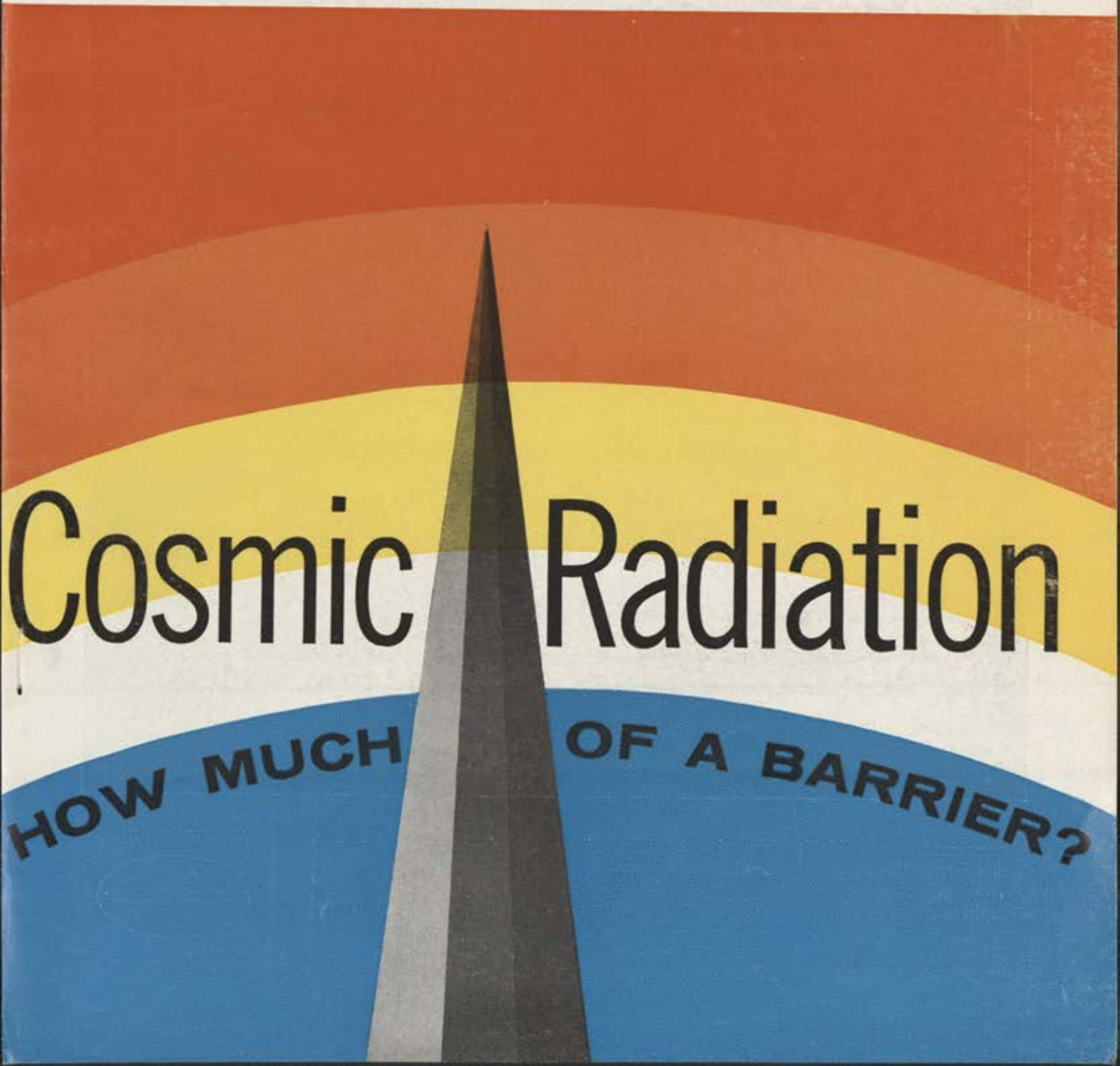
OCTOBER 1958 / 50c

AIR FORCE

• The Magazine of AMERICAN AIRPOWER / Published by the Air Force Association



NORTH AMERICAN's highly advanced A3J "Vigilante," a new carrier-based attack aircraft for the U. S. Navy, depends on vital Hamilton Standard equipment. More than 50 types of turbine or rocket powered aircraft and missiles rely on Hamilton Standard flight controls, propellers or other aeronautical equipment.

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Flight Controls • Starters • Air Conditioning Systems • Fuel Controls • Valves • Pumps • Propellers

