu-planner, Mrs. Rachel Hubbard who runs her cupboard from Wright-Patterson AFB.

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in the Northeast Air Command, say the medics, needs between 4,500 and 5,000 calories a day to keep up his health and strength. An airman in the Philippines, performing the same work, would need only 3,800 calories.

"In planning our menus," reports Mrs. Hubbard, a graduate of Ohio State with a master's degree from Cornell, "cost is a big factor but not the top one. Acceptability rates number one."

To make sure our global airmen get what they like to eat—and it costs $225,000,000 a year to feed them—the Food Services Branch conducts a continuing menu preference survey. Here, at last report, was what airmen like best: Steak still tops the list, followed by grilled ham, pork chops, roast turkey, and chicken. The lowest rated meats—and consequently airmen will be seeing less of them on future menus—are cold cuts, baked tunafish and noodles, fried fish, and stews. The most acceptable vegetables are corn-on-the-cob, green beans, and tomatoes.

The least liked vegetables are asparagus, beets, cauliflower, parsnips, spinach, squash, and turnips. When it comes to desserts, ice cream is king, with pie and cake coming after that. Strawberry shortcake is always acceptable. Airmen don't like puddings and canned fruits. Milk heads the beverage list with iced coffee last.

World War II veterans will be shocked to hear that today's airmen like Spam. Food service people—and we're not kidding—rate it close to tops of the "acceptability lists."

"Of course," says Mrs. Hubbard, "for a long time we couldn't give the stuff away. Then someone got the bright idea of changing the name to 'Canned Luncheon Meat.' Overnight it became popular. It's still the same meat—just a different name."

Powdered eggs, we're sad to say, are still being widely used, particularly overseas.

"But the men still don't like them," Mrs. Hubbard confesses.

Today's balanced diet is a far cry from the haphazard feeding of our troops of yesteryear. During the Revolutionary war, there were no cooks and bakers as such. The ordinary soldier cooked his own food the best way he knew how. After receiving his basic ration of beef, flour, milk, peas, and rice, it was up to him to exercise his culinary skill over a campfire or crude oven of dirt or rocks.

The ration authorized by Congress in 1802 consisted of "one and one-quarter pounds of beef or three-quarter pounds of pork; eighteen ounces of bread or flour; and one gill of rum, whiskey or brandy."

All forces under the Department of Defense are cur-

(Continued on following page)

AND HERE'S WHAT THE AF IS DOING ABOUT ANOTHER SIDE OF THE FOOD QUESTION

WHILE the Air Force is working overtime to see that its people are well-fed, there's another side to diet. It's overeating, with the subsequent overweight problems which follow. As a result, there's a widespread drive on now in all commands to reduce waistlines.

Out in the Far East, for example, special low calorie menu charts are provided to all Air Force and Army bases. They average 500-600 calories fewer than regular meals.

"With this daily deficit," reports the bulletin accompanying these menus, "the body weight should reduce one pound per week. This is as rapid a reduction as one should attempt unless under medical care."

While special low-calorie diets are a big help in reducing weight, many Air Force medical men are taking long, hard looks at the theories of Dr. Norman Jolliffe, Director of New York City's Bureau of Nutrition in the Department of Health.

"To satisfy your hunger without gaining or losing weight appreciably, it is necessary to have a well-functioning 'appestat,'" says Dr. Jolliffe. "This is a term I coined for the automatic weight-reducing mechanism lodged in the hypothalamus, a part of the brain near the base of the skull, which also contains centers for sleep, water balance, and body temperature. When the appestat is functioning properly, the intake of food calories is perfectly balanced to one's energy expenditures.

"For instance, a person might go on a food spree and eat an extra piece or two of pie-a-la-mode. If his appestat is working properly, he will eat less at the next meal and take more exercise or both, without any conscious thought of it. The appestat, or automatic appetite-control mechanism, has taken over and is regulating the amount of food so that caloric intake is not greater than necessary."

It's when the appestat, which might well be compared to a furnace thermostat, is turned up too high that you begin to gain weight. You eat more calories than your body can burn up. Once you've gained an extra pound, it takes a lot of energy to burn it up.

"In achieving this dynamic balance," says Dr. Jolliffe, "it isn't the quantity of food you eat, but the kind of food. It's the little things that add up. Take the morning coffee break. An extra cup of coffee a day, if you use two lumps of sugar and a tablespoon of light cream—fifty-seven calories—adds up to five extra pounds of weight a year."

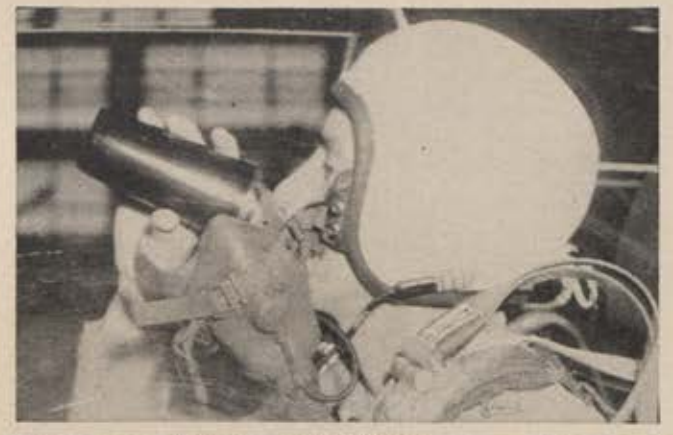
A baked potato, by itself, is only eighty calories. Add one pat of butter and it jumps to 130 calories or more. A slice of bread is sixty calories; add a pat of butter and it is 110 calories. A handful of potato chips is 100 calories. A handful of salted peanuts is fifty calories. A tablespoon of gravy amounts to almost 100 calories. By eliminating gravy just twice a week, your annual intake is reduced by almost 10,000 calories—a loss of nearly three pounds.

"It's learning to recognize these little things—what we like to call re-education in eating—that allows you to stay slim once you've lost weight," says Dr. Jolliffe.

Dr. Jolliffe, who has lectured before many military medical groups, is rabid in his desire to see the waistline of the nation—civilian and military—reduced.

"The chief defect of the American diet today," he states, "is overabundance of fat. The average fat intake per person in the US last year was forty-one percent of their total food calories. Eskimos, who have a traditional high fat diet, average only forty percent fat intake. And a high fat diet prescribed in hospitals is usually only about thirty-five percent.

"Anything we can do to reduce the nation's waistline—and keep it down—will result in better health and longer life."—END



There are no drive-ins at 40,000 feet, so you either pack a liquid lunch or go hungry—a case of drink or not drive.

rently working to standardize on as many food items as possible in troop feeding. When finally worked out this program will result in multimillion-dollar-a-year savings.

Local menu boards are permitted to vary the basic menus prepared by Mrs. Hubbard's Ohio office, and often do. Local foods, where possible, are always purchased and used, although there are some hard-and-fast rules and restrictions. All meat served in Air Force messes, for instance, has to be bought and shipped out from the United States.

Environmental factors, too, such as climate, topography and living or battle conditions, also greatly affect our airmen's attitude toward food. Noise, orders, and sights of varying kinds can all affect a man's willingness to eat certain kinds of food. Anxiety, fear, monotony, and fatigue also affect his eating habits.

"In isolated areas," says Mrs. Hubbard, "we have found that proper food is more valuable as a morale factor than for its nutritional values."

To keep morale high at such places as lonely weather stations in the Arctic, off-season items such as fresh tomatoes and watermelons are airlifted to these bases year-round.

"One of our current problems," Mrs. Hubbard reports, "is getting flight personnel to get off the ground with a good breakfast."

What a good breakfast means in the Air Force is explained this way by Col. William H. Lawton, air surgeon of the Flying Training Air Force at Randolph AFB in Texas:

"For a long time our unexplained accident rate was entirely too high. We were having two, three, and sometimes four unexplained accidents per month. A pilot's duties require the expenditure of an enormous amount of energy. Flying a modern jet is not only an arduous job physically—it also makes extreme mental demands on the pilot.

"Last year the surgeons of this command conducted a survey and found that as many as fifty percent of the student pilots went off without a proper breakfast. If a flyer gulps down a cup of coffee and maybe a doughnut, and then goes off on a flight, after an hour or so his blood sugar may fall to a dangerously low level. His coordination will be off, reaction time will be slowed down, thinking will be slower, and judgment will be off. He is a candidate for another mishap marked down to 'pilot error.'

"This summer a program was started to encourage pilots to eat an adequate breakfast, consisting of fruit or fruit juices, eggs, bacon, toast, milk, and so on. Wives were taught their husbands' needs for a hearty morning meal. Snack bars were set up in every ready and briefing room to serve milk, fruit juices and sandwiches between flights.

"Within a few weeks time the accident rate of the command was the lowest on record!"

In addition to recipe development, menu-planning, and watching the calorie counts for ground feeding, Hubbard also has the same responsibility in flight feeding.

Here she works closely with the Air Research and Development Command, among others, and with civilian food research units in devising new—and more nutritious ways—to keep our high flyers well nourished. Much of the work along this line is still in the development and testing stage, but one of the newest in-flight developments—designed particularly for jet crews—is liquid meals. Entire meals, still retaining their original tastes, are concentrated into liquid form. A turkey dinner, thus reduced, is concentrated into a container the size of a small condensed milk can. Flying personnel, unable to remove their oxygen masks for sustained periods, can sip these liquid meals through special rubber tubes. Additionally—shades of *1984*—research and testing is also underway on concentrating entire meals—such as chicken or steak dinners—into pellets no larger than an ordinary alka-seltzer tablet. Just pop one into your mouth and—presto!—you're well-fed.

One of the biggest steps forward today in military food service, and one with possibly the most important applications for the future, is the preservation of food by radiation. Much of the research in this atomic-age field is being done by the Army's Quartermaster Corps, which shares the responsibility for feeding Air Force personnel in many sections.

"In essence," reports Col. William D. Jackson, Chief of the Office of Research and Development of the Quartermaster Corps, "the process resembles that of taking an X-ray. Food is exposed to the invisible rays which pass through, killing any micro-organisms and insects. The food itself, however, remains fresh. It is not cooked. If the food is pre-wrapped before exposure to the rays so as to prevent reinfection, it will remain preserved in its fresh form—just as it is preserved in the freezer. A significant benefit is that irradiated foods do not require refrigeration for storage or transit."

Radiation preservation, it is foreseen, will contribute to future military operations in many ways. For example, the amount of fresh food for airmen or soldiers in battle areas can be increased.

"Normally," reports Colonel Jackson, "if troops in the field are to be fed as they should be, it would require one walk-in and two reach-in refrigerators for each consolidated mess of approximately 450 men. This represents a total weight of approximately 8,500 pounds, or an average of nineteen pounds per person. Nor does this take into account the back-up refrigeration required for storage and transit in ships, planes, railroads, and trucks."

Eliminating refrigeration will also decrease the long line of spare parts, maintenance, and resupply. Cutting down on over-all tonnage, with its haulage and maintenance problems, will permit release of many procurement, maintenance, and repair personnel for more direct combat activities.

"Right now, however," reports Mrs. Hubbard, "the biggest change in Air Force feeding has been brought about by prepared mixes. Foods are prepared in bulk and in powdered and concentrated form, easily packaged for shipping. Only water has to be added."

Whatever form of food—fresh, canned, dried, or powdered—the Air Force feeds its men and women around the world, it's a safe bet that this Mrs. Hubbard's giant cupboard is one that'll never be bare.—END

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only ordinary bench tools are needed to assemble Aeroquip "*super gem*" Fittings and 666 Teflon* Hose!

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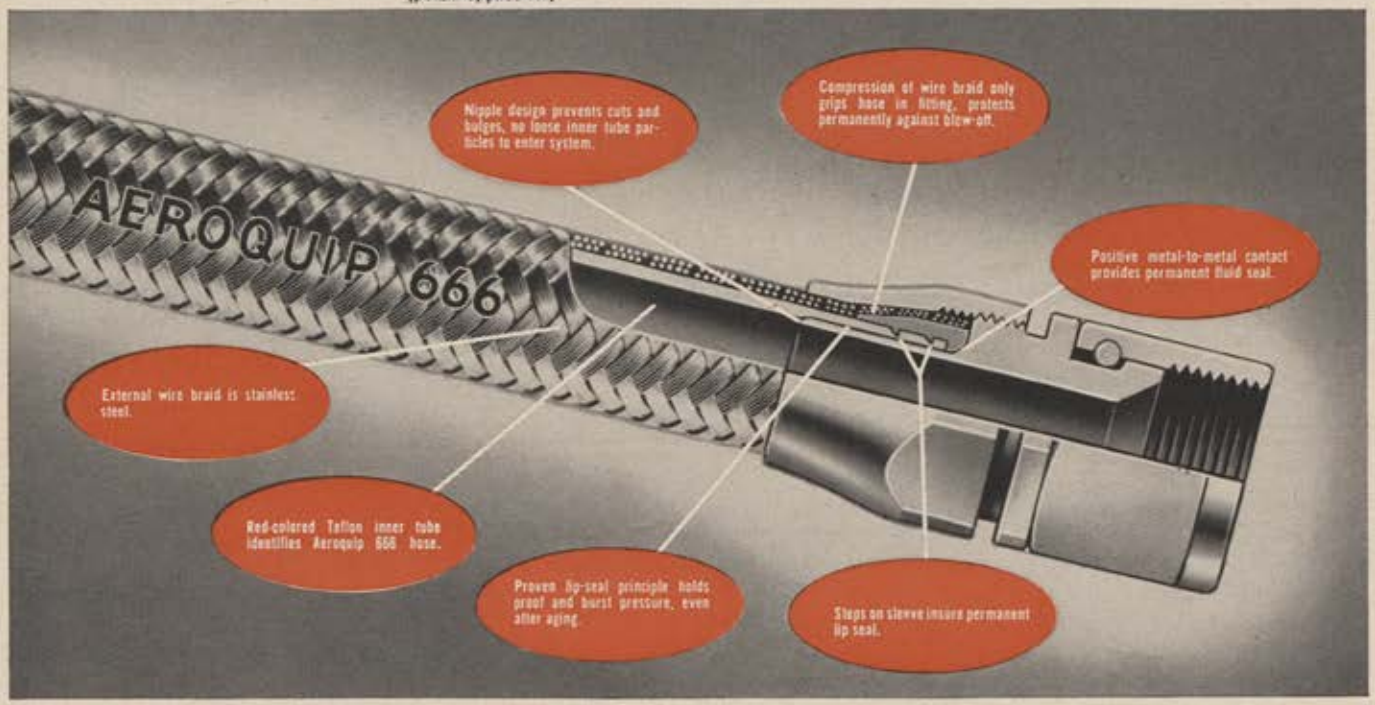