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1934 Stratosphere Suit

1958 Lightweight Full Pressure Suit

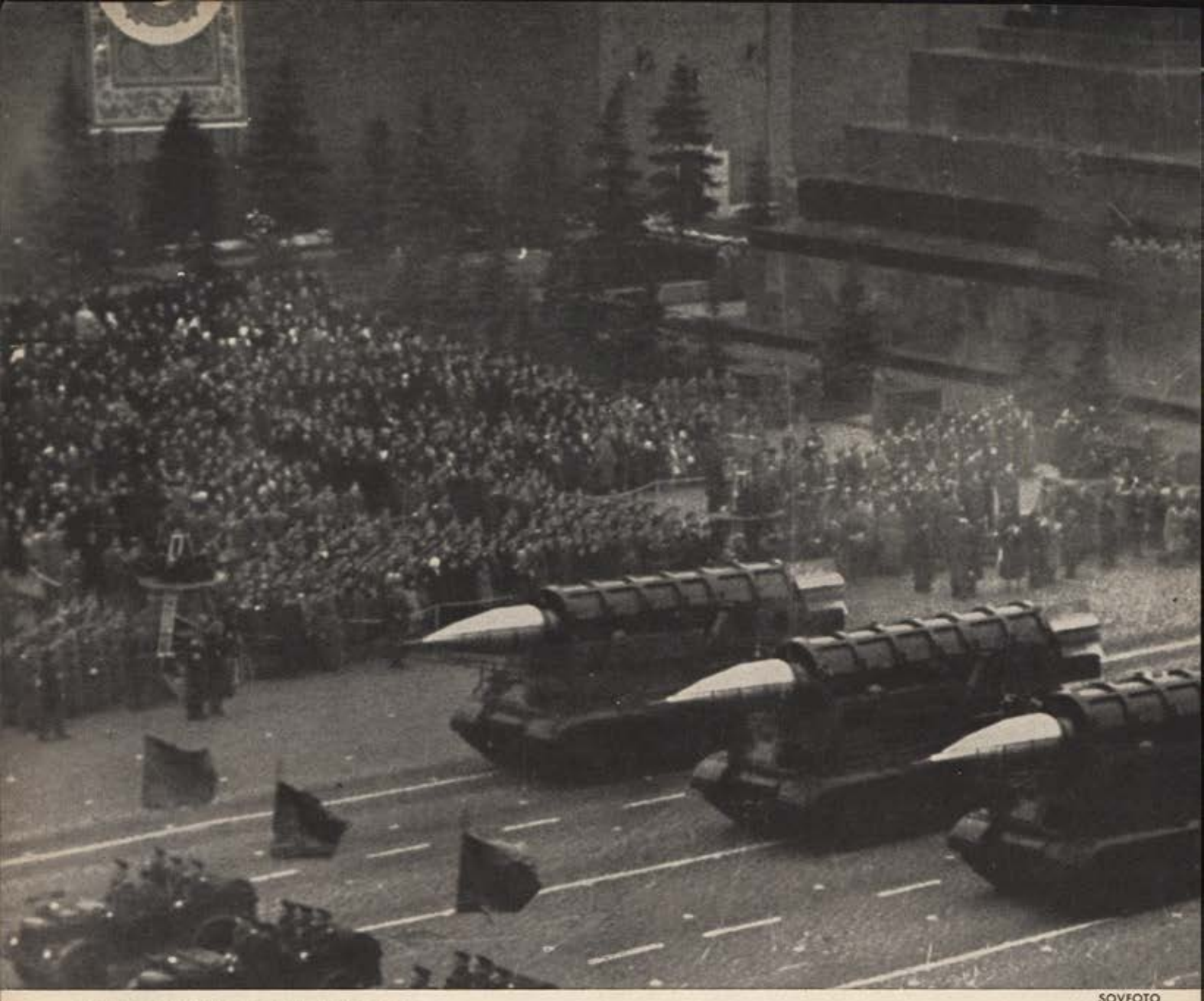
B.F.Goodrich

At B.F. Goodrich the space age started in 1934

That was the year B.F.Goodrich developed the first rubber stratosphere flying suit for attempts at setting altitude records. Through the years this suit has been constantly improved to meet the needs of higher-flying pilots. And when the first man sets foot on the moon he will probably be wearing a modification of today's B.F.Goodrich Full Pressure Suit.

B.F. Goodrich engineers are working in many ways to help man break the bonds of earth—and return safely. Missile nose cones, improved solid fuels, propellant heaters, missile battery box heaters, instrument heaters, printed and etched circuits, stronger metal and plastic structural materials, insulating materials, precision rubber seals and gaskets, blind fasteners—these are only a few of the items that may help solve *your* space age problems. For specific R&D information, write B.F.Goodrich Aviation Products, a division of The B.F.Goodrich Company, Akron, Ohio.

B.F.Goodrich *aviation products*



SOVFOTO

MISSILES IN RED SQUARE SHOW . . .

Why we must be businesslike about Research and Development

To insure its security, the United States must continue to match—or exceed—Soviet technological progress. As General Electric sees it, we can do this only by continuing to re-examine and revitalize the *way* we develop defense products.

In 1958, the United States will spend an estimated $5.6 *billion* on military Research and Development (R&D). The reason: we cannot afford to possess defense equipment that will be "second best."

Our dynamic free nation should be capable of out-planning, out-inventing and out-producing totalitarian nations. Yet, despite large appropriations, we are not doing as well as we might in the R&D field. In many cases, we are not capitalizing on the inherent strengths of our successful, free-enterprise system. To keep pace, we must re-examine our R&D attitudes and methods.

● **R&D funding should be continuous . . . not "stop-and-go."** Now funded on a year-to-year basis, R&D programs are often drastically influenced by short-term political considerations. As a result R&D contractors are hesitant to divert more scientific manpower and facilities to defense projects.

● **R&D responsibility must be pinpointed.** Today, responsibility is often scattered among *many* government and private organizations. Fixing project responsibility on individual prime contractors could mean faster progress—at less cost.

● **Incentives must generate confidence among contractors.** The current incentive level on defense production contracts fails to stimulate private investment in military R&D . . . makes it necessary for the government to fund most R&D projects.

America's military-industrial team is now working to solve these critical problems. But their complete solution will be possible only if the need for a revitalized R&D effort is recognized—and supported—by U.S. citizens. 695-2B

GENERAL ELECTRIC

C. W. LAPIERRE

Vice President and Group Executive
Electronic, Atomic and Defense Systems Group, General Electric Company

"If we wish to face the future confidently . . ."

"We must not handicap ourselves with grave doubts and misgivings about the ability of free men in a free economy to out-plan, out-invent, and out-produce a controlled economy.

"If we can continue to subject our methods and our system to critical analysis and appraisal; if we cut through red tape, and simplify prevention-of-mistakes machinery, and eliminate restrictive practices that put the brakes on innovations, to allow for continued bold technological leaps forward; if we organize and administer the work of R&D more effectively—we can face the future, whatever its dangers, adequately equipped, confidently and without fear."

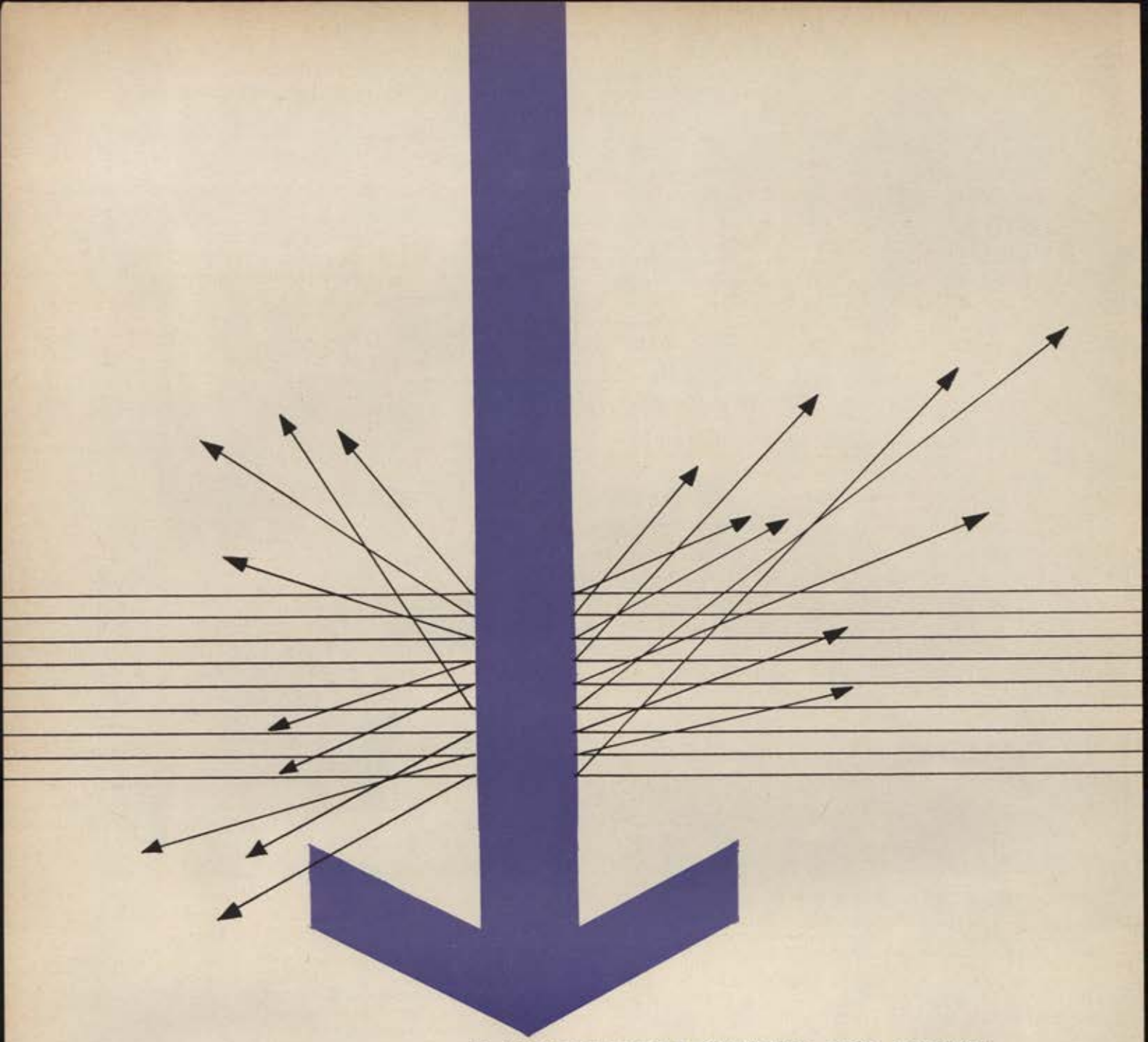
At General Electric, progress in defense presupposes extensive research

RESEARCH FOR MISSILES. Thor nose cone being readied for test flight at Cape Canaveral is a dramatic example of research progress at G.E.'s Missile and Space Vehicle Dept., Philadelphia, Pa.

RESEARCH IN RADAR. New height-finding radar developed by General Electric's Heavy Military Electronic Equipment Dept., Syracuse, N. Y., will help improve this nation's air defense network.

RESEARCH IN PROPULSION. Mighty G-E J79 turbojet, powerplant of Convair's supersonic B-58 (above), typifies progress at General Electric's Aircraft Gas Turbine Division, Evendale, Ohio.

This public information message also appears in current issues of NEWSWEEK and FORTUNE.



A MANAGEMENT GEARED FOR ACTION

Keeping pace with the demands of this high-speed era are the sweeping managerial advances within the Military Products Division of IBM. The result is a dynamic organization geared for action and organized for decision. The project officer of the military will now find his opposite number at IBM—equally dedicated to the accelerated development of the versatile equipment so vital to national security. These men are entrusted with complete operational responsibility for a project with full authority to cut across functional lines whenever it is necessary to expedite the results demanded by the special needs of the services. IBM has always responded at once to defense requirements. These most recent actions offer more evidence of the eminent qualifications of the IBM Military Products Division for serving the data processing and computer requirements of the military.

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AIR FORCE

THE MAGAZINE OF AMERICAN AIRPOWER

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FEATURES

DEPARTMENTS

Preserver of Peace...

BMEWS

It sees...
thinks...
warns...

OUR WATCHDOG OF THE FIRMAMENT

BMEWS—Ballistic Missile Early Warning System—is under development to provide a scientific answer to the detection of intercontinental ballistic missiles. In its various functions, it will be one of the electronic wonders of the age. The unblinking eyes of its strategically located radars are being developed to detect an onrushing missile thousands of miles away. Almost at once electronic computers will determine altitude, course and speed, and set in motion the necessary defense apparatus. RCA acknowledges its tremendous responsibility as prime contractor for the design and construction of BMEWS—so vital to our country's defense and so effective as an instrument for peace.

RCA Tmk(s) ®

RADIO CORPORATION of AMERICA

DEFENSE ELECTRONIC PRODUCTS

CAMDEN, N. J.

An Editorial

Start of an Eventful Journey

John F. Loosbrock, Editor

THIS is a lucky time in which to live—if we have the courage and the wit to grasp the opportunity that modern science holds out to us.

Consider this quotation from Senator Lyndon B. Johnson, Democrat from Texas, under whose aegis the National Aeronautics and Space Act was passed by Congress with bipartisan support. Said Senator Johnson:

"Space has implications for virtually all of human activity. Space, as a dimension, enlarges the field of all our various earthly enterprises—from commerce and trade to education and communication. The material of the Space Age may well reshape the structure of basic industry. The technology of space will have incredible impact upon our consumer goods. Our leisure and luxuries, as well as our essentials, will be affected. The size of our economy—and its financial values—will be influenced and altered. So, also, will be where we live, what jobs we hold, what products we sell, what foods we eat, what land we farm, what medicines are prescribed for us. *At present, our vision in this realm could scarcely be more myopic.*"

It is to space myopia that this editorial is addressed.

The challenge of the Space Age is unique in human history. For once we have an opportunity to lay the educational, philosophical, and moral groundwork for a revolutionary period of technology *before* the fact rather than after; to attempt to *avoid* problems rather than waiting to solve them after they have occurred; to *anticipate* crises and thereby lessen their impact.

Had we but a fraction of the knowledge of the potential of the airplane *before* Wilbur and Orville Wright first flew at Kitty Hawk that we *already possess* about spaceflight, chances are the world would now be a better place in which to live.

The fantastic growth of air transport following World War II was predictable, and even predicted by a few. Yet the need for a commensurate growth in air traffic control techniques—an obvious corollary—was repeatedly ignored or underestimated. In fact the nation waited for the inevitable to happen—the tragic collision of two great airliners over the Grand Canyon—before taking serious steps to solve the air traffic control problem.

The history of transportation is full of head-in-sand thinking. Highway and airport planning still lag far behind the production of high-performance automobiles and aircraft.

Over the years we—as a people and as a government—have let the development of hardware outstrip the "state of the art" in the sociological, economic, educational, and philosophical factors which shape the society the hardware is designed to serve. Thus we wind up with too many autos for our roads, too many airplanes for our airports. The Jet Age sneaked up on us.

To prepare for the Space Age, we have a little time. Man himself has not yet ventured into space. But time of itself is like money. Its value is in proportion to the wisdom with which we spend it. And to accumulate wisdom, we must accumulate knowledge.

In this great effort, technical societies are doing all they can to advance the state of the art in missiles, rockets, and space technology in general. Specialized magazines find their niche in reporting technical progress. But someone, we submit, should worry about fitting the pieces together, keeping them in perspective, recognizing that we are living in the Jet Age, the Missile Age, and the Space Age all at once, with grave problems of national security coloring our efforts in all three fields. Through proper understanding of these factors, we can achieve economic growth on a scale hitherto unknown to mankind. The Air Force Association has consistently approached the future with this philosophy.

Now, in this issue, the Association is proud to announce AIR FORCE Magazine's new **SPACE DIGEST**, literally a magazine within a magazine (*see pages 38-39*). In **SPACE DIGEST** we intend to report on Space Age development in all its ramifications—to discuss, synthesize, and digest the best of current thought in a way to make our readers, busy men all, the best-informed people in the world on space matters. Our interest is deeper than rockets and missiles. It extends beyond the stars.

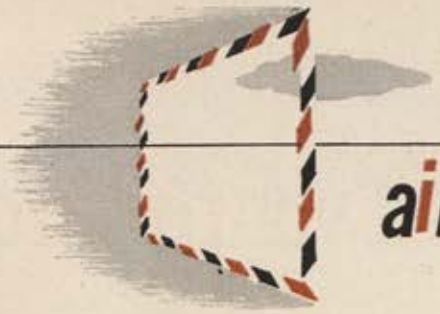
This is a logical extension of our present mission, even as we consider the projection of American military strength upward and outward into space a logical extension of the Air Force mission.

Beginning with our November issue, **SPACE DIGEST** will be over and above the normal editorial content of AIR FORCE Magazine, substantial enough in size and meaty enough in content to warrant the title "a magazine within a magazine."

SPACE DIGEST will contribute to an editorial policy that covers the full spectrum of American aerospace power: from helicopters and trainers, through manned airborne missile launchers, through the missiles themselves which serve as interim vehicles until the ultimate goal—man in space, and in purposeful, directed flight—is achieved.

We will continue to bear in mind, as we discuss outer space, the imperative need to maintain a free world to take off from and return to.

In short, we wish to invite our readers to enter the Space Age in an editorial environment that applies calm reason and broad perspective to the greatest adventure in history. We look forward to an eventful journey.—END



air mail

Comments on Anniversary Issue

Gentlemen: I am deeply impressed with the wide and thorough coverage you have given the USAF in the August "Almanac Issue" of AIR FORCE.