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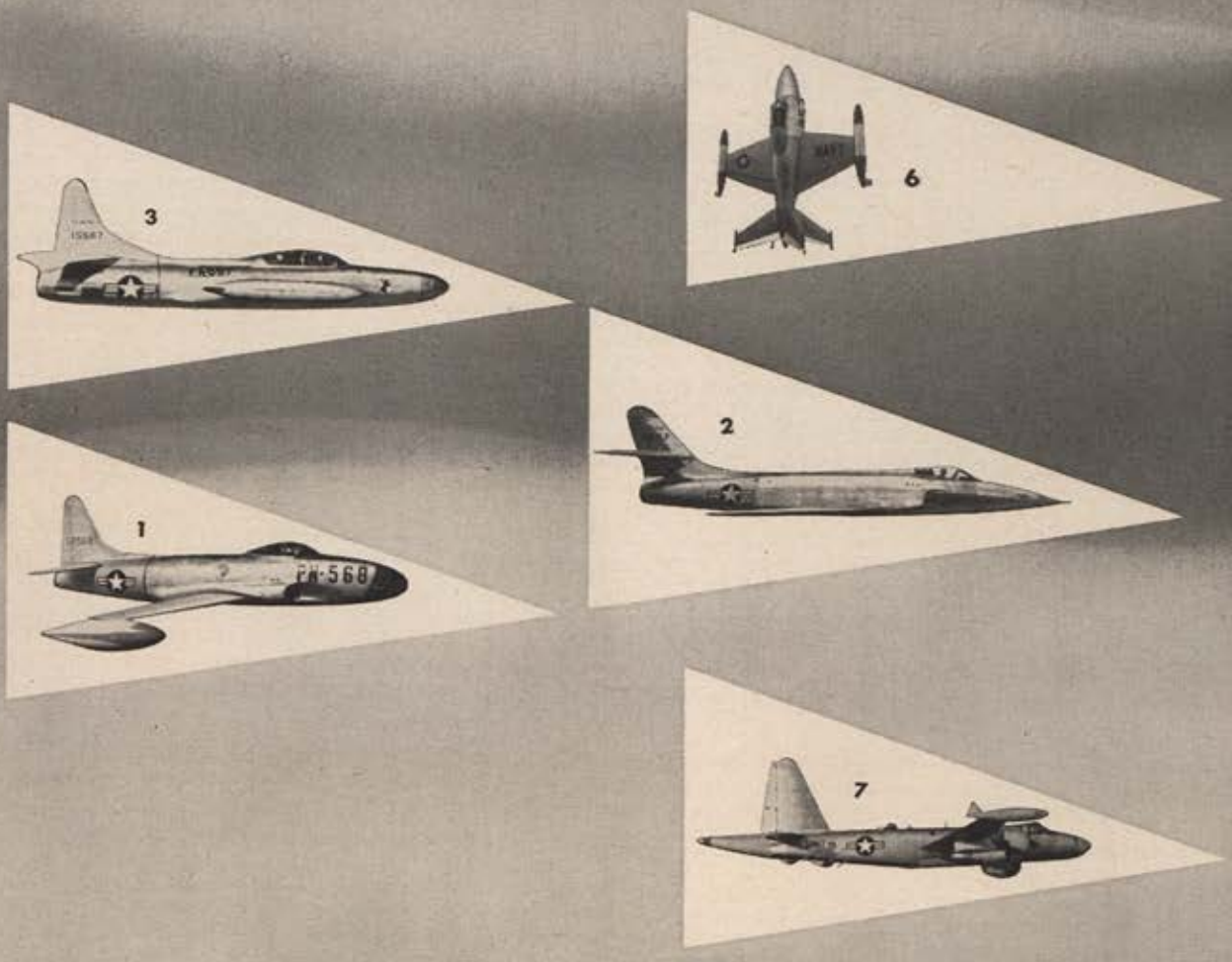

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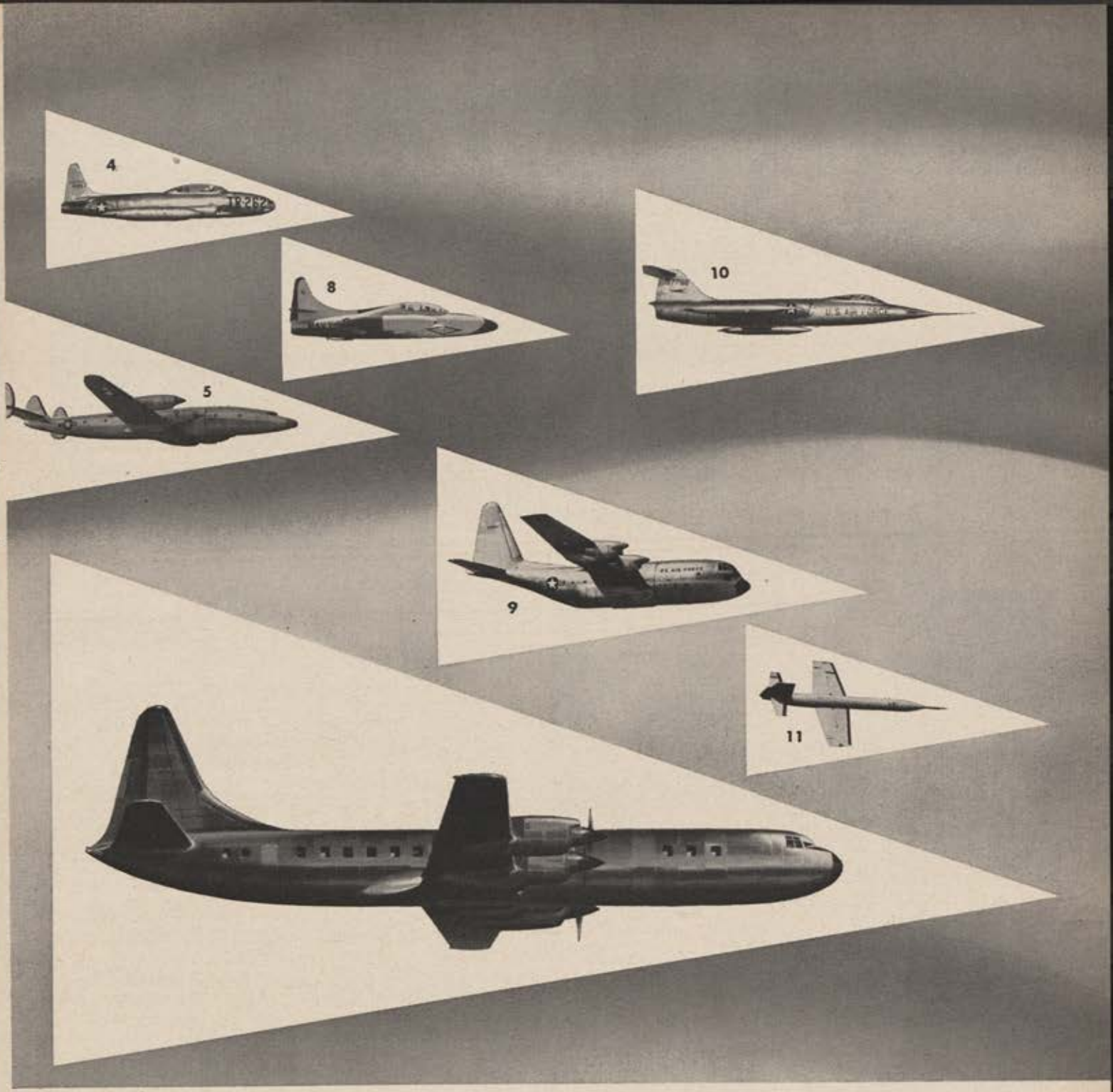
Sleek aerodynamic beauty, time-tested structural stamina, unique high-performance capabilities and exceptional economy of operation and maintenance are but a few of the LOCKHEED ELECTRA's points of superiority. Its mighty Allison propjet engines, combining jet thrust with proven propeller dependability, enable it to whisk passengers into and out of existing air terminals which now handle nearly 98% of total U. S. air passenger traffic.

The new LOCKHEED ELECTRA's high speed, swift climbing ability and king-size fuel reserves insure greater schedule regularity and reliability—because the ELECTRA can depart on time and fly, undaunted, above or around bad weather. And its spacious cabin-compartments are so restfully quiet, so vibration-free and comfortable, you'll be amazed to discover you're traveling at 7-mile-a-minute speeds.

Unexcelled for short-to-medium range flights, the LOCKHEED ELECTRA brings the advantages of jet age air travel to all of the people, of all cities, everywhere—with commuter-like timetables affording travelers a wide choice of flights.

Now in production, the LOCKHEED ELECTRA starting in 1959 will go into service for American, Braniff, Eastern, KLM-Royal Dutch, National, Western and other leading domestic and foreign airlines—extending Lockheed's jet-powered leadership around the world.



ELECTRA

JET L-1000 Turbojet Engine, designed and built by Lockheed in 1941 . . . incorporated many years-ahead features now widely used in present-day jet engines.

1. JET F-80 Shooting Star, first U. S. production jet fighter; first to exceed 500 mph on everyday Air Force duty, providing near-sonic flight experience.

2. JET F-90 Penetration Fighter, first U. S. aircraft to dive through sound barrier routinely—proving supersonic flight not awesome as pilots then thought.

3. JET F-94 Starfire, first of the almost-automatic all-weather jet interceptors—pioneered application of modern electronic equipment in jet aircraft.

4. JET T-33/TV-2 Trainer—world's first successful jet trainer, which gave America its vitally needed backlog of military jet pilots in record-breaking time.

5. PROPJET R7V-2/C-121F Super Constellation—world's fastest propeller-driven transport developing valuable new data for U. S. on high-speed prop-flight.

6. PROPJET XFV-1 Vertical Takeoff Fighter with 2 jet turbine engines and contrarotating props—expedited valuable VTO flight research/development.

7. JET-ASSISTED P2V-7 Neptune—7th in a hardy line of far-ranging U. S. Navy patrol planes, equipped with jet pods to increase attack and evasion capabilities.

8. JET T2V-1 SeaStar Trainer—"World's Safest," first production plane utilizing Boundary Layer Control for slow, safe landings and takeoffs on USN carriers.

9. PROPJET C-130 Hercules—the versatile new go-anywhere, haul-anything "strongman" of the USAF that led America into a new era of swift, low-cost movement of heavy cargo.

10. JET F-104 Starfighter—World's Fastest Jet Fighter . . . "America's Missile With a Man in It," capable of overtaking and destroying any aircraft.

11. RAMJET X-7 Missile, designed and built by Lockheed's Missile Systems Division, is one of a family of supersonic vehicles testing and developing air-breathing ramjet engines.

LOCKHEED AIRCRAFT CORPORATION

CALIFORNIA DIVISION, *Burbank, California* • GEORGIA DIVISION, *Marietta, Georgia* • MISSILE SYSTEMS DIVISION, *Van Nuys, Palo Alto and Sunnyvale, California* • LOCKHEED AIR TERMINAL, *Burbank and Palmdale, California* • LOCKHEED AIRCRAFT SERVICE, *Ontario, California*

New CAP commander, Maj. Gen. Walter Agee, accepts sword from Italian AF Academy students.

Before leaving for South Pole, CAP Cadet Robert Barger talks over his trip with AF Chief, Gen. Nathan Twining.

Fifteen years of service to the nation in peace as well as in war

The CAP Gets

Fifteen years ago, Gill Robb Wilson, now AFA's Board Chairman, suggested Civil Air Patrol to President Roosevelt.

As national commander of CAP for eight years, Maj. Gen. Lucas V. Beau increased the membership to 37,000 cadets.

ON DECEMBER 1, the Civil Air Patrol, official auxiliary of the United States Air Force, will be celebrating its fifteenth birthday.

Dreamed up back in 1941 by Gill Robb Wilson, now Air Force Association Board Chairman, and by a few worried aviation enthusiasts, the Civil Air Patrol has struggled its way through infancy to its present healthy status. In 1941 Gill Robb Wilson approached President Roosevelt with the suggestion that, if properly organized, America's private pilots could perform an unusual and vital service to the nation in time of emergency.

And, on December 7, 1941, that "emergency" came. Through World War II, CAP pilots flew hundreds of thousands of miles aiding the war effort through submarine patrol, border patrol, special courier missions, and in scores of other ways whenever ordered to do so by the Army Air Corps.

At the close of the war, the CAP was caught in the mad rush of demobilization and its life was practically ended. Once again, clear-thinking airmen went into action, this time with Gen. Carl A. Spaatz carrying the ball. It was "Tooey" Spaatz, first Chief of Staff of the Air Force, who helped save the Civil Air Patrol from abandonment and planned its future course. With the blessing of Congress, CAP was named the official civilian auxiliary

Cadets brush up their radio-telephone procedure at one of CAP's transmitters, from its net of 9,000 facilities.

Cadets at two-week summer encampment get acquainted with the J-47 jet engine. Encampments are held at AF bases.

Cadets take time out from their studies in International Cadet Exchange to get a first-hand look at Swiss Alps.

Cadets learn about G-forces from AF's Lt. Col. John Stapp.

Another Fogey

of the Air Force and granted a charter as a non-profit corporation. Under the new plan, CAP was "to provide aviation education and training especially to its senior and cadet members; to encourage and foster civil aviation in local communities and to provide an organization of private citizens with adequate facilities to assist in meeting local and national emergencies."

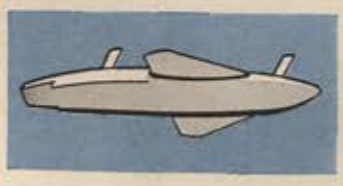
Today, the Civil Air Patrol has a force of 91,000. Of this number, 51,000 are its most important product—the cadets. It is for these young people (fourteen years and older) that the CAP expends the bulk of its efforts. And these efforts are paying off. Thirty-six of the Air Force Academy's first class of 310 members were from the ranks of the Civil Air Patrol cadets. More than ten percent of this year's class had also been CAP cadets.

CAP is playing an even closer part in the over-all Air Force picture. Accompanying the Air Force to the South Pole on the airborne phase of "Operation Deep Freeze" is a seventeen-year-old CAP cadet from Peoria, Ill. There he is working along with Air Force crews, and after his return he's another who will try for entrance in the Air Force Academy.

At fifteen years of age, the Civil Air Patrol has become a mature outfit, one well equipped to continue serving the nation.—END

All the World is OUR Airport

The remote corners of the world are now accessible to aircraft designed to include the Stroukoff Pantobase landing system. A product of Stroukoff research and development, Pantobase will permit landings and take-offs from snow, ice, water, sand and unimproved terrain as well as standard runways. The increased versatility of the aircraft will reduce the need for conventional airports and contribute materially to the advancement of logistical techniques. The safety of the Pantobase landing system, is assured by the extensive experience and complete reliability of the Stroukoff organization.



Pantobase – When designed into an aircraft the Stroukoff Pantobase system enables the plane to land and take off from many types of surface without changes or additional landing equipment.

BLC – Boundary layer control as developed by Stroukoff increases the effective lift and delays stalling of the wing, thereby reducing required speeds and distances for take-offs and landings.

Achievement is a tradition at Stroukoff. Leaders in the development and design of cargo and transport aircraft, Stroukoff offers challenging opportunities to creative engineers.

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Stroukoff AIRCRAFT CORPORATION

WEST TRENTON, NEW JERSEY

AIR FORCE CAREERS

NO. 2 OF A SERIES

AF technicians prepare a Martin TM-61 Matador guided missile for launching at the Missile Test Center, Patrick AFB, Fla. Rocket propulsion unit is used to boost the Matador into the air, where its own jet engine takes over.

ROCKETS ARE THEIR RACKET

By Flint O. DuPre

MENTION the word rocket and the imaginative types think of a trip to the moon.

But for a select group of USAF airman, the word has a more run-of-the-mill meaning. They are the Air Force's Rocket Propulsion Technicians (career field 44170) who daily work with many types of rockets—one of the important weapons of the fast-growing jet-age Air Force.

The rocket is a relatively new member in the family of air weapons. Its real baptism in air combat came during the Korean war. But actually such rockets go back to the early 1920s when a small group of individuals—looked upon suspiciously by their less technically informed neighbors—experimented during an exciting and productive period.

Some exploratory flights were even made. The launching towers were converted windmills bought from Sears Roebuck—a far cry from the expensive and complicated towers that are used today.

Since rockets are so important in present-day jet aircraft—the 104 air-to-air rockets the Northrop F-89D Scorpion carries make it the nation's most heavily armed fighter—it is natural that the Rocket Propulsion Technician (or RPT, as he's come to be known) is one of the USAF's most valuable airmen.

The RPT also is a member of one of the smallest and most select career fields in the Air Force, for on the supervisory level there are fewer than forty assigned AF-wide. They're assigned to four of the Air Research and Development Command's centers—at Edwards AFB, Calif.; Holloman AFB, N. Mex.; Patrick AFB, Fla.; and Wright-Patterson AFB, Ohio.

These men, with seven-level skills and wide experience, and others who are now learning the rudiments of this specialty, come from the aircraft mechanic career field. Some served when a Boeing B-17 Flying Fortress of World War II was the last word in airplane weapons.

One such man is M/Sgt. Jim Ferguson of Holloman Air Development Center, whose experience with rockets led him to become right-hand man for Lt. Col. John P. Stapp during the early days at Muroc Lake where rocket sled tests were first begun ten years ago. Still on the job, Sergeant Ferguson consistently volunteers for the rides which Colonel Stapp completed so successfully to gain information on acceleration and deceleration forces for safety devices to be incorporated in new design aircraft. But Sergeant Ferguson is just as consistently turned down. Rocket technician specialists are rare birds, and they're not easily replaced.

The supply of RPTs doesn't meet the demand, so a course has been established by TechTAF at Chanute AFB, Ill., where small classes—in some cases there is an instructor for each student—gain exact knowledge of rockets, big and small.

Upon graduation and assignment to the flight line, these airmen find their job dangerous and exciting. They handle tricky liquid fuels while running fuel lines from test stands up to rocket engines. This they call a hot firing, and nothing could be hotter—or more deadly—in case of an accident.

The career field personnel book says the RPT generally "installs, orients, inspects, repairs, maintains, and overhauls liquid propellant rocket systems." His qualifications must include knowledge of the composition and characteristics of oxidizers and fuels. He must have some education in basic electricity. Knowing the principles of rocket propulsion is mandatory for this specialist.

He gains experience in maintaining and repairing liquid propellant rocket systems, by installing rocket assemblies and by testing various kinds of rocket motors.

He also must be adept at maintain-

(Continued on following page)

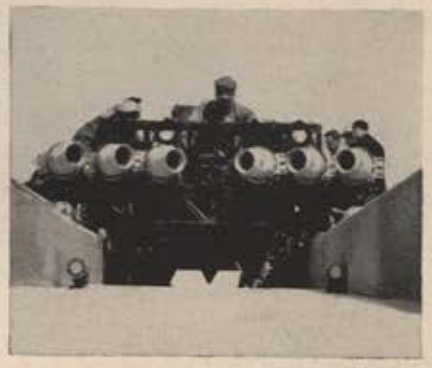
Team of SAC armorers assemble a potent five-inch HVAR. Rockets were first used in aerial combat in Korea.

ing records and reports, for the manner of performance of rockets is important to research comparison and study. And he has an eagle eye turned toward the rocket during its actual operation.

In time the RPT becomes an expert on preventive maintenance. He must check for and correct conditions of congealed acid, leaking or cracked containers, corroded or leaking fuel units, and loose or leaking connections.

The RPT has a vocabulary of his own. To him lox is liquid oxygen, RATO is rocket-assisted take-off. Burn-out is the point at which a rocket fuel is exhausted, and to him hot firing means super caution.

These specialists generally work with two types of rockets. One consists of the five- and 2.75-inch rockets that arm such fighters as the Republic F-84F Thunderstreak, North American F-86 Sabrejet, Lockheed F-94 Starfire, Northrop F-89 Scorpion, and



Northrop-designed rocket test sled wouldn't get far without AF RPTs to rig the six 4,500-lb.-thrust rockets.

the North American F-100 Super Sabre.

The other type is rocket power in experimental aircraft like the Bell X-1A, the Douglas X-3, and the ill-fated Bell X-2 which crashed in September after earlier setting an unofficial speed record of 1,900 miles per hour and an altitude record of 126,000 feet.

Scientists believe the rocket aircraft now being flown by the Air Force may lead ultimately to high-speed, high-altitude commercial rocket ships for flights between such widely separated centers on the earth's surface as New York to London or from San Francisco to Tokyo, for example.

And if and when a rocket-powered space ship makes that trip to the moon, it's a safe bet there will be an airman Rocket Propulsion Technician aboard.—END

Stand by to launch . . .

This automatic testing equipment understands the story the missile is telling.

Until the very instant a missile is launched, its critical functions must be monitored continuously. Warning of any failure of function must be transmitted instantaneously so that immediate remedial action may be taken.

The Stromberg-Carlson Dual Limit Detector and Automatic Auto-Pilot Tester work together to monitor all functions: auto-pilot, guidance system, power plant and electrical system. With this automatic testing team on the job, complete and continuous monitoring is assured.

Checking out guided missiles is only one of many uses to which our equipment is put. We custom-build automatic equipment to meet a myriad of testing requirements for the Armed Forces and for industry.

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S-C

HARD WORK IN ICELAND—Supporting an aerial survey team in Iceland, this Sikorsky H-19 of the U.S. Air Force carried personnel and supplies between ship and shore bases. In 23 flying hours, the helicopter carried 41 people and 47,000 pounds of cargo. This is a good example of how rugged Sikorsky helicopters can operate from very small areas, with minimum support facilities, and under a variety of weather conditions.

AROUND THE WORLD WITH SIKORSKY HELICOPTERS

FIRST S-58 TO BELGIUM—The first units of a fleet of 12-passenger Sikorsky S-58Cs have been delivered to Sabena Belgian World Airlines. Sabena will operate the fleet on its European routes. Larger and more powerful than the S55s Sabena now flies, the S-58C, named the *Continental*, cruises at 105 miles per hour.

1000th S-55—B. L. Whelan, general manager, and Igor Sikorsky, engineering manager, mark a milestone in production of transport helicopters with completion of this 1000th Sikorsky S-55, a Marine Corps HRS. Two newer and larger helicopters are also in production, the S-58 and the twin-engined S-56.

AIRLIFT DEMONSTRATION—To show evacuation techniques in the removal and transport of light aircraft, an Army Sikorsky H-34 helicopter carries a Cessna L-19. The demonstration and the suspension arrangement were worked out at Fort Sill, Oklahoma, site of the Army's H-34 transition school. The Sikorsky H-34, the Army's newest helicopter in operational use, can carry cargo loads of up to two tons or 17 combat-ready soldiers plus crew of two.

HELICOPTER HISTORY

H-34 SPEED RECORDS

In July, 1956, an Army Sikorsky H-34, flown by Capt. Claude Hargett, right, and Capt. Ellis Hill, of Fort Rucker, Ala., established new closed-circuit speed records. The records were for 100 km, 141.9 mph; for 500 km, 136 mph; and for 1000 km, 132.6 mph. The previous 1000 km closed-circuit world speed record for rotorplanes, 66.6 mph., was set by a Sikorsky R-5A in 1946.

SIKORSKY AIRCRAFT
BRIDGEPORT, CONNECTICUT
One of the Divisions of United Aircraft Corporation

Gear teeth get in line when he takes a hand

R. L. Thoen, right, explains faulty tooth conformation on a minute gear which has been enlarged 100 times in this king-sized projector. Gear specialist on the engineering staff of the Mechanical Division of General Mills and author of numerous technical papers, Thoen makes gear trains perform with uncanny accuracy. He helps design and build the special machines which make such accuracy routine work at the highly specialized plant.

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General Mills Pioneers Scientific Frontiers One of General Mills' numerous research projects involves the behavior of metals in space flight. Here a scientist determines the "sputtering" or disintegration rate of molybdenum at 200 miles above the earth. The metal is under fire from atoms moving at 25,000 m.p.h.

MECHANICAL DIVISION OF General Mills

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In "Jet Blasts" you can sound off on any subject you want. We'll pay a minimum of $10 for each "Jet Blast" used. All letters must be signed but we'll withhold names on request. Keep letters under 500 words. "Jet Blasts" from service personnel do not necessarily report official policy.

Why Not a Distinctive Insigne for the Air Force Uniform?

Why is it that this great Air Force of ours does not have a distinctive insigne that would be readily apparent to and easily identifiable by the man on the street?

Ask some of your friends and associates what are the distinctive insignia of the Air Force and how do they identify its members. Some will answer right off the bat, "By the silver Air Force wings." This is right, but the silver wings are worn only by rated officers. Non-rated officers are not entitled to wear the wings, nor are the enlisted ranks of the service. In the summertime one answer may be, "By the blue cap and belt and black shoes, worn with the khaki tan." In the wintertime another answer may be, "By the new blue uniform."

The true answer is that at present the United States Air Force has only one distinctive insigne—on the buttons of all Air Force coats. The nomenclature of this insigne describes it as of oxidized silver-colored metal of suitable composition, usually metal, circular and slightly convex, with raised rim, with the Great Seal of the Department of the Air Force in clear relief against a horizontally lined background.

But what *really* distinctive insignia does the Air Force wear? All commissioned officers and warrant officers have as a cap insigne the United States coat of arms in oxidized silver color, in bold relief. This is worn on the service cap but not on the garrison cap. Airmen wear the circled silver-colored cap device of the United States coat of arms. On the coat or jacket, both officers and airmen wear the silver letters "US" on the upper lapel.

There are times when Air Force personnel will be wearing very little to identify them. For instance, in the summertime an officer may wear his overseas cap with his khaki shirt and pants. The only distinctive insigne he wears will be that of his rank on both sides of his shirt collar and on the left side of his overseas cap.

Even in his winter outfit, there is not much to identify him prominently with the Air Force, unless he wears those silver pilot's wings over his left pocket.

It is true that only the Air Force utilizes the oxidized silver-colored coat of arms, but this emblem is not very distinctive in itself and definitely does not serve the purpose of identifying its wearer as a member of the Air Force.

It is also true that the United States coat of arms, as a distinctive emblem, is and has been the exclusive property of the United States Army. There is nothing wrong with this. The Army had it first, and the public recognizes it as the insigne of that particular branch of the military service. Instead of adopting the gold United States coat of arms of the Army and merely changing its color, let's be original for a change—and come up with a completely new, distinctive insigne. Why not an insigne which even at a casual glance leaves not a single doubt but what its wearer is definitely a member of the United States Air Force. With a little improvising this can easily be made possible. The Navy and Coast Guard make good use of the anchor of a ship as an identifying insigne. The Marine Corps does the same with its terrestrial globe and fouled anchor.

With this in mind, let us pause for a moment and ask just one question —What one single item of Air Force insignia do we presently have which is known and recognized by everybody, from all the teen-agers of America to our oldsters sitting in their front porch rockers? That's right—the silver wings of an Air Force pilot! Those silver wings are a natural for an outstanding insigne of the *Air Force*.

Why not combine the beauty of the present United States coat of arms with the traditional prominence of the Air Force pilot's silver wings? This emblem could consist of the silver United States coat of arms superimposed upon the silver wings of the Air Force pilot. For commissioned officers, the coat of arms, superimposed upon the silver wings, would be in bold relief. For warrant officers a circled coat of arms superimposed upon the silver wings in bold relief would be readily recognizable. For airmen the coat of arms superimposed upon the wings could be worn in a circled form similar to the present airman coat of arms.

As headdress insigne it could be worn on the service cap and the overseas cap. This usage can apply for both summer and winter wear. Officers, wearing the overseas cap, would wear an insigne of rank on the left side of the cap, with the Air Force emblem on the right side of the cap. The same practice would apply to warrant officers. Airmen would wear the circled insigne in place of the present circled coat of arms.

By use of this outstanding insigne khaki caps could be worn with the summer dress. For officer or warrant officer wear, a summer-type service cap can be improvised, similar to the Navy's, utilizing a dark blue band, with the Air Force emblem mounted thereon.

This new emblem could also be worn very effectively on both the lower right and left lapels of the Air Force coat or jacket. The silver letters "US" could continue to be worn on the upper lapels.

Personnel wearing such an emblem could also be readily identified in suntan uniform. Commissioned officers and warrant officers would wear an insigne of rank on their right collars and the Air Force emblem on the left collar. Airmen personnel could wear the circled insigne of the Air Force on both their right and left collars.

Such an emblem would mean a lot to the Air Force. From its use would come ready recognition from the public—and added prestige. The emblem would also mean a lot to its members, who could wear it with distinction and pride—as members of the greatest military team on earth!

CAPT. JAMES W. HALL

A Ready Room Feature

RESERVE GUNNERY MEET

By Edmund F. Hogan
RESERVE AFFAIRS EDITOR

Jim Kumpf, left, meet's high scorer, shakes with Don Price, the runner up.

THE Air Force Reserve program reached an important plateau at Casper, Wyo., last month in its climb toward operational readiness when eight of the nine jet fighter wings competed in the first Reserve jet aerial gunnery exercise. And the championship trophy now graces headquarters of the 440th "North Star" Wing at Wold-Chamberlain Field in Minneapolis.

Approximately 600 officers and airmen who took part in the week-long exercise saw a young Korean war veteran, Lt. James Kumpf, lead the Minneapolis wing to an impressive victory over the field.

One-half of an identical twin team firing for the "North Star" Wing, Kumpf finished the exercise with a high individual score of 321 points. His brother, John, also a first lieutenant, placed thirteenth among individual scorers with 121 points. Their combined totals added up to more than fifty percent of the team score of 789, which led the second-place 349th "Golden Gate" Wing of San Rafael, Calif., by 160 points.

The individual winner flew 100 missions in North American F-86 Sabrejets in Korea before becoming gunnery instructor for the Air Force with his brother at Las Vegas. Upon leaving the Air Force, they returned to Minneapolis, became business machine salesmen, and joined the 440th.