This edition is bound to find frequent and wide use among Air Force people everywhere. A similar annual roundup in subsequent years will contribute invaluable documentation to the history of the USAF and American military airpower.

Hon. James H. Douglas
Secretary of the Air Force
Washington, D.C.

Gentlemen: I've seen your 1958 Anniversary Issue of AIR FORCE Magazine and was impressed.

I wish to convey to your staff and all concerned with its publication my enthusiastic congratulations.

Maj. Gen. Jacob E. Smart, USAF
Ass't Vice Chief of Staff
Washington, D. C.

Gentlemen: I have just finished reading your Anniversary Issue, August 1958, of AIR FORCE Magazine, and want to compliment you on a fine edition. Your coverage was complete, and each article excellent. While last year's Anniversary Issue was superior, the 1958 edition surpasses it—a very comprehensive and vital magazine that is a credit to the Air Force Association.

Lt. Gen. C. S. Irvine, USAF
DCS/Materiel
Washington, D. C.

Gentlemen: Each time I receive an issue of AIR FORCE Magazine I marvel at the methods used in this publication for presenting the airpower story in such an interesting and instructive way.

Each special issue you publish contains a wealth of material in a most interesting format. The August Anniversary Issue is a typical example.

Lt. Gen. Roscoe C. Wilson, USAF
DCS/Development
Washington, D. C.

Gentlemen: If my memory serves me right, this is the first letter to the editor I have ever written. But when I finished reading the August issue of AIR FORCE, I couldn't wait to get with it.

From cover to cover the 1958 Anniversary Issue is filled to the brim with sparkling, timely information. Truly this is an airman's encyclopedia enlivened by masterful makeup and pithy comment. The book is an enviable editorial achievement.

Here at Air University, the Anniversary Issues have been accepted by many students and faculty members as informational auxiliary texts. The 1958 Air Force Almanac did not disappoint us.

Accept my congratulations for producing an outstanding issue of an outstanding magazine.

Col. Laurence H. Macauley
Air University
Maxwell AFB, Ala.

Gentlemen: The Anniversary Issue is a mighty impressive compilation and should be a valuable reference work for us as well as other publications. This is without any reservations but may I make a couple of minor points?

1. As a reader I think the whole package would be more convincing if you went out of your way more often to allow that other services are in the act—notably in the space section but in other places as well.

2. As a picture man, understandably, I think the whole thing could have been made sexier with better and bigger and more illustrations.

Edward K. Thompson
Managing Editor
Life Magazine
New York, N. Y.

● *On the comments: (1) We tried to stay within the limits of an Air Force Almanac; (2) We agree and would have, had space and better pix been readily available.*—THE EDITORS

Gentlemen: I want to congratulate the Association for the splendid work done in preparing the material in the August issue of AIR FORCE. It gives such a comprehensive and useful picture of the present Air Force organization that I am arranging to secure several additional copies for distribution in our own organization to those who have frequent contacts with the AF.

Henry T. Killingsworth
Vice President
American Telephone & Telegraph Company
New York, N. Y.

Gentlemen: Please accept my hearty congratulations for the excellent August edition of AIR FORCE Magazine—"Air Force 1958 Almanac."

I am sure all Air Force Information Services Officers will find this issue a useful desk companion.

The annual appearance of this publishing concept will provide a unique and valuable documentary of the history of the USAF and American military air- and spacepower.

Maj. Gen. Arno H. Luehman, USAF
Director of Information Services
Washington, D. C.

Gentlemen: The August issue of AIR FORCE is an outstanding edition.

H. A. Leedy
Director, Armour Research Foundation of Illinois Institute of Technology
Chicago, Ill.

Gentlemen: I have just finished reading the most enlightening editorial "Force in Being" in the August Anniversary Issue of AIR FORCE. I cannot find words to adequately describe the thrill I felt while reading your editorial. The words are placed exactly right, and your description of an "invisible umbrella of airpower" over the free world is something which needs to be brought to our attention. I think even more so now when the clamor of missiles and space tend to make us forget the requirement for force in being.

All in all, it is a great editorial and one which I hope we will see used over and over again.

Col. R. J. Watson, USAF (Ret.)
North American Aviation, Inc.
Washington, D. C.

Realism, Not Militarism

Gentlemen: I take violent exception to

(Continued on page 12)

Think small

Mechanical brains for missiles must be as tough and tiny as possible . . . a design problem that calls for experts skilled in both electronic computers and miniaturization.

ARMA's computer group has shrunk a digital computer module until it's the size shown above . . . a feat comparable to squeezing the contents of a steamer trunk into a cigarette package.

Right now, in fact, through new techniques of solid state circuitry, systematic design and compatibility testing, ***ARMA*** is producing a family of airborne digital computers that are operational under the most severe conditions of vibration, temperature, noise, acceleration and deceleration, and nuclear radiation.

For information on our fully transistorized, airborne digital computers, contact ***ARMA***, Garden City, N.Y. A division of American Bosch Arma Corporation.

5836

AMERICAN BOSCH ARMA CORPORATION

ADVANCED INERTIAL GUIDANCE

Complete systems or components for aircraft, missiles and spacecraft

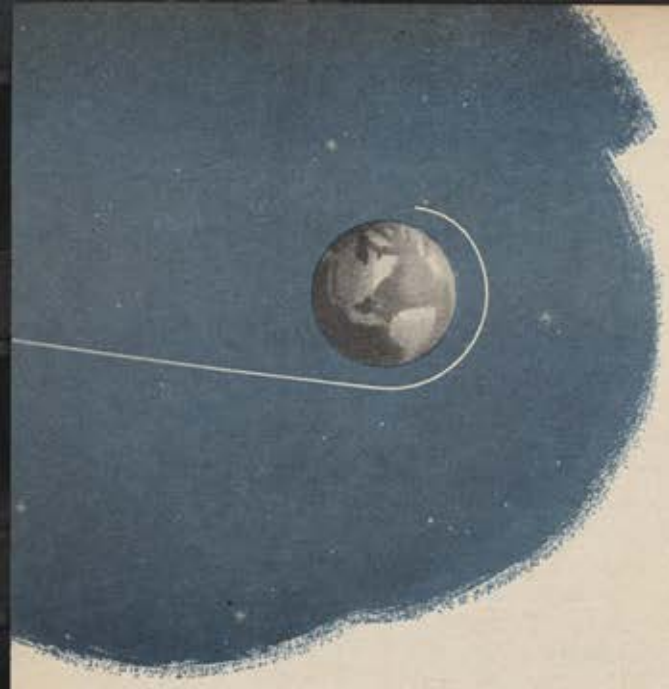
To design and produce extremely accurate inertial guidance systems requires a complex combination of engineering and manufacturing skills. Each component must be developed to meet the accuracy needed for the system's mission.

The long background in gyroscopics, electronics and computation has made it possible for Sperry to design and produce advanced inertial systems for some of our country's most modern weapons of defense. Other Sperry inertial systems will, one day, allow man to explore space.

On these pages are highlighted some of Sperry's recent achievements in inertial guidance. If you have a systems problem or are interested in individual components, write our Air Armament Division for further information.

CONVAIR'S B-58 HUSTLER with Sperry inertial navigation system will be able to navigate undetected for thousands of miles to exact target. Most nearly automatic airplane yet developed and requiring only a 3-man crew, the B-58 will fly faster than sound at altitudes well over 50,000 feet.