The "North Star" Wing, flying Republic F-84Es and captained by Col. Russell F. Gustke, a World War II fighter ace, took the lead on the opening day of the meet and never relinquished it. Jim Kumpf set the pace with seventy-two hits, while the fourth member of the team, Maj. Harry E. Anderson, hinted at his eventual fourth-place individual finish of 200 points with an opening day score of fifty-nine hits.

Winning team from 440th FBW, Minneapolis. From front: 1st Lt. John Kumpf, Maj. Harry Anderson, 1st Lt. James Kumpf, Col. Russell Gustke.

Capt. Donald D. Price of the 349th, who finished second among individual scorers with 259 points, gave Jim Kumpf his closest competition throughout the meet. Price, a crop duster in civilian life and owner of more than 13,000 flying hours, might have won the individual championship had he not been disqualified on his third mission.

Only four points separated the two when Price took off from the 5,300-foot high Natrona County Airport on his third mission. Firing inside the minimum allowable angle, Price broke fifteen strands in the polyethylene target, an error requiring automatic disqualification for the mission. Despite this zero, Price finished forty-four points ahead of teammate Lt. Don Rutledge, third among individual scorers.

A final target pierced by 117 hits earned a third-place finish in the team scoring for the 89th "Minute Man" Wing of Bedford, Mass. This target gave the New Englanders a total score of 493 points, only eleven points better than the 482d Wing of Marietta, Ga.

Fifth place, at 460 points, went to the 319th "Chickasaw" Wing of Memphis. Sixth place, at 448 points, went to the 438th "Flying Badger" Wing of Milwaukee. In seventh place, at 280 points, was the 439th "Wolverine" Wing of Detroit. Drawing up the rear was the 448th "Stormy Rains" Wing of Grand Prairie, Tex.

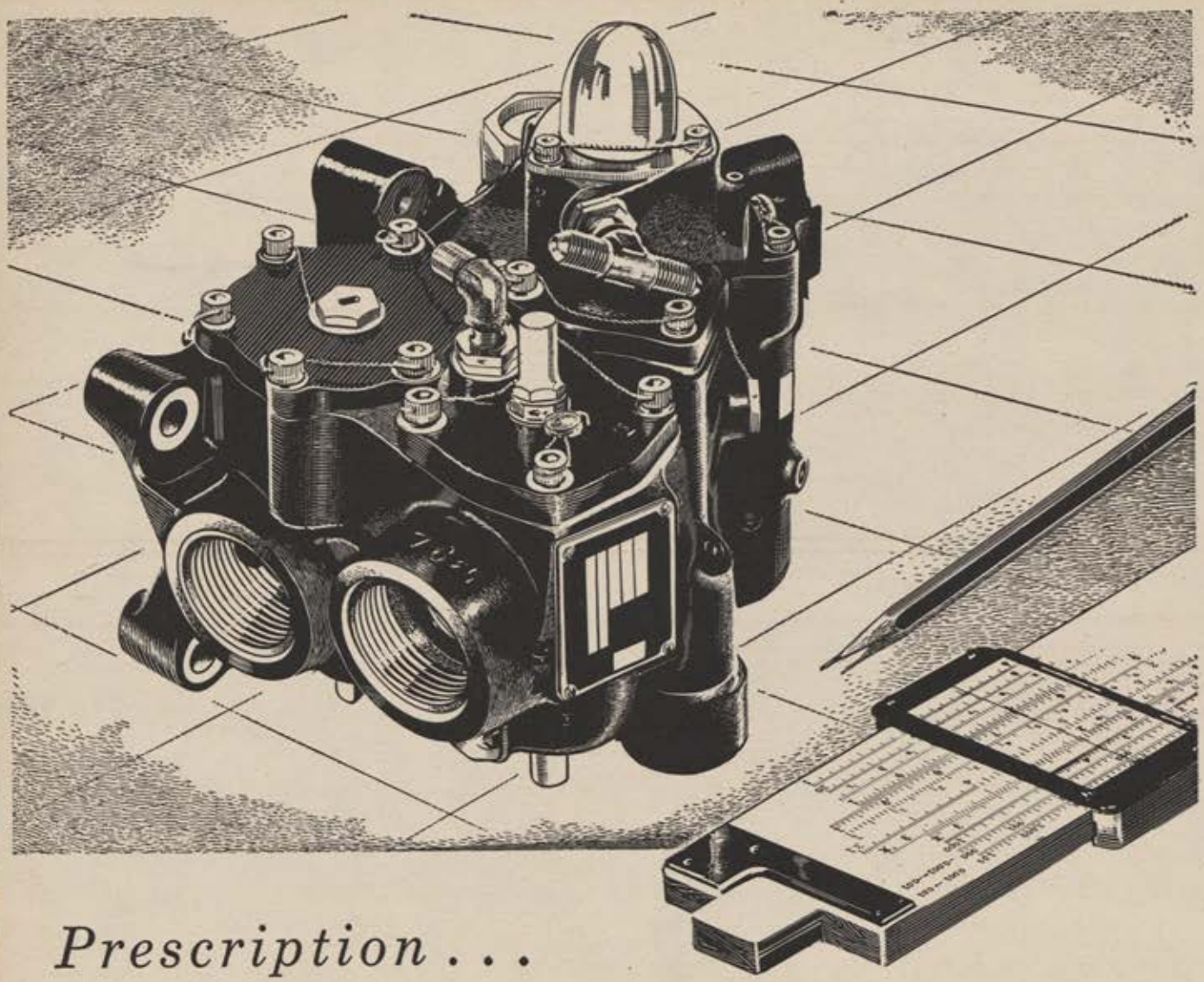
The competition began with an idea expressed more than a year ago by Brig. Gen. Felix R. Vidal, Continental Air Command's Deputy Commander for Reserve Affairs. It ended in an awards dinner at Casper's Gladstone Hotel where Alan Thompson, vice president of Arma Division of American Bosch Arma Corp., donors of the huge championship trophy, urged Reservists to adopt modern sales techniques to encourage greater public support of their program.

The young executive proposed that the term, "weekend warriors," universally applied to Reservists, be scrapped in favor of one that would more appropriately report the fact that Reserve fighter pilots are available for instant cockpit duty in the event of emergency.

Nor did Thompson recognize a "dime's worth of sell" in the term, "bald-headed tigers," which has been applied fondly to the competitors. "It makes you sound," he said, "too much like old men trying to outlive or re-live your youth." Instead, he suggested thought be given to a term that would connote "young men doing the most important job in the world today—helping to keep the peace."

Thompson predicted, too, the time when, "because of their general organizational structure and capability, the Reserves will be found uniquely qualified to assume operating re-

(Continued on page 91)



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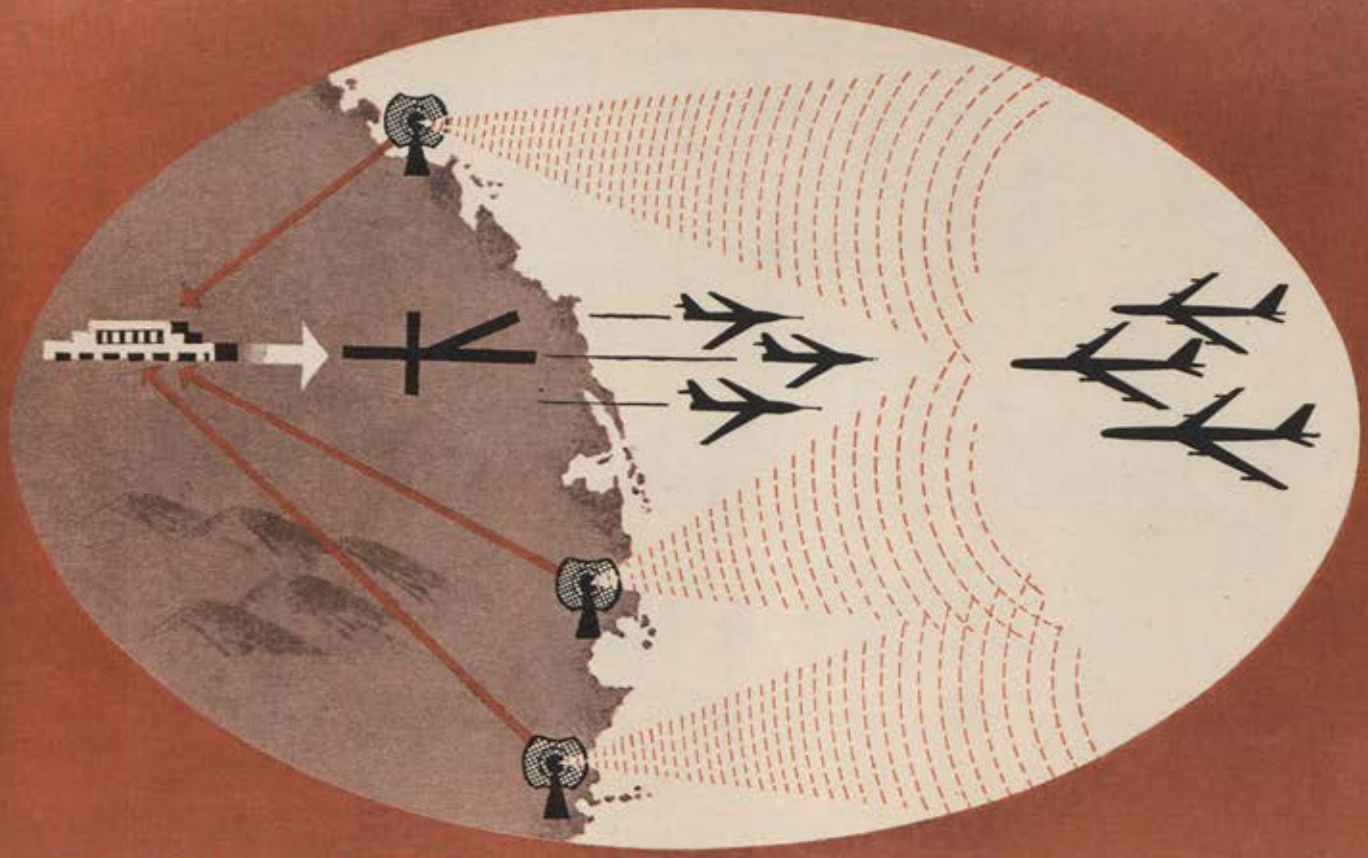

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sponsibility for even our most advanced weapons."

This first Reserve jet gunnery meet originally called for eight firing missions, four at 16,000 feet and four at 21,000 feet. But two days of bad weather forced a revision of the plans to five missions at 16,000 feet.

Each team provided eight aircraft, four as primary gunnery aircraft plus a spare, two tow aircraft, and one T-33. Teams were allowed the prerogative of using the F-84, F-80, or T-33 for tow purposes.

Targets were the standard six by thirty sleeve, attached to the tow ship with 800 feet of armored cable and 100 feet of safety webbing. Each aircraft fired two guns, totaling 180 rounds of .50-caliber ammunition. Shooters were allowed ten passes on the target on each mission, two for orientation and eight for record firing.

Crew Training Air Force provided nine aerial umpires, one of whom flew on each mission to assure that no rule was broken. CrewTAF also supplied the chief of the arbitration committee, Lt. Col. John D. McFarlane. The additional members of the committee, Capt. Mario Capelli and Capt. Robert M. Allison, were provided by Air Defense Command.

Tactical Air Command helped out with the seven-man judging committee which scored targets, and Air Rescue Service flew in a helicopter from Eglin Air Force Base in the event any pilot had to eject in the wild country surrounding the gunnery range.

The Air National Guard made a major contribution in the person of Lt. Col. Roy Cooper, Commander of Wyoming's 187th Fighter Squadron at Cheyenne. Cooper, from years of personal experience flying in and out of Casper's mile-high airport, set the stage for safety at the opening briefing with a thorough report on fly-in conditions in that area. That his advice was absorbed is documented by the fact that this first Reserve gunnery meet ended without a single accident.

Safety was stressed in three principal areas: Operating from a mile-high field, which increases the take-off and landing rolls and induces a high sink rate when turning on final approach; on the gunnery range, where dangerous practices such as firing below the minimum fifteen degrees allowed would bring disqualification; and in the arming and disarming of guns on the airport proper.

Maj. Gen. Roger J. Browne, Commander of First Air Force, drew the responsibility for planning, coordinating, and supporting the exercise. On hand for the entire meet, he was warm in his praise for the Reservists at its end.

"I think," he said after the 440th had won the championship, "that we are well on our way to proving that our Reserve fighter wings can do a commendable job in this business of aerial gunnery."

He recalled that the Reserve fighter wings have had jet aircraft just a little more than a year and that few have the gunnery ranges which will permit constant practice. "Still," he said, "the winning team averaged better than twenty-five percent of the possible score across-the-board and Jim Kumpf, who won the individual scoring, averaged better than thirty-three percent." Both percentages, he added, "are quite acceptable in view of the limited practice facilities we have."

Col. Russell Gustke, 440th team captain, accepts Arma trophy, as Tenth AF's Maj. Gen. Robert Eaton looks on.

Rescue helicopter is off-loaded from the C-124 that flew it in from Eglin AFB.

As important as the opportunity for the pilots to fire competitively for record, General Browne saw the exercise promoting higher unit morale and serving to increase recruiting activities. His views were echoed by Maj. Gen. Robert E. L. Eaton, Commander of the Tenth Air Force, in whose area the "North Star" Wing is located.

"I am convinced," General Eaton said, "that this exercise will make the officers and the airmen who supported it so well want to go back home and bring into their units the people they know can improve their gunnery."

Lt. Gen. Charles B. Stone III, Commander of Continental Air Command, had high praise for the participating Reservists as did Maj. Gen. Robert B. Landry, Commander of Fourth Air Force. Illness prevented the attendance of Maj. Gen. George G. Finch, Commander of Fourteenth Air Force.

Scarcely had the team captains' critique ended before plans were afoot for the 1957 exercise. Preliminary discussions indicated that most persons concerned with putting the competition together favored an exercise in May. This date was advanced for two reasons. First, it would not conflict with summer field training schedules; second, if the winning team could be entered in the 1957 world-wide Air Force gunnery meet, held each fall in Las Vegas, it could concentrate almost exclusively on aerial gunnery during the summer training period.

But whether this occurs, the Air Force Reserve gunnery exercise, based on the results of this year's important "first," appears capable of standing on its own the second—or any other—time around the pattern.—END

The READY ROOM

A seventeen-year-old Staten Island high school senior appeared at Mitchel Air Force Base one day last month, held up his right hand, promised to obey the orders of superiors duly appointed over him, and became the first youth in the nation to enlist in the Air Force under the **National Reserve Plan's six-month training program.**

When **Robert A. Soldivera** was sworn in (*see cut*) by **Maj. Gen. Morris R. Nelson,** Vice Commander of ConAC, it ended more than a year of opposition by the Air Force to the six-months' trainee feature of NRP.

Last of the services to accept six months' trainees, the Air Force now has agreed to take **2,500 young men** between the ages of seventeen and eighteen and one-half, for the Air Force Reserve.

The Air Force plan calls for the 2,500 to take six months of training with the active establishment. Upon completion of this period, the 2,500 will be assigned to combat and support units of the Air Reserve for seven and one-half years.

The Air Force program parallels those established by the Army and Navy, **with one minor difference.** None of the 2,500 will be permitted to participate in Reserve unit training before taking six months of active duty. The Army and Navy will enlist a man directly into a Reserve unit and order him to six months of active duty sometime during his first enlistment. The Air Force wants their young men to take **active-duty training as soon as possible,** with a maximum of nine months' delay from the time of enlistment for such purposes as finishing high school.

The Air Force hopes to get the 2,500 trainees enlisted by next June 30. In the fiscal year between July 1, 1957, and June 30, 1958, Air Force intends to jump the figure to **approximately 4,000.**

Air Force officials believe that accepting six months' trainees in limited quantities for the specific purpose of beefing up **airmen slots in Reserve units** will not have a serious effect on recruiting for the active establishment. On the contrary, they believe that a taste of active duty will encourage many of the trainees to join the active Air Force for four-year tours.

* * *

The Air Force **Ready Reserve** program, including the Air National Guard, is now pegged at a total of **314,000 officers and airmen.** But this figure probably will be reduced in the next two months.

The prediction of the reduction is contained in a report just published by **Maj. Gen. William E. Hall,** Assistant Chief of Staff for Reserve Forces, covering the first six months of this fiscal year.

Robert A. Soldivera (left), seventeen, becomes the first six-months' trainee to enlist in the Air Force. Here Maj. Gen. M. R. Nelson, Vice Commander of ConAC, swears him in.

Arthur Godfrey (right) waves as he returns from his first flight in a Northrop F-89 Scorpion. Col. Seymour Levenson, (center) of the Wisconsin ANG, piloted the jet for Godfrey.

"The continuing evaluation of requirements," General Hall said, "has occasioned the decision to delete certain logistical, medical, and personnel processing units from the Air Force Reserve program. Some of this requirement will be reflected in additional individual spaces; however, on the basis of what is known now, the over-all total objective will be decreased from the present 314,000."

Although the individual training spaces will be increased, General Hall said he believed the cut in the unit requirement will more than offset the boost in individual slots.

The unit program now contains **202,000 officers and airmen.** The 112,000 presently assigned as individuals—plus those to be so assigned in the future—will be earmarked for a specific active-duty unit.

Strides have been made toward providing the Reserve with **facilities** it needs, General Hall said, but lack of adequate facilities still remains the **greatest single deterrent** to achieving a combat-ready Reserve.

(While the report was being distributed, the Air Force announced that **Bureau of Budget had released $10,184,500** for construction at **seven flying locations.** These include **Bradley Field,** Conn.; **Billy Mitchell Field,** Wis.; **Grandview AFB,** Mo.; **Alvin Callender Naval Air Station,** La.; **Niagara Falls Municipal Airport,** N. Y.; **Paine AFB,** Wash.; and **Willow Grove Naval Air Station,** Penna.)

Another serious problem, General Hall said, is that of **adequate air traffic control.** Six locations supporting Reserve and Guard flying activity already have been declared high-density areas by Civil Aeronautics Administration, and several civilian airports have indicated that they **will not renew existing joint use agreements** because of the dangerous air traffic control situation.

The third major problem is the **shortage of combat-suitable aircraft** and training equipment. Because of the increased aircraft requirement for the active establishment, the Reserve and Guard continue to be equipped with what he described as "other than modern combat aircraft."

This situation, he added, "has been, and will continue to be, a deterrent to the early achievement of operational readiness by units of the Reserve forces."

Despite the many problems, General Hall concluded, the program for the Reserve and Guard has made **steady progress** and, given adequate support, can achieve the objective of making both components combat-ready.

—EDMUND F. HOGAN

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Defending Today's USAF Bombers . . . .

16 YEARS' SYSTEMS ENGINEERING EXPERIENCE BACKS B-47 AND B-52 ARMAMENT PRODUCED BY GENERAL ELECTRIC'S AIRCRAFT PRODUCTS DEPARTMENT

TODAY all Boeing B-47 and most operational B-52 Air Force Bombers are equipped with electronic defense systems designed and developed by General Electric. The evolution of systems engineered bomber defense since 1940 has brought about today's completely integrated armament equipment, remotely operated by a single Air Force gunner.

Electronic Armament From General Electric

1940 General Electric entered the bomber armament field with amplidyne turret drives for the Consolidated Aircraft B-24 Liberator.

1942 Boeing B-29 Superfortress was defended by the first remote-control armament system including General Electric controls and turrets.

1944 G-E control and turrets linked with a periscopic sight allowed Douglas B-26 gunner to aim and fire both upper and lower turrets by remote control.

1945 Standard equipment on the Boeing B-50 included an advanced General Electric, remote-controlled armament sighting system.

1949 Convair B-36 is armed with a complete G-E defense system including turrets, sighting stations, radar control and a G-E electronic computer.

1956 The Douglas B-66 was the first tactical bomber to be equipped with radar-directed, automatic tail armament system.

222-4

ENGINEERS: *Expanding electronic bomber defense projects at G.E. are creating opportunities for you. Contact C. E. Irwin, Aircraft Products Department, Johnson City, N. Y.*

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Tech Talk

By Bob Strobell

Boeing's KC-135 Stratotanker "City of Renton" (foreground), first production model of the jet tanker-transports being built for the Air Force's Strategic Air Command, is shown in formation with the Boeing 707 jet transport prototype on the initial flight of the KC-135, August 31. The new four-jet plane is one of a number ordered by the AF for aerial refueling of USAF jet bombers.

A giant **telescopic tracker** capable of following a missile **300 miles** away, and clearly showing fast-moving aerial objects in **natural color** on the instrument's scope through a powerful **160-inch lens,** has been developed at the **Army Signal Corps Engineering Laboratories** at Fort Monmouth, N. J. The new one-and-a-half ton optical colossus, which has a 400-pound lens system developed by **Fairchild Camera and Instrument Corp.,** takes black-and-white photographs of rockets, jets, and other flying objects automatically. The new equipment is currently undergoing tests at White Sands, N. Mex.

Army's powerful telescopic tracker can follow a missile 300 miles away.

Air Force's new wind tunnel simulates 11,000-mph speeds of future aircraft.

Trackers are used to follow aircraft and missiles, during test flights and launchings, to record performance. The new tracker is equipped with a camera that photographs the target and records the reading of a clock on the same frame. It uses **seventy-millimeter film** and can take up to **twenty pictures per second.** An auxiliary camera, using thirty-five millimeter film, photographs a data display unit which indicates the orientation of the tracker pedestal in elevation and in azimuth. The entire system produces a highly accurate record which can be reduced to reveal information on velocity, altitude, direction, acceleration and, coupled with radar information, it will give a precise location on the missile or aircraft at any point in time. Radar can "aim" the tracker at the target before it is visible to the operator.

A new type wind tunnel, capable of realistically simulating the **11,000-mile-per-hour speeds** and **15,000-degree temperatures** predicted for long-range missiles and aircraft of the future, has been placed in operation at ARDC's **Arnold Engineering Development Center,** Tullahoma, Tenn. A test run in this hypersonic tunnel lasts about **one-hundredth part of a second,** producing much valuable data on precisely scaled models of missiles, aircraft, and theoretical aerodynamic shapes. More than one hundred successful test runs have already been made.

The new tunnel (*see cut*), called **"Tunnel Hotshot"** by engineers, is being used to explore possible methods for **cooling the surface of missiles** or aircraft as they encounter speeds in the so-called **"thermal barrier area,"** and to investigate methods of withstanding these high pressures and temperatures. Basic principles involved in the operation of the tunnel are simple. **Air is pumped** into a chamber under high pressure. A powerful **electrical charge** (approximately one million amperes) is triggered into this air. It **heats the air** to about 15,000 degrees and **increases the pressure** to about 20,000 pounds per square inch, which causes it to break through a thin plastic seal at the entrance of the test section. The heated air accelerates as it enters the test section which has been pumped to a vacuum. Flashing through the test chamber, it strikes the model in a stabilized condition. Sensitive instruments measure the temperature, flow, and flight effects experienced by the model, and record them for study.

An extremely **lightweight, mobile radar set** of revolutionary design and long range has been developed by the **Westinghouse Electric Corp.** for the US Air Force. The key development is the **radar antenna** (*see cut, page 99*) consisting of two paraboloids—one of which is coated on the inside with vaporized aluminum to form the radar reflector—joined at their rims and inflated. Called the **Paraballoon antenna,** this radar was developed to detect high-flying aircraft and to

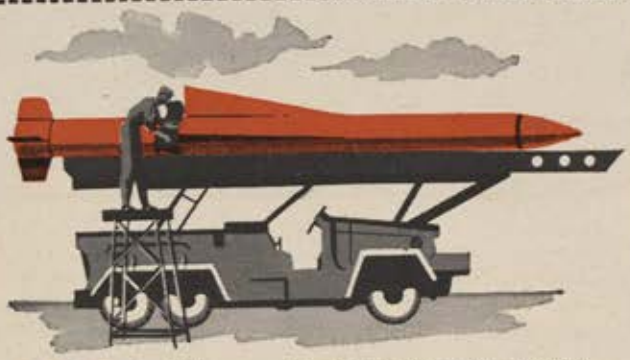
(Continued on page 99)

1002 Before launching this missile hundreds of tests must be made — a process usually requiring several hours and highly-trained technicians.

1003 Sperry Check-Out Equipment built into truck is readily moved to launching area to handle all tests.

1008 Inside truck the operator sits at console and by merely pressing button sees micro-filmed information for operational decisions on each malfunction.

1009 Pressing another button operator receives card showing adjustment or repair required and detailed instructions.



1025 With complete instructions for repairs, the check-out is rapidly and accurately completed.

1030 Missile is launched with assurance that its complex mechanisms are operating properly.

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Keeps Weapons Fit to Fight

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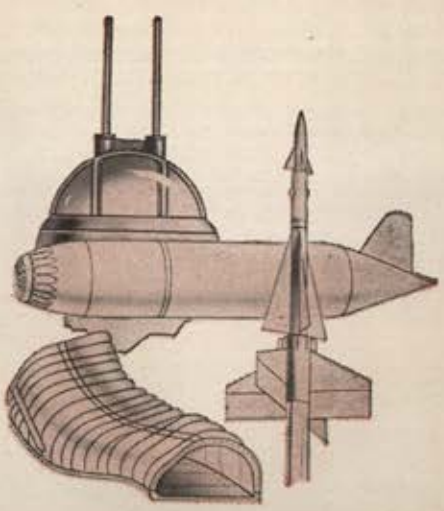
Rheem's integrated Government Products facilities are presently in quality development and production on air frames, missile and jet engine components, airborne ordnance, electronics and ordnance materiel.



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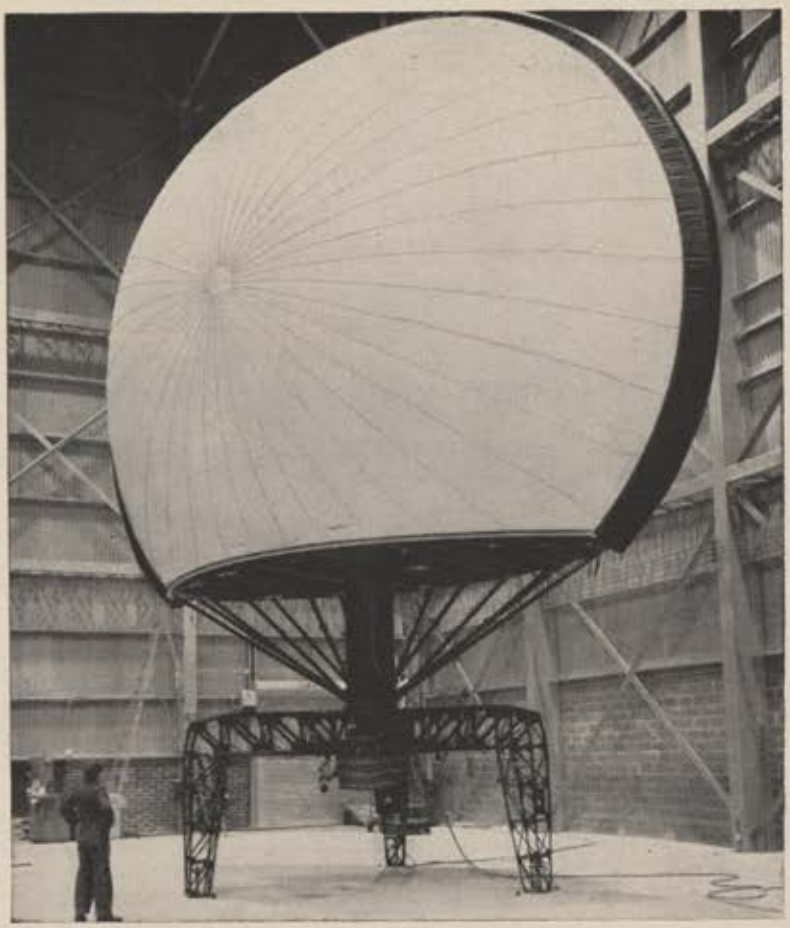
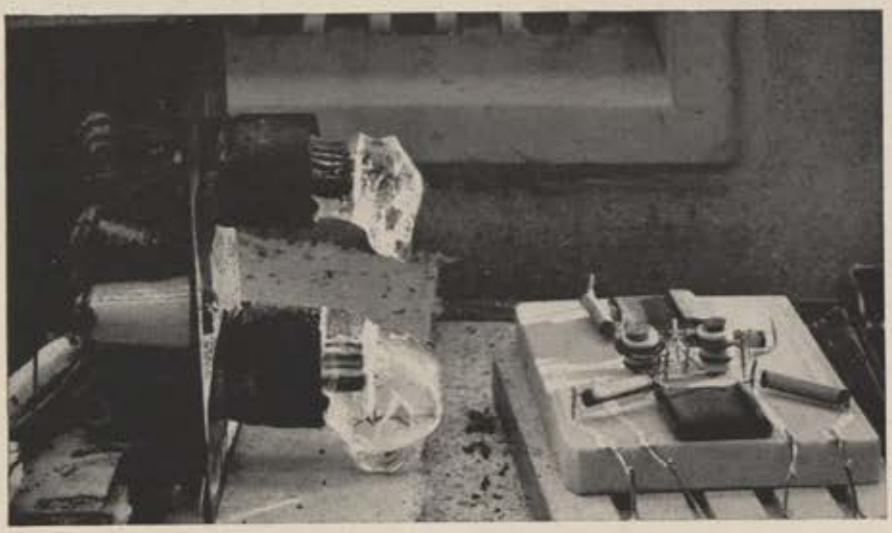
strengthen defense networks. When inflated and fully erected, the Paraballoon antenna is thirty feet high.