HYPERSONIC, ROCKET-POWERED X-15 manned research aircraft by North American is designed to explore near space. Sperry inertial system, developed for USAF, will give pilot data for navigating and maneuvering the NACA-sponsored X-15 with extreme accuracy at speeds of one mile per second.



UNDER MICROSCOPE, Sperry employee assembles floated gyros under specially-designed hood and in sealed pressurized room. Since even dust speck might cause serious error in a long-range mission, every precaution is taken in the production of these critical units.

COMPACT Sperry stable platform mounts three advanced floated gyros. Nerve center of the inertial system, platform serves as fixed space reference in flight for maintenance of prescribed course.

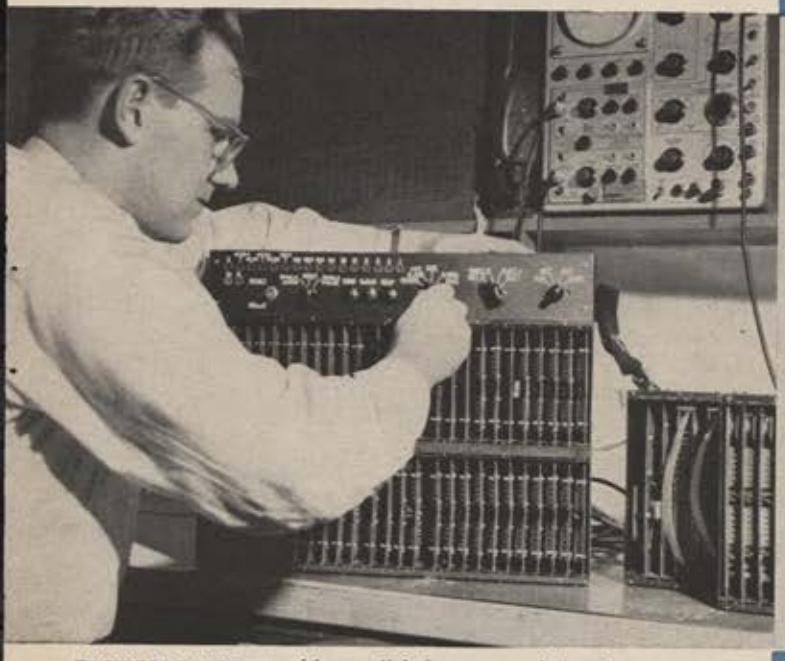
NEW linear integrating accelerometers weigh only 1½ lb., measure exact velocity of aircraft or missile in any direction. New sensing mechanism moves in straight line, eliminating errors inherent in previous types.

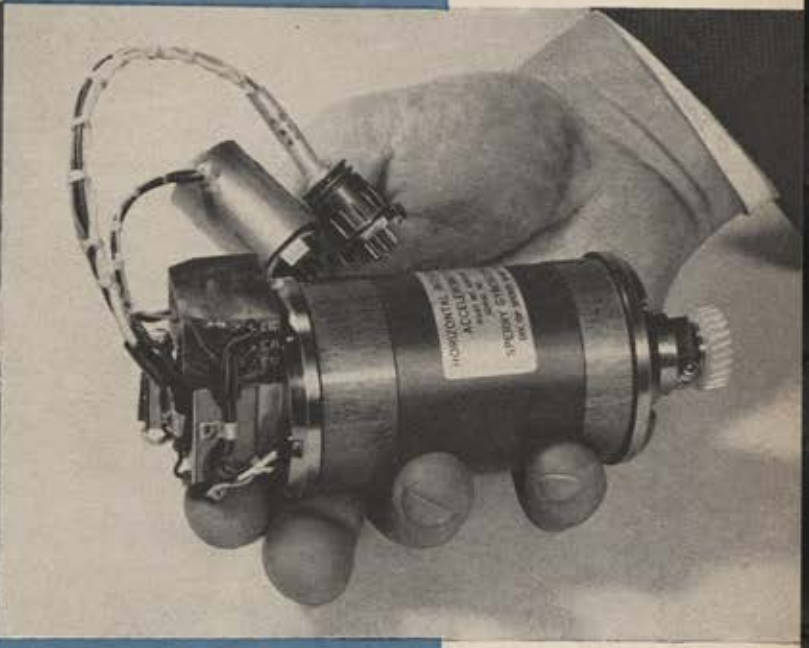
AIR ARMAMENT DIVISION

SPERRY GYROSCOPE COMPANY

Great Neck, New York

DIVISION OF SPERRY RAND CORPORATION





ENGINEER TESTS new airborne digital computer designed by Sperry. Computer accepts data from stable platform's gyros and accelerometers, gives instructions for automatic corrections in flight path. Closely related operator displays permit inflight monitoring and control.

←

ULTRA-SENSITIVE floated gyroscope minimizes random drift, assuring high performance for inertial system over long periods. These production gyros withstand shock and vibration many times the force of gravity.

the obviously parochial tone of Associate Editor Leavitt's article on space in your August issue, particularly this statement:

"On USAF's shoulders rests the mission of spearheading the free world's space effort."

An appealing part of this democracy is that control of peaceful pursuits is vested in civilian agencies. In passing the Space Act (Public Law 85-568) Congress was very clear that our activities will be devoted to peaceful purposes.

Neither AFA nor Editor Leavitt do the Air Force or the US any great service by an erroneous inference that our space activities are being spearheaded by a military department. Our requirement to maintain a strong military force does not make this a militaristic nation; articles such as Leavitt's give this country the aggressor connotation, and add fuel to the fire of Communist accusations that we, not they, are the potential attacker.

It is a matter of record, not opinion, that the National Aeronautics and Space Administration will spearhead the country's space effort. And like the agency which forms its nucleus, the National Advisory Committee for Aeronautics, we look to the NASA to continue to be the cause of United States leadership in aeronautics—and in astronautics.

Edward H. Kolcum
Hampton, Va.

● *Mr. Leavitt's statement referred to the space technology capability in being of the USAF, the missilry and human factors know-how already available and under development. At the present time, these capabilities exist nowhere else. This is not militarism but realism.*—THE EDITORS

For the Sake of Accuracy

Gentlemen: May I congratulate your entire staff on the 1958 Anniversary Issue of AIR FORCE. This well-planned, definitive issue gives excellent coverage of the global activities and future plans of the USAF from the thought-provoking editorial by Mr. John F. Loosbrock to the very end.

There are a few minor discrepancies that I would like to call to your attention for future reference. First, on page 125 it is stated that "C-124 Globemaster transports from the Tactical Air Command serve in USAFE on a rotational training basis." These C-124s are actually Military Air Transport Service aircraft. Second, on pages 71 and 79, respectively, Donaldson AFB, S. C., and Palm Beach AFB, Fla., are listed as EASTAF bases. They are, of course, under WESTAF (Western Transport Air Force), as you showed on page 156.

Such incidental errors in no way detract from an excellent and very informative Anniversary Issue, but are mentioned in the interest of accuracy.

Lt. Col. M. E. Williamson
Hq. MATS
Scott AFB, Ill.

Crash Victim

Gentlemen: I noted with interest your first paragraph of "Shooting the Breeze" on page 31 of the August issue on the crash of the KC-135 in June at Westover AFB, Mass. The story of this most unfortunate accident failed to mention that the commanding officer of the entire operation, Brig. Gen. Donald Saunders, was himself killed in the accident.