The entire antenna system is enclosed in an **air-supported radome** made of lightweight, rip-resistant fabric. This radome is inflated, like a balloon, and can withstand winds up to 125 miles per hour. The radome can be deflated and unzipped into sections and the associated supports dismantled. The entire antenna system can be disassembled and packed in containers in a matter of minutes. Fully packed containers weigh about **200 pounds each.** A trained crew of twenty men can reassemble the entire system in two hours.



Mobile Paraballoon radar antenna can be disassembled and transported in standard trucks. Complete station can be assembled in two hours.

General Electric has developed some revolutionary **electronic devices** and circuits that will operate literally "red hot" when exposed to the skin-sizzling heat generated by air friction on aircraft and missiles flying at **supersonic and hypersonic speeds.** An equally important feature of the new electronic circuits is their ability to operate for long periods while exposed to **intense nuclear radiation** in an atomic reactor. GE's Research Laboratories in Schenectady, N. Y., dramatically demonstrated the new circuit recently by placing it in an electric oven at **1,500 degrees** Fahrenheit along with a conventional electronic circuit. The conventional circuit stopped working almost immediately and soon began to melt (*see cut*) while the high-temperature circuit continued to operate. The circuit has, in fact, operated for thousands of hours at this temperature. Both the **Intercontinental Ballistic Missile** and the **Vanguard satellite** will have a number of immediate applications for these high-temperature electronic components.



General Electric's high-temperature electronic circuit (right) operating in an electric furnace at 1,500 degrees Fahrenheit after ordinary circuit has melted.

Period analyzer, a medical research instrument developed by the American Machine & Foundry Co., New York, will provide a faster and more accurate means of determining which men are best suited to stand the stresses of the jet age. It will measure physiological changes affecting brain waves.

Cessna has announced its new **Model 172 business utility airplane** with patented **"Land-O-Matic"** gear designed to make flying like driving an automobile. The new wide-span gear permits the pilot to **drive** the airplane down the runway and into the air. With this new gear the airplane can be used in **rough fields** or in areas **without surfaced runways.** The nose wheel of the airplane can be lifted from the ground immediately after application of power for take-off. It is **steerable** with rudder **up to ten degrees** on either side and does not turn when rudders are activated once the airplane is airborne, thus reducing drag.—END

Jet Age Conference Held in Spokane

LARGE AUDIENCE HEARS A DISTINGUISHED GROUP OF SPEAKERS AT SEPTEMBER MEETING

SQUADRON OF THE MONTH

The Spokane Squadron
Spokane, Washington
CITED FOR

its success in public aviation education achieved through the sponsorship of the Spokane Jet Age Conference. The program reflected great credit upon the Squadron and its leaders.

Spokane Squadron Commander Roy F. Hanney, left, discusses Jet Age Conference with J. M. Klapp, Assistant to the President of United Air Lines (see below).

Spokane's Redpath Hotel was the scene of the **Northwest Jet Age Conference** sponsored by **AFA's Spokane Squadron** on September 14. **Roy F. Hanney,** Squadron Commander, who was program chairman for the event, reports it was the **most successful aviation program** ever held in Spokane.

William M. Allen, President of the Boeing Airplane Company, was the luncheon speaker, and **John R. Alison,** Past AFA President and Board Chairman, delivered the keynote address.

Other speakers were **James A. Pyle,** Acting Administrator of the Civil Aeronautics Administration, who discussed "Civilian Requirements"; **J. M. Klapp,** Assistant to the President of United Air Lines, who spoke on "Flying Safety"; **Col. Harry W. Shoup,** Director, Combat Operations Center, Continental Air Defense Command, whose subject was "Military Requirements"; and Spokane's **Mayor Willard Taft,** who welcomed the audience.

More than **150 registrants** attended the day-long meeting, and the press coverage was excellent. As an added feature, Boeing's new **707 jetliner,** on display at the municipal airport for the day, attracted a great number of people.

AFA **President John P. Henebry** was the principal speaker in **Dallas** on September 21 at a **combined luncheon** of the **Dallas Squadron** and **Airpower Council.**

Addressing seventy-five civic leaders, Mr. Henebry discussed the **manpower problems** now facing this nation, and the tremendous strides **Russia** is taking in **scientific and technical education.**

Reporting that **500 Red Air Force officers** are graduated annually from the University of Moscow after a **five-year technical education,** Mr. Henebry declared: "Nothing in the US can **compare** with this program, and while this nation doesn't desire to adopt Russian methods, we certainly must recognize that **technological leadership** today logically means world leadership tomorrow."

Paul Cain, Dallas Squadron Commander, presided at the meeting. **Eugene McElvaney,** Chairman of the Airpower Council, introduced Mr. Henebry.

At Spokane, seated from left: John Warn, H. R. Wallace, Roy Hanney, Brig. Gen. Sam Agee, Will Alton. Standing: Capt. Malcolm Stewart, Col. Grover Wilcox; Wilson Gillis, Howard Watson, Ted Turner, Lt. Col. Don Cameron, Eugene Roberts.

Illinois's new Wing officers: Commander R. C. Vaughan (left); Lee Cordell, Vice Commander; Al Sarnecki, Secretary; and Kit Carson, Treasurer.

The **Maryland Wing of AFA,** under the direction of **Wing Commander Paul Fonda,** took part on September 25 in the premiere of a new airpower film, Warner Brothers' **"Toward The Unknown,"** starring **William Holden.** The premiere took place in the

(Continued on page 103)

Miniaturized
Radar Switchboard Goes Down the Hatch
NOT THROUGH THE HULL

They used to remove a section of the deck to get a radar switchboard inside a submarine. Now it fits easily through a hatch because Admiral has redesigned the unit to reduce bulk and weight by as much as two-thirds!

This priceless saving in pounds and inches is only one of the new unit's many advantages. Formerly up to 400 man-*hours* were needed for major repairs such as replacing a defective switch section. Now the job is done in 20 *minutes!* The entire unit is built up of standardized sub-assemblies fitted with multiple connector plugs. It is a simple matter to remove and replace a faulty switch or amplifier. Each switch section even has its individual power supply to keep the switchboard operable in case one section goes out. The unit can be readily expanded to handle additional radar indicators by simply adding more self-contained sections. Printed switches and circuit boards, designed for automation assembly, are ruggedly resistant to vibration and humidity.

The radar switchboard, for use on all types of naval vessels, is typical of Admiral's advanced design, research and development in electronics, now being carried forward for all branches of the Armed Services.

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20 or 40 channel 2-way VHF, R-15/T-20 or R-15/two T-20s
Course Director for use with 15-D, Type CD-1
VOR Localizer Receiver, Type 15-D
Powerful Cabin Speaker Amplifier, F-13A
Marker Beacon Receiver, R-20
Miniaturized ADF, Type 21

You will appreciate how each unit has been designed to operate as part of an integrated system — a complete and reliable communication-navigation installation. You will be pleased how its small size units make it fit easily into spaces forward and aft of the center of gravity . . . how it operates on the existing generator/battery system because of its low power consumption.

For your new twin aircraft we urge you to specify dual installations of the 20 or 40 channel 2-way VHF and of the VOR Localizer Receiver for IFR flying.

This dual equipment not only makes flying safer, but makes IFR operations so much more simple.

Ask your ARC dealer to quote you on all the above equipment. Ask him, or write us, for new condensed catalog of our entire line.

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Randall Leopold (left) installs New York Wing's new officers. From left are Art Wegman, Brooklyn Sqdn.; Alvin West, Syracuse; Bill Stein, Wing Commander; John Mack, Metropolitan New York; and Harold Rosenstrauch, from Albany.

Stanley Theater in Baltimore, and the guest list included top-ranking officers of ARDC, civic leaders, and military and civilian guests from Washington.

For his portrayal of the test pilot in the picture, Mr. Holden received a framed **Citation of Honor** from the Wing, presented by **Miss Joanne Alford,** AFA's "Miss Airpower of 1956."

The **Pennsylvania Wing** has chartered a new squadron in **Beaver Valley,** with the help of Pittsburgh Squadron Commander **Chester Richardson,** and AFA Director **Carl Long.**

William Rohm, 1306 McMinn St., Aliquippa, is Commander. Other officers are **John Malay,** Vice Commander; **Don Gutshall,** Secretary; and **George Garmen,** Treasurer. The Council consists of **S. E. Jacobowski, W. T. Gordon, Jr., Tom Shafer,** and **George Loschiavo.**

The Charter presentation took place at a formal installation banquet on October 24. Carl Long made the presentation and installed the officers.

Nick Schwall, commander of the **Skokie Valley, Ill., Squadron,** reports that on September 27, more than fifty local citizens attended an **educational program** designed to inform the community of the aims and activities of the **Air Force Association.** The main item of attraction was the film **"Take Off Zero"** from the DuPont "Cavalcade of America" series, showing tests on the **Convair XFY-1 VTO aircraft.** This is the **third of a series** of such programs sponsored by the Squadron with each creating great interest.

On September 25, the regular monthly luncheon meeting of the **Washington, D. C. Capital Squadron** featured an informal address by **Lt. Col. William H. McVey,** Aide to **Gen. Nathan F. Twining,** USAF Chief of Staff. Colonel McVey who accompanied General Twining on his recent trip to Moscow, said he was particularly impressed by the **"VIP treatment"** given the **American military figures,** and the almost utter **lack of respect** accorded the **reporters and photographers** who accompanied them.

Don Steele, Capital Squadron Commander, introduced the speaker and presided at the meeting.

(Continued on following page)

The New Jersey Wing entertains cadets from Civil Air Patrol's Exchange Program. Shown here are cadets, their instructors, and members of the AFA Wing.

AFA NEWS——CONTINUED

CROSS COUNTRY . . . Dave McCallister, who took first place in the 1956 AFA Ricks Trophy Flight from San Francisco to New Orleans, will be guest of honor at a reception and banquet on November 2, sponsored by **Metropolitan Philadelphia Squadron. Gill Robb Wilson,** AFA Board Chairman, will speak. . . . **New Jersey's Wing Convention,** at the Albion Hotel in Asbury Park on **October 13-14,** featured a Symposium on the aviation industry. **Dr. Phillip Geary** of Trans World Airlines spoke at the banquet. . . . **Pittsburgh** has announced plans for another Conference, on December 6, in the Sheraton-Penn Hotel. . . . The dates for **AFA's 1957 National Jet Age Conference** have been announced: **February 14-15,** in the Sheraton-Park Hotel, **Washington, D. C.** . . . **A paid-up AFA membership card** will now get you credit at any of the **Longchamps Restaurants,** famous East Coast chain. After dinner, just show your card to the cashier and the bill will be sent to your business or home address. . . . The August 17 issue of **"General Electric News,"** weekly publication of GE's Evendale, Ohio, plant, featured a **twelve-page report** on the 1956 **AFA National Convention** in a special tribute to the New Orleans meeting. Copies have been requested and **will be mailed** to all AFA leaders.—END

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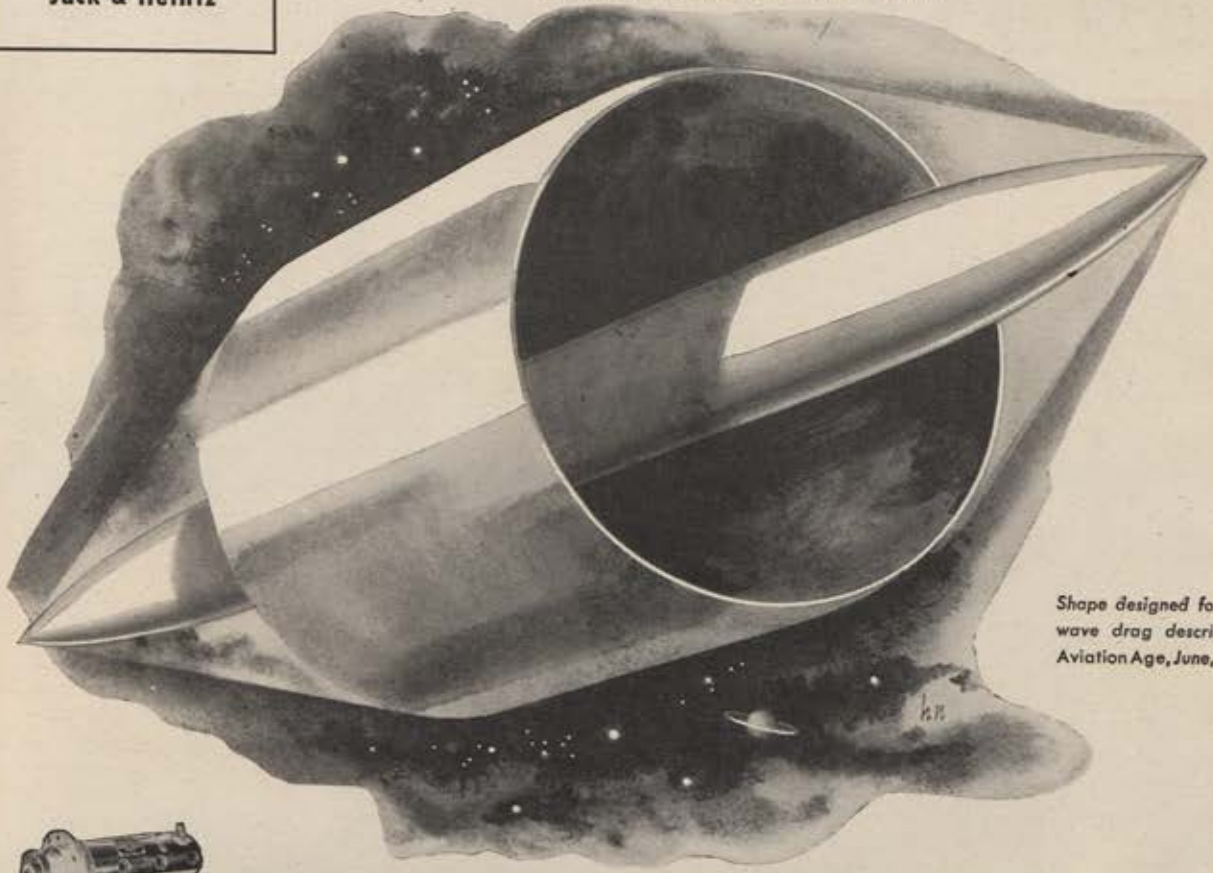

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BILLY BISHOP

Ace of Aces

Bishop checks his Lewis gun, the only armament on his Nieuport fighter.

In September, Canada's greatest World War I air ace, William A. (Billy) Bishop, died, closing the book on one of the most colorful careers in aviation history. In 1917, in his first five months of combat, Bishop shot down forty-seven German planes. Then, after a triumphal tour of Britain and Canada, he returned to the front and in twelve blazing days shot down twenty-five more Germans. Here's the story of Canada's Ace of Aces . . .

By William W. Walker

THE flimsy biplane, engine alternately popping and revving up, circled the mud-engulfed cavalry encampment on the English meadow and made a graceful landing.

A disgruntled young Canadian subaltern, bogged down in the mud, watched enviously as the tiny plane glided down.

William Avery Bishop, of His Majesty's Canadian Mississauga Mounted Rifles, swore vehemently. "I'm bloody well damned if I'm going to wade through this quaggy for the rest of the war."

That stormy July afternoon in 1915 changed aerial history. Sick of months of seeing nothing but mud, horses, baled hay, and more mud, Billy Bishop went to London on his next liberty. At the Savoy Hotel bar, he met several English drinking mates who had recently joined the Royal Flying Corps. He learned that if he applied for a transfer, the request could not be blocked by superior officers. How, he inquired, did one make application for RFC training? The answer staggered him. Go directly to the War Office and request an audience with Lord Cecil.

AWOL and stone-broke by Monday, Bishop timidly advanced to the tiny office of Lord Hugh Cecil, Commander of the RFC. He convinced that dignitary that he knew the difference between an aileron and a vertical stabilizer, and was transferred to flying school for training as an observer.

Thus started a career that was to make him a legendary Ace of Aces in World War I, with a record of seventy-two confirmed German planes and every decoration for valor a grateful Britain could bestow.

Blond and handsome, Bishop was destined to become the toast of two continents. He was born at Owen Sound, Canada, February 8, 1894, and when the war began in 1914, he was a cadet at the Royal Military Academy at Kingston, Canada's West Point. Ordered to England with his cavalry unit in the spring of 1915, Bishop was beginning to despair of ever seeing anything but mud when he decided to transfer to the RFC.

He got to France in 1916, spending four months at the front as an observer. When he returned to England for pilot training he had not been under fire. Then his career was delayed another four months while he recovered from a knee injury suffered when his pilot-instructor crashed. This proved to be his sole war injury. Billy Bishop dodged countless thousands of German machine-gun bullets, ack-ack, shrapnel, and deadly "flaming onions" and often came back to base with as many as fifty holes in his plane, engine shot up, fuel tank perforated, and wing fabric reduced to tattered shreds—but never once was he wounded. His closest brush was when a bullet ripped his cap.

(Continued on following page)

Bishop beside his Nieuport. He preferred to fly alone over the German lines.

While recuperating from his knee injury Bishop met Lady St. Hillyer, a grande dame of British nobility who practically adopted him. A great and generous character, who died in 1928 at the age of eighty-two, she was related to most of the English peerage and introduced him to leading military and political figures. Through her Bishop became acquainted with Winston Churchill, an in-and-out cabinet member, and Air Marshal Viscount Hugh "Boom" Trenchard (who died earlier this year).

After qualifying for his pilot's wings he served several frustrating months as a balloon hunter—but without ever finding a single one in his gunsights. Bursting with pent-up ambition, he transferred to the 60th Fighter Squadron billeted near the front lines in France. In less than two months of combat he won the Military Cross, Distinguished Service Order, and Britain's highest accolade for valor, the Victoria Cross.

Bishop's closest confidant was Col. Jack Scott, CO of the 60th. Scott taught him to hold his fire until he was often only a scant fifteen yards from his foe. Scott had gone to college at Heidelberg and many of the German pilots had been classmates and friends. With a gallantry that seems passé today, he would hold his fire until he came close enough to identify his foe. If it happened to be one of his pre-war drinking mates, he would wave, dip his wings, and hold his fire. Bishop, on the other hand, had no old school ties. He would open fire at this close range and chalk up another victory.

The young pilot roamed the skies like a vengeful hawk, preferring to fly solo in his forays over German lines. His single-gunned S.E. 5 was always looking for trouble rather than avoiding it. Once he lined up an enemy plane in his gunsight he would power dive straight at it in a swoop that put him in position just scant yards away to trigger a burst. He would smash into formations of as many as nine planes and send one or two down by the sheer courage and audacity of his attack.

His exploits read more like fiction than fact. He downed his first German on March 25, 1917, and doggedly managed to glide back to British lines with a stalled engine. One week later he won the Military Cross for shooting down a German observation balloon and the plane that tried to intercept him. The next day he smashed into a formation of eight planes, downing two, scattering the other six, and then sent an artillery-spotting balloon crumpling to earth in flames.

Bishop's hawk-like tactics soon ran up his score. He celebrated his promotion to captain by taking on twenty-three enemy planes in one day and destroying three of them. That exploit won him the Distinguished Service Order.

Bishop, flying solo as usual, had barged in on three two-seaters, artillery spotting. As he dived they scattered. He picked the nearest plane and from twenty yards fired a short, fatal burst. Meantime the other two scouts and four fighters closed in to box him off. These were the odds Bishop liked best and he promptly sent the closest one down in flames. Then he turned his plane head-on into the four fighters, firing point-blank. The Germans gave way, and Bishop dropped into a nosedive, pulled out, and streaked for home.

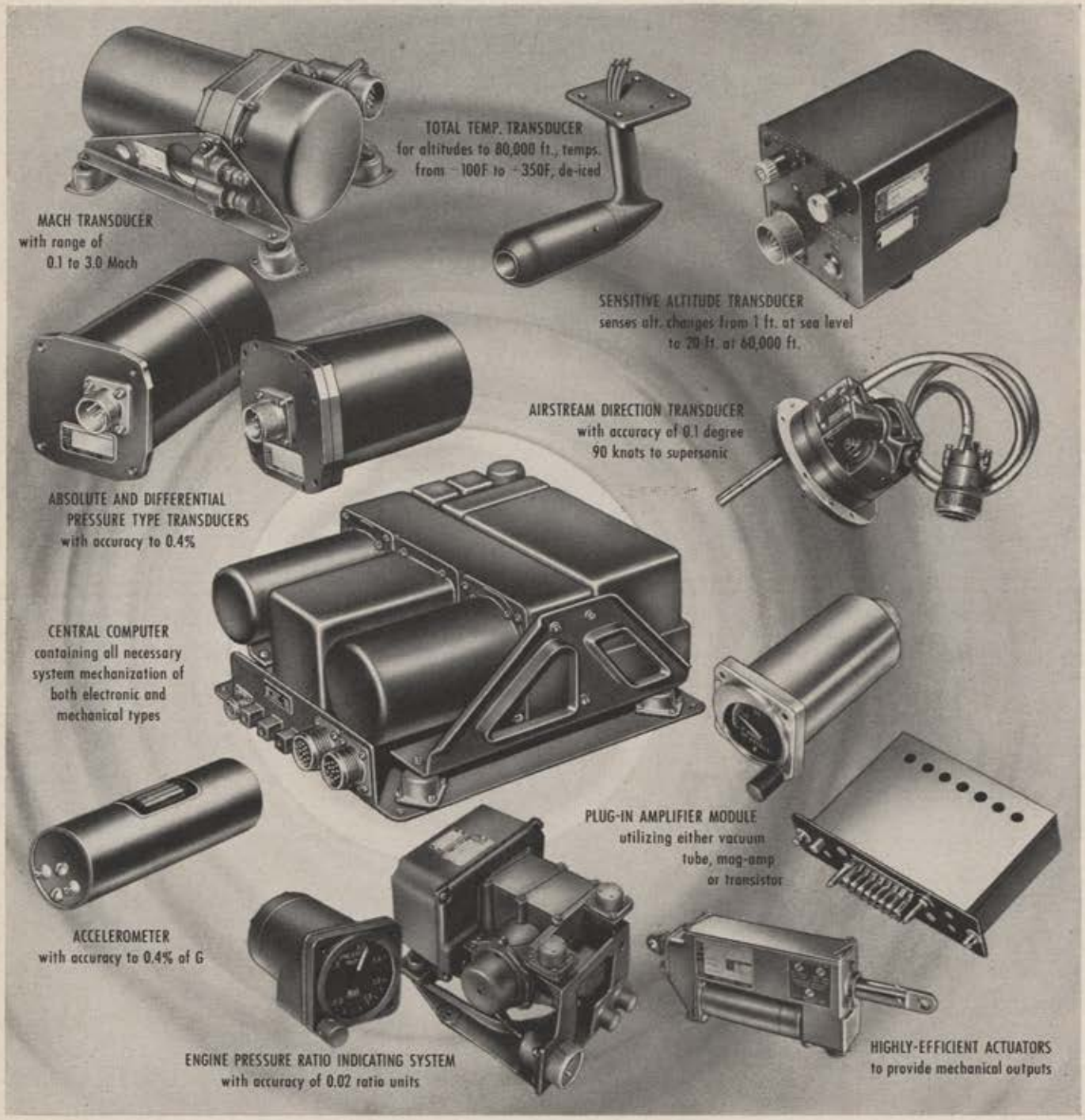
Then came a fortnight's leave and rest in England. His score then stood at twenty-two confirmed planes. Ten days after he returned to duty he executed the daring escapade that won him the Victoria Cross. He carefully planned a solo attack on a German airdrome twelve miles behind enemy lines. June 2 was the day and he left a call with his "batman," a young Belgian refugee named Dobie, for 3 a.m. His friends thought that "Wild Billy" Bishop had indeed "blown his stack." But before breakfast he successfully carried out one of the most daring singlehanded jobs of destruction of the entire war.

The air was chilly, and in the predawn blackness even the war seemed to have come to a standstill as "Bish"

(Continued on page 111)

Photo courtesy Smithsonian Institution

Bishop flew S.E.5s like this one on his daring forays against the Germans.



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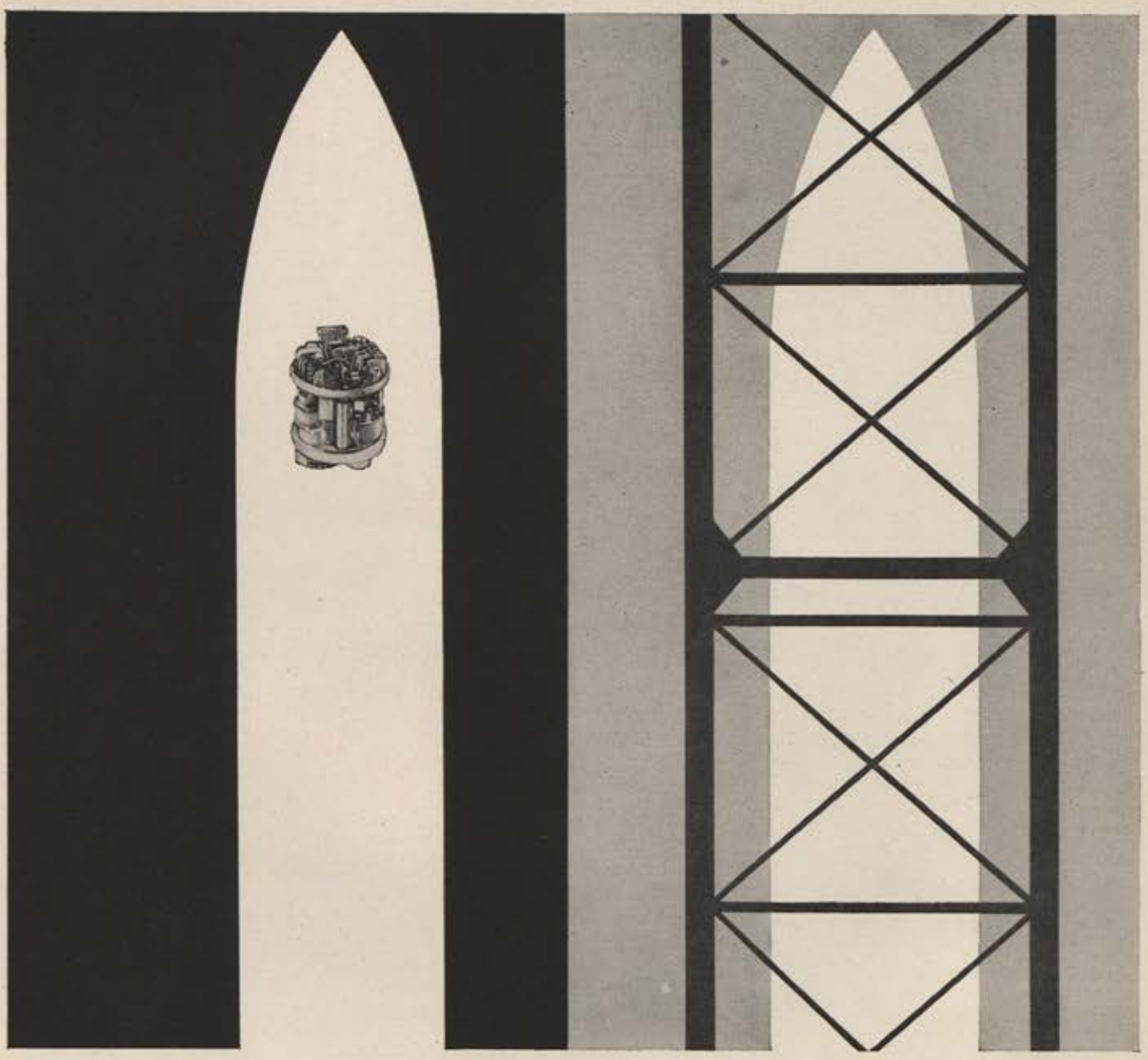

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left his base at Vimy Ridge in his new one-gun Nieuport and headed toward his objective. But the enemy field was deserted—not a plane in sight. Not the least bit discouraged, he flew on until he sighted another 'drome with seven planes warming up. As he dived, gun blazing, men came swarming out to man anti-aircraft guns, and pilots scrambled frantically into their fighters. As one of the scouts left the ground, Bishop jockeyed into position on its tail and sent it crashing down. By the time he pulled up, another scout was airborne. A short burst sent that Boche smashing into a tree. Now two more fighters were aloft. As Bishop climbed, one of the Germans followed, Bishop executed the classic Immelmann maneuver, circled, and with the last bullets in his drum, sent the German crashing in flames.

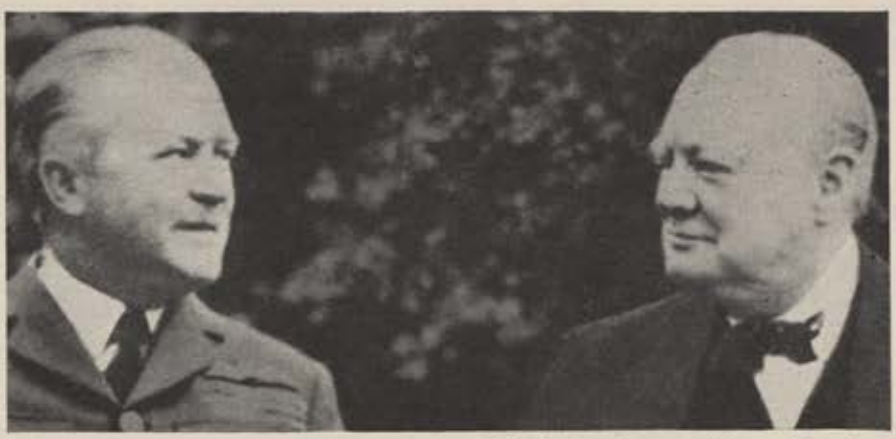
Thus in ten minutes of concentrated assault, three enemy planes were down and an enemy airdrome was shot up. His ammo gone, Bishop headed for home, followed by four German scouts at a discreet distance. Had they realized he was weaponless, they might have scored a victory. Bishop's reward was Britain's highest honor, the coveted Victoria Cross.