I had the pleasure of serving under General Saunders when he was a lieutenant colonel and squadron commander of the 874th Bomb Squadron, 498th Group—part of the first B-29 Wing to attack Japan from the Marianas. He later commanded the 498th Group.

He was an extremely intelligent, alert, and progressive thinker and planner, and all who knew him felt he had the potential to become one of the great leaders in the Air Force. His loss will set back the development of strategic air tactics.

More than that, General Saunders personally led the B-29s whenever the mission in question was an extra difficult or dangerous one. The fact that he volunteered his leadership on only the most hazardous flights set a wonderful example and undoubtedly resulted in a more rapid completion of the entire campaign against Japan.

If there is some way in which the contribution of General Saunders to the development of the USAF could be emphasized, such as the naming of an airfield, I think he is a most worthy candidate for that honor.

Warren G. Moses
New Orleans, La.

We'd Like to, But . . .

Gentlemen: I wish to offer you my congratulations for an especially interesting and valuable Almanac Issue of AIR FORCE Magazine.

I would like to call your attention to the Photochart on page 51 which shows the "operational forces." I believe the three Air Defense Forces of ADC should have been included therein, as well as the 64th and 73d Air Divisions. These organizations together are responsible for operating the USAF air defenses and direct more than 100,000 Air Force people.

Denys Volan
Director, Command History
Hq. ADC
Ent AFB, Colo.

● *We agree that our Photochart might have been more complete if we had included ADC's Air Defense Forces and two air divisions as "operational forces." Similarly, we would like to have included the Transport Air Forces of MATS, the Air Materiel Areas and Depots of AMC, the Centers of ARDC, and the operational elements of ATC, among others. But since space for "operational forces" was so limited, we held our coverage primarily to the numbered air forces, and went into considerable detail about the operational forces of ADC and the other commands in the organizational charts that appeared in the various chapters of our Almanac Issue.*—THE EDITORS

Record-Breaking Flights

Gentlemen: I have read with interest your list of "Milestones Toward Man in Space" (August issue), and have duly noted that monkeys and mice survived a high-altitude flight in 1951; that a balloonist reached 96,000 feet in 1957; and that mice began riding in missile nose cones in 1958; etc., etc.

But nowhere have I found any mention of the world's first rocket-powered spaceship, that carried man farthest and fastest in his history; penetrated the heat barrier for the first time with a human pilot; the only inhabited vehicle that has yet flown Mach 3; and still the firm holder of the world's speed and altitude records—the Bell X-2.

John Guenther
Rye, N. Y.

● *Both the Kincheloe and Apt X-2 flights were indeed monumental, and we're embarrassed at the oversight. However, they were mentioned in the more detailed chronology, on page 210 of the same issue.*—THE EDITORS

From Son to Father

Gentlemen: At the top of page 80 of your August issue, in the "Guide to Air Force Bases," there is a minor correction which should be noted. Land for Stewart AFB, N. Y., was provided by the *son*, not the *father*, of Lachlan Stewart, for whom the base was named.

While on the subject of Stewart AFB,

(Continued on page 15)

At DRESSER, Men with Imagination Help You Probe New Horizons

Wherever new horizons in technology are being explored – whether in the stratosphere or at the bottom of the sea – the men of Dresser Industries are helping to supply technical services and equipment.

Dresser experience in engineering and manufacturing has set high standards in oil, gas, chemical and electronic industries for many years. Today, in atomic research, in missilery, in electronics, the men with imagination at Dresser are exploring new frontiers in technological development. These men are supported by the combined facilities of the companies that make up Dresser Industries, Inc. The engineered equipment Dresser supplies to government agencies ranges from tiny hermetically sealed transformers for jet aircraft to compressors for giant atomic submarines, from launching towers for missiles to gas pumps for nuclear power installations.

Whatever your needs, look to Dresser. From no other single organization will you receive the same combination of facilities and experience with individual attention to your needs. For although each Dresser company works independently, all are teamed together in a single organization to provide unified research, engineering and manufacturing facilities.

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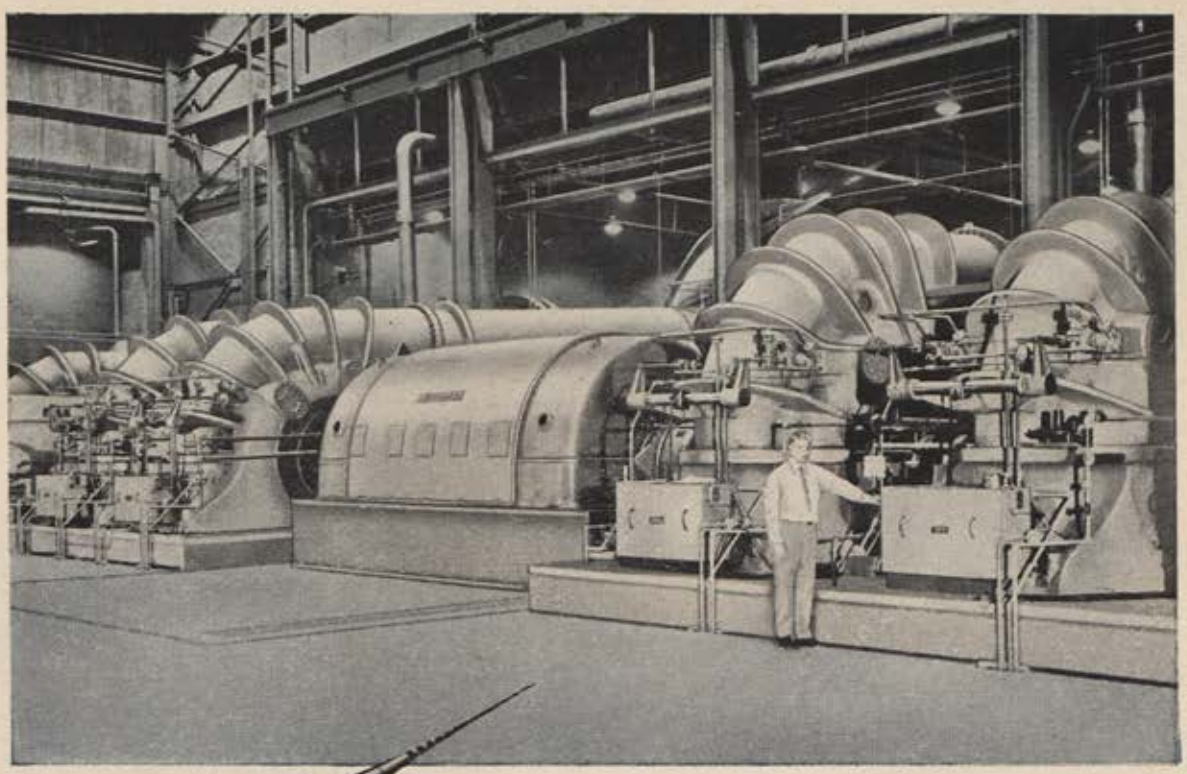

Roots-Connersville creates

stop-and-go whirlwinds for aircraft research

Man-made air masses that match the violence of nature's hurricanes pour from the Roots-Connersville Blowers at the Lewis Flight Propulsion Laboratory of the National Advisory Committee for Aeronautics. Yet the power of these huge wind-making machines can be instantly controlled, from a soft, whispering breeze to a roaring, whirling cyclone. In the reverse, the siphoning air movement can develop almost perfect vacuums to simulate the air conditions of high altitudes. A similar but larger N.A.C.A. "wind-making system" has now been completed at Langley Field, Virginia.

The same engineering and manufacturing abilities that developed these stop-and-go whirlwinds are applied by Roots-Connersville to the everyday movement of gas and air, in small or large quantities, for industry. Now in its second century of service, Roots-Connersville Blower Division, one of the Dresser Industries, designs and builds the world's most extensive and varied line of such equipment.

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In its specialized field, each Dresser company, operating independently, has the experience, facilities and engineering manpower to meet the progressive needs of the industries it serves. Whenever an unusually challenging problem is put before any Dresser operating unit, the vast research, engineering and production facilities of all divisions of Dresser Industries, Inc. can be swiftly mobilized into effective teamwork. Throughout the oil, gas, chemical, electronic and other industries, this coordinated performance is known as the Dresser *Plus* +... a standard of comparison the world over. *Briefacts* gives the complete story of the Dresser *Plus* +. Write for your copy today.

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you might be interested in having a list of the officers who were involved with the undersigned in the acquisition and development of the base: General of the Army Douglas MacArthur, Gen. Orval Cook, Maj. Gen. George Richards, Maj. Gen. John M. Weikert, Maj. Gen. Kenner Hertford, Brig. Gen. T. A. Sims.

With the exception of General MacArthur, whom the writer believes to have been a brigadier at the time of the transaction, the above officers were all captains except George Richards, who was a major.

Thomas A. Stewart
Newburgh, N. Y.

Some Recognition Due

Gentlemen: For many years there has been something that has bothered me regarding the first atom bomb dropped on Japan.

There has never been, to my knowledge, any mention of the two F-13As (B-29 Photo) from my old squadron which accompanied the B-29 on this drop and took actual photos of the mission. Two ships from our squadron, the 3d Photo Recon Squadron, based at Harmon Field, Guam, were sent to Tinian for a special mission about two days prior to the actual atom bomb mission, where they were briefed on what to expect, etc. They flew on each side of the bomber, and slightly above, I believe, and took photographs of the actual dropping of the bomb on Hiroshima.

It has always sort of "burned" me that our squadron never has received any credit for the terrific job they did in mapping all of the Japanese islands, following shipping on the Inland Sea, taking pictures for bomb missions, and then taking bomb damage assessment photos for all the services, plus being with the bomber that dropped the first atom bomb. Never have I read any accounts of this little, forgotten outfit that was attached to the Twentieth Air Force.

D. U. Woodfield
Port Jefferson, N. Y.

● *Craven and Cate, in* The Army Air Forces in World War II, Vol. V, the Pacific-Matterhorn to Nagasaki, *say ". . . The main force consisted of three B-29s: Colonel Tibbets'* Enola Gay *with the bomb aboard and two observation planes—Maj. Charles W. Sweeney's The Great* Artiste *and Capt. George W. Marquardt's* No. 91—*loaded with cameras and scientific instruments, and both carrying military and civilian observers in addition to their crews. . . ."*—THE EDITORS

go first-class..

The Fairchild F-27, only American jetliner delivered to an airline, is setting the pace into air transportation's new age of first-class, luxury-all-the-way service. Soon, wherever you fly —on trunkline jet express or short line local—you'll relax in luxurious, first-class comfort.

Soon to be the first U. S. Jet Age transport to enter scheduled service, the F-27 brings to the short and medium range local airlines many outstanding comfort features.

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Douglas DC-8

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all the way

Among these comfort features of the new Fairchild F-27 are:

- **On-the-ground air conditioning—as well as in flight**
- **Low cabin sound and vibration levels**
- **New, luxurious interiors**
- **Pressurized for sea-level comfort at high altitudes**
- **Propjet power for over-the-weather performance**
- **Weather radar for smoothest flying**
- **High-wing visibility for the best view in the air**
- **Jet Age speed for on-time arrivals, departures**

Look for the Fairchild F-27, new luxury limousine of the air. It links small and medium Main Street communities and connects them to big city trunkline terminals where long-range jets will operate. Together, the F-27 and the big jets will provide—for the first time—all-the-way luxury service throughout the nation. The F-27 is in a class by itself in performance, comfort, dependability and job capability.

In addition to its personal passenger comfort features, the F-27 is in a class by itself as the instrument for generating new local feeder traffic to and from the trunkline jets.

You'll go first-class all the way when you fly

FAIRCHILD F-27

Now being delivered to these progressive airlines: *AREA (ECUADOR) AVENSA • BONANZA AIR LINES • LINEA AEROPOSTAL VENEZOLANA (LAV) • LLOYD AEREO BOLIVIANO • MACKEY AIRLINES • NORTHERN CONSOLIDATED AIRLINES • PACIFIC AIR LINES • PIEDMONT AIRLINES • QUEBECAIR • WEST COAST AIRLINES • WHEELER AIR LINES • WIEN ALASKA AIRLINES*

MANUFACTURED BY FAIRCHILD ENGINE AND AIRPLANE CORPORATION • HAGERSTOWN 15, MARYLAND

* FAIRCHILD F-27: AIR TRAFFIC GENERATOR FOR THE JET AGE

FLIGHT LINES

President Eisenhower has appointed four members of the **National Aeronautics and Space Council,** under provisions of the NASA Act. They are **Dr. James H. Doolittle; William A. M. Burden,** Assistant Secretary of Commerce for Air in 1943-47 and Special Assistant for Research and Development to the Secretary of the Air Force in 1950-52; **Dr. Alan T. Waterman,** Director of the National Science Foundation; **Dr. Detlev W. Bronk,** President of the National Academy of Sciences since 1950 and President of the Rockefeller Institute of Medical Research since 1953.

The other five members, as established in the Act that set up the new National Aeronautics and Space Administration, are fixed by law as the President, Secretary of State, Secretary of Defense, Chairman of the Atomic Energy Commission, and the Administrator of the NASA. The National Aeronautics and Space Council, with the President as chairman, will set policy for all space and aeronautical activities conducted by government agencies.

Wide World Photos, Inc.

Plaque marking 1908 Wright Flyer tests at Fort Myer, Va., was unveiled September 3. Taking part, AF Secretary Douglas; Mrs. F. G. Kellond, sister of Lt. Thomas Selfridge, first military air crash victim; Brig. Gen. Frank P. Lahm (Ret.); and Acting Secretary of the Army, Hugh Milton.

Dr. James H. Doolittle Lt. Gen., USAF (Ret.), currently vice president and a director of the Shell Oil Co., will become chairman of the board of the **Space Technology Laboratories,** a division of Ramo-Wooldridge that will be **a separate corporation** concerned exclusively with **ballistic missile and space problems.** Dr. Doolittle will join Space Technology Laboratories about the first of the year, but will continue as a member of the board of directors of Shell Oil.

Dr. Simon Ramo, now **president of Space Technology Laboratories,** will continue as a member of the board of directors for a short transition period, after which he will return to his duties as **executive vice president of Ramo-Wooldridge,** which will merge with **Thompson Products** to form **Thompson Ramo Wooldridge.**

Dr. Louis Dunn, now executive vice president and general manager of STL, **will become president** when Dr. Doolittle assumes the board chairmanship.

The United States **first lunar probe,** four-stage rocket launched from Cape Canaveral, Fla., on August 17, blew up after seventy-seven seconds and less than ten miles of flight. The 88.1-foot vehicle carried instrumentation weighing forty pounds. Bottom stage was a **Thor IRBM,** generating about 150,000 pounds thrust. Second stage was based on the **Aerojet liquid engine** of the **Vanguard second stage,** with a thrust of 7,500 pounds. Third stage was a **solid-propellant rocket** of 2,500 pounds thrust. Fourth stage was a **solid-propellant rocket** with a thrust of 3,000 pounds. **Maj. Gen. Bernard A. Schriever** called the attempt a "random failure," and attributed it to an explosion in the Rocketdyne engine of the first-stage Thor.

Dr. Hubertus Strughold, who founded the School of Aviation Medicine's **Department of Space Medicine** ten years ago, has been awarded the academic rank of **Professor of Space Medicine** by Air University. He's the world's first holder of this title.

A **four-man committee** of scientists has been named to propose a US program for the **international control of space exploration,** particularly in the research area. Headed by **Dr. W. Albert Noyes, Jr.,** formerly Dean of the College of Arts and Sciences at the University of Rochester, the committee is an **offshoot of the Space Science Board of the National Academy of Sciences-National Research Council.** Other members are **Dr. Wallace O. Fenn,** a physiologist at the University of Rochester; **Dr. E. Bright Wilson, Jr.,** specialist in physical chemistry at Harvard, and **Dr. H. P. Robertson,** a theoretical physicist at the California Institute of Technology.

Dr. Ernest O. Lawrence, recipient of the Nobel Prize, the Enrico Fermi Award for 1957, and many other honors, **died in Berkeley, Calif., on August 28.** Dr. Lawrence, **inventor of the cyclotron** in 1929, contributed to the world of science as a **pioneer in the field of nuclear physics,** as a teacher, and as an organizer. He was Director of the **University of California Radiation Laboratory** at Berkeley. He was a US delegate to the East-West talks in Geneva on nuclear tests when he became ill.

The AF disclosed on September 9 that a **Lockheed X-7** ramjet missile has been flown approximately **3,000 mph.** The X-7 was air-dropped from a B-50 over the test range at **Holloman AFB, N. M.** The thirty-seven-foot X-7 also holds the **altitude record** for air-breathing missiles, estimated to be **almost 100 miles.**

Checky and Whitey, two **canine colleagues of Laika,** were claimed to have been **rocketed 281 miles high** by Russian scientists. Prof. Anatoly Blagonravov, a member of the USSR Academy of Sciences, said that their upper atmosphere flight had had **no ill effects on the dogs,** and

(Continued on page 20)

DISTANCE!

A Lockheed airplane set a new world's non-stop distance record, October 1, 1946: 11,236 miles, from Australia to Ohio. This record has remained unbeaten for 12 years!

LOCKHEED means leadership

reported that the gravity load had not exceeded their limit of endurance.

A chemical so flammable it will ignite asbestos, leather, and even water on contact, has been harnessed for space-flight rocket propulsion. The chemical is **elemental liquid fluorine,** the most powerful known oxidizing agent, which will combine with water to produce a **combustion temperature of 5,000 degrees** and can be combined with existing fuels to produce propellant combinations capable of increasing rocket engine outputs from twenty-two to forty percent.

Honored with the USAF Cheney Award for 1957 was Lt. Robert M. Kerr, cited for saving the life of a stricken T-33 pilot, who became ill in flight. Kerr, not a rated pilot, took over controls, landed the craft safely. Beaming as husband receives award from Chief of Staff White, Mrs. Kerr.

Bell Aircraft Corporation announced on August 26 that its engineers had "achieved the **last major breakthrough in chemical rockets.**" With the existing ballistic missiles and space vehicles now on the drawing board, Bell's rocket division is said to achieve **payload increases up to seventy percent.** This should allow a **great reduction in size and weight of rocket-powered missiles** without sacrificing performance. Propellant combinations now in use, such as liquid oxygen and kerosene, yield a sea-level specific impulse of about **246 pounds of thrust for one second** for each pound of propellant consumed; with liquid fluorine as the oxidizer thrust can be **increased to from 300 to 345 pounds.**

As part of the current **Department of Defense reorganization,** the **Air Force Security Review Branch** has been abolished, and its functions returned to the **Office of Security Review, Assistant Secretary of Defense (Public Affairs).** Contractors whose releases must be cleared by the Department of Defense should submit them to this DOD office.

The **National Advisory Committee for Aeronautics,** soon to become absorbed by **the new NASA,** presented its **Distinguished Service Medal** to its first employee, **Dr. John Francis Victory,** on August 21. Dr. Victory was appointed to the NACA on June 23, 1915, and has been its **Executive Secretary since 1945.** The award citation, read in Washington by Dr. James H. Doolittle, Chairman of the NACA, reads in part: ". . . Dr. Victory has given service of a high order to the NACA and has administered responsibilities of steadily increasing importance . . . with great honor and integrity, he has been a tireless leader in the promotion of public interest for and support of aviation."

The supersonic **Northrop T-38** jet trainer was rolled out at Northrop Aircraft's Hawthorne, Calif., plant on August 15. Designed to train pilots of the Century series fighters, the T-38 is **forty-three feet long,** has a **wing span of twenty-five feet, three inches,** and a **height of eleven feet, eleven inches,** with a maximum takeoff weight of **10,960 pounds.** Instructor and student are seated **tandem** in individual cockpits, the instructor's ten inches higher and to the rear, with all instruments in front of both pilots. Each cockpit is **air-conditioned, pressurized, and is enclosed by a jettisonable canopy.** Powerplants are two **General Electric J-85** turbojets. The T-38 is being evaluated for use by the **Air Training Command.**

A **ground-based brake** has been successfully applied by Air Defense Command to **prevent high-speed jet aircraft from overshooting runways.** The **All American Engineering Company** has developed a system consisting of a **water-squeezer engine and a runway cable.** The engine includes **two water-filled tubes,** one below ground level on each side of a runway. **Loose fitting pistons** in the tubes are attached to a cable stretching across the runway. In test two **Northrop F-89 Scorpions,** equipped with tail hooks weighing less than seventy-five pounds, have been arrested quickly and smoothly by the cable-arresting gear, which was reset in less than ten minutes for the ADC tests.

Seven hundred of the 5,000 members of the **National Flying Farmers Association** met in New York on August 11-14 for their **thirteenth annual convention.** The association has chapters in thirty-seven states and three Canadian provinces, with members who own tracts of from five acres to more than 340,000 acres of wheat and cattle land. One farmer who tries to keep his light plane in the barn along with the tractor says he has trouble with his young son, who borrows it to visit a girl seven miles away.

Here's the **1958 Air Academy football schedule:**

Date	Opponent	Site
Sept. 26	Detroit	Detroit
Oct. 4	Iowa	Iowa City
Oct. 11	Colorado State	Denver
Oct. 18	Stanford	Stanford
Oct. 25	Utah	Denver
Nov. 1	Oklahoma State	Stillwater
Nov. 8	Denver	Denver
Nov. 15	Wyoming	Colorado Springs
Nov. 22	New Mexico	Albuquerque
Nov. 29	Colorado	Boulder

STAFF CHANGES . . . Brig. Gen. Kenneth O. Sanborn has been relieved from duty as Comdr, 3520th Combat Crew Training Wg (Medium Bombardment), ATC, to become Comdr, 4347th Combat Crew Training Wg (Medium Bombardment), still at McConnell AFB, Kan. . . . **Brig. Gen. James C. McGehee,** formerly Comdr, 3595th Combat Crew Training Wg (Fighter), ATC, Nellis AFB, has become Comdr, 4520th Combat Crew Training Wg (Fighter), TAC, also at Nellis. . . . **