When "Bish" returned to England in August 1917, he had engaged in 110 fights in five months of combat, officially destroyed forty-seven planes and downed twenty-three more which he could not confirm. At the age of twenty-three he was already a legendary hero, his tunic ablaze with every decoration except the DFC—which he went on to win in 1918.

Promoted to major after he won the VC—the first Canadian flyer to earn Britain's highest award—he added a bar to the DSO for destroying forty-seven enemy planes in five months. He was then ordered to Canada to stimulate recruiting. His vivid stories of action over the Western Front boomed enlistments in the Royal Flying Corps. Bishop's whirlwind recruiting stint led him to the altar in Toronto, where he married department-store heiress Margaret Eaton Burden.

What sort of a man was this hero? He was a superb marksman, trained as a hunter from his boyhood days in the Ontario bushlands. Bishop himself credits his success primarily to his sharpshooting ability. He rated his tactics as second and his flying ability as third. Sparing of ammunition, Bishop usually accomplished his mission with a short burst of three to fifteen rounds at close range. At his home airdrome he would practice diligently on "Le Petit Boche," a cloth target laid out on the ground that resembled the outline of an airplane. In his spare time, he would dive on the ground target with machine gun kicking up spurts of dust, pulling up just scant yards off the apron.

France's René Fonck downed seventy-five Germans to top Bishop's record.



Old friends. Air Marshal Bishop with Churchill during German blitz of London.

Lt. Col. George A. Drew, in his book, *Canada's Fighting Airmen*, says of Bishop:

"It is true that Richthofen (eighty victories) and Fonck (seventy-five) exceeded his total by a few machines, but in the short period of his active service in 1918 Major Bishop proved himself beyond question the most brilliant aerial duelist the world has known."

Capt. A. Roy Brown, the Canadian ace who shot down Germany's greatest fighter pilot, Baron Manfred von Richthofen, described Bishop as a "human hawk, cool, swift, calculating." Bishop had an icy disdain for danger. His eyes could pick up the faintest speck on a distant cloud, an overwhelming advantage in aerial combat. His split-second sense of timing, precise and deliberate reactions made his aim so accurate that he would often get two planes with one continuous burst without even changing course.

In his own book, *Winged Warfare*, Bishop described a battle when he closed to within fifteen yards and shot down a German two-seater. In a letter to home he described it as "great sport. I never enjoyed myself so much in my life." From a sport in his early days, the pursuit of the hated Boche became an all-consuming ambition. He wrote:

"My list of victories was not climbing as steadily as I wished . . . so I went over the lines six or seven hours a day, praying for some easy victim to appear. I had had some pretty hard fighting. Now I wanted to shoot a 'rabbit' or two. To bring down a machine did not seem like killing a man. It was more as if one just destroyed a mechanical target with no human being in it."

Bishop never took his guns for granted. Occasionally they would jam in combat; he would pull out, fix them, and go back to the fight. No gunnery sergeant ever gave his guns more loving care, and it was his boast that he never shot a bullet that he hadn't pulled through the breech before take-off. He always loaded his own drums.

Staff and recruiting duties bored him and he longed to return to combat. In May 1918 he went back to France as CO of the 85th Fighter Squadron. In twelve days he shot down twenty-five German planes. Kill, kill, kill—that was Bishop's blazing ambition. This crack squadron he commanded was an international mix-

(Continued on following page)

Photo courtesy Smithsonian Institution

It looks pretty harmless today, but in the skies over the Western Front the Pfalz D-12, German pursuit plane, was regarded as a particularly deadly foe.

ture – Scots, Canadians, New Zealanders, Englishmen, South Africans, and three mad-cap Americans–Elliott White Springs, Larry Callahan, and John M. Grider, whom Bishop had personally picked after seeing them all but fly the wings off a trio of S.E. 5 scouts one afternoon in the skies over London.

His last fling was a day of individual glory that only the French ace, René Fonck, and his Canadian contemporary, Billy Barker, each with six planes in a single day, were to surpass. Bishop bagged five planes in two hours, four of them the deadly new Pfalz scouts, and as usual, he did it alone. Furious at being ordered back to England again for desk duty, Bishop disobeyed orders and went aloft over Ypres, looking for one last thrill. Scarcely over the German lines he spotted three of the fast Pfalz fighters. He dived on the nearest and sent it spinning down in flames. The other two Boches turned toward him and from a cloud layer above two other scouts closed in. But his official report best tells the story:

"The second and third of the enemy scouts circled around me, trying to get under my tail, and as I dived between them they collided and fell together, the first bursting into flames. The remaining two started to climb away, and I chased them, opening fire at two hundred yards. One of them went into an uncontrollable spin and crashed. The other zoomed into the clouds and escaped."

Photo courtesy Smithsonian Institution

With eighty victories, Baron Manfred von Richthofen was top ace of WW I.

Bishop was not satisfied. Only four planes down, and it wasn't time for lunch yet! He cruised on and his report continues:

"Near Neuve Eglise I met a two-seater which I attacked from behind and beneath. It burst into flames and crashed. Zooming down to see what happened I encountered a column of enemy troops on the march and scattered them. Then I climbed into the clouds and went home."

It was a fitting valedictory. Now Lieutenant Colonel Bishop, he was awarded the Distinguished Flying Cross, the last honor short of a peerage a worshipful Britain could bestow.

How did Bishop compare with Germany's greatest ace, Baron von Richthofen? Richthofen seldom flew alone or fought except in formation. He knew the names of most of his victims because they were shot down over German territory, and his total of eighty was augmented by planes that were driven down without being destroyed, as a day-by-day check of his victories (in the appendix of *The Red Knight of Germany*, by Floyd Gibbons) would show. The British scoring system allowed only for planes that actually crashed or went down in flames, as verified by at least two observers. Ninety percent of Bishop's fights were over enemy ground where he could not follow and verify. A fight-by-fight analysis of his combats – and there were over 200–shows that seventy-five percent of them were undertaken alone and against great odds. Yet Bishop personally regarded Richthofen the greatest pilot of either side in the war.

He once mixed with Richthofen's Flying Circus while piloting a Nieuport scout armed with a single gun. Accompanied by one other plane he tangled with five red Halberstadt fighters. A battle royal ensued, with no kills on either side and no chance for accurate aiming. The battle was broken off when four strange planes appeared on the scene. Both sides paused momentarily to look at the intruders, who proved to be British naval triplanes. The Germans disappeared, and ended what might have been an epic battle.

The way Bishop celebrated his return to the front in 1918 was typical. One day over Thourout he found nine German scouts in formation below him. He dived and sent one flaming with a short burst. As the enemy scattered, he zoomed 200 yards below his first score and sent another enemy flaming to the ground.

"Bish" could keep his feelings bottled up, unlike some of his flying mates who would celebrate a victory by stunting all over the home airdrome. Billy would land, turn his plane over to his favorite mechanic, Bourne, and work off his excess energy on the tennis courts. He was idolized by his ground crew, and his mechanics and armorers considered it a challenge to drink with Bishop. His

(Continued on page 115)

About the Author

Bill Walker, an AFA member since 1946, has served as Santa Monica Squadron Commander, California Wing Treasurer, and Chairman of the 1954 Wing Convention. On the editorial staff of the Los Angeles Herald-Express *since his graduation from the University of Southern California in 1940, he served in the AAF in WW II. He wrote "They Commute by 'Copter" in our February 1956 issue.*

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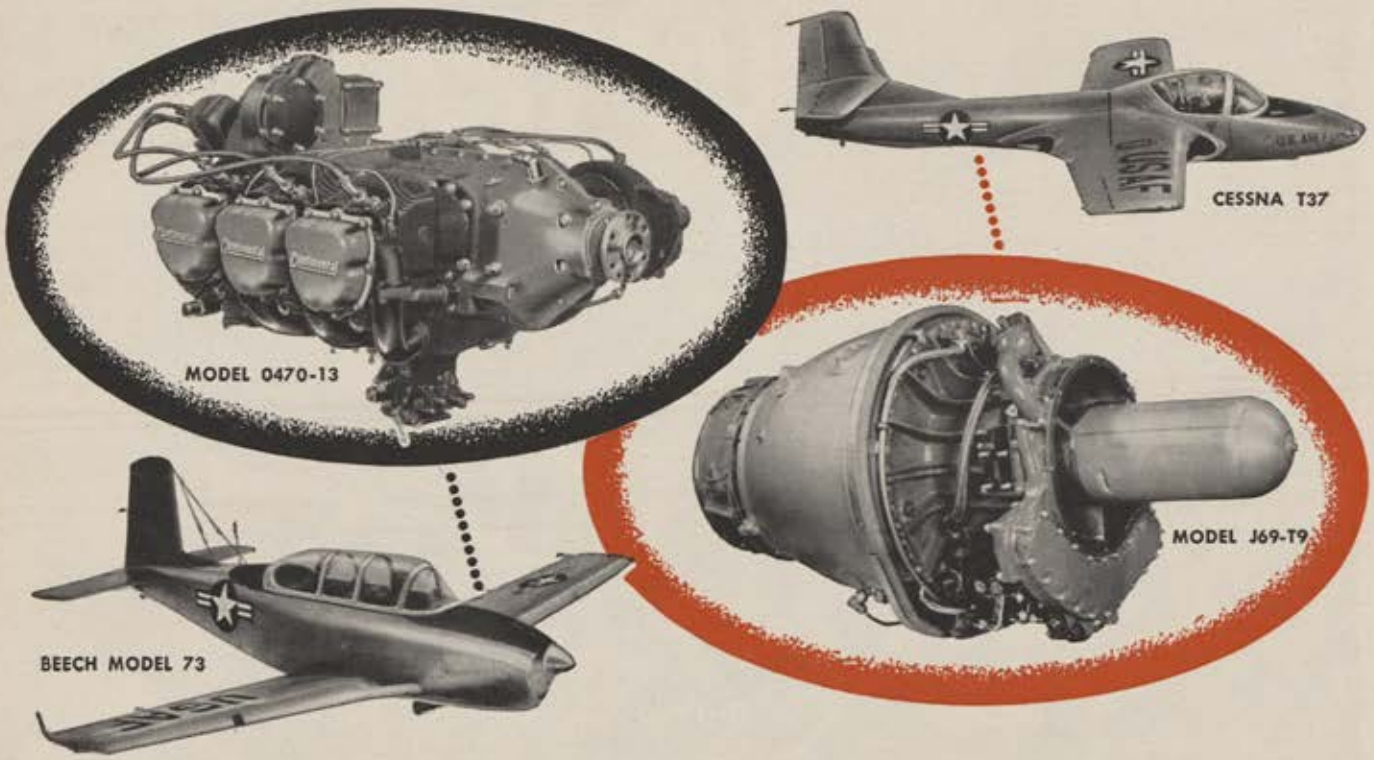

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favorite drink was scotch. Bishop and some of his fellow flyers considered it a lark to fly over enemy lines dressed in pajamas or tennis togs, tucked under their flying suits. He was credited with inventing trench strafing, using his plane's fixed machine gun. A typically Bishop refinement was to fill barracks room bed-pots with dynamite and drop them on the trench-bound Huns at close range.

In *War Birds: Diary of An Unknown Aviator*, Elliott White Springs, who shot down sixteen Germans while a member of the 85th Fighter Squadron, tells of an amusing incident. Springs had been chased back to his home field by six German scouts and was a bit jumpy when he landed after shedding all the fabric on his top wing. He ran into Bishop's plane on the ground and locked wings. With all the official dignity he could muster, the major was set to chew Springs out, but Elliott walked up to him, rippled his finger over his rows of ribbons and said, "See those medals?" Bishop nodded. "Well," said Springs, "I just want to tell you that you are welcome to them!" With that he repaired to the bar to soothe his shattered nerves, leaving Bishop laughing so hard he forgot all about the reprimand.

Bishop was recalled to England to help organize the Canadian Flying Corps late in June 1918. His score stood at seventy-two confirmed planes. Only Mickey Mannock, the fiery Irishman who replaced him as CO of the 85th, exceeded his score – Mannock had seventy-three planes when his plane crashed, carrying him to his death in July 1918.

Bishop returned to Canada in October 1918 to help organize and recruit the Royal Canadian Air Force. He was returning to England when the war ended. He was one of four Canadian aces whose aggregate score totaled 230 planes—the highest of any nation's aviators in that first World War. Bishop had seventy-two, Ray Collishow, VC, shot down sixty, Bill Barker, VC, had fifty and Don McLaren, forty-eight.

A proud moment for Air Marshal Bishop as he pins pilot's wings on his son.

Bishop tried a few post-war ventures in aviation in Canada with Billy Barker, including bush flying. It became a booming business, supplying transportation to the rich mining and timber areas of Canada's back country, heretofore accessible only by dog sled and canoe. He gave this up to become vice president of the McColl Frontenac Oil Co. of Canada, Ltd. and to act as director of the English Electric Co. In partnership with Elliott White Springs he organized a freight-carrying railroad that ran for a grand total of five miles. With utmost dignity they printed fancy letterheads and exchanged passes with almost every railroad in many countries of the world!

He kept in close touch with military aviation developments and served as chairman of the air advisory committee to the Ministry of National Defense. When World War II erupted in 1939 he volunteered and was appointed Air Marshal in charge of recruiting for the RCAF. He was particularly effective as chairman of the Clayton Knight Committee, which recruited young Americans who volunteered to fight with the RCAF while the United States was still neutral. One of his proudest moments came when he pinned pilot's wings on his son, W. A. Bishop, Jr., at Upland Flying School, Ottawa, on August 13, 1942.

Visiting his old friend, Prime Minister Winston Churchill, during one devastating blitz, Bishop noticed that every few minutes Mr. Churchill would excuse himself and leave the room. Finally when Bishop suggested that a wee nip might be in order to calm his nerves, his host told him to help himself to a bottle of scotch in the pantry. Only when Billy got there —the bottle was bare. His host had made one trip too many.

Before his death Billy Bishop spent his winters in Palm Beach and his summers in Canada, with his wife, Margaret. In his 1944 book, *Winged Peace*, which was a panoramic history of aviation from its infancy at Kitty Hawk to the decisive role it played in World War II, Bishop sounded this grim conclusion: "Never again dare the people of the world allow airpower to be used without restraint by mad dreamers of world conquest, or monopolized by private owners solely for acquisition of profit."—END

THIS IS AFA

The Air Force Association is an independent, non-profit, airpower organization with no personal, political or commercial axes to grind; established January 26, 1946; incorporated February 4, 1946.

OBJECTIVES

• To assist in obtaining and maintaining adequate airpower for national security and world peace. • To keep AFA members and the public abreast of developments in the field of aviation. • To preserve and foster the spirit of fellowship among former and present personnel of the United States Air Force.

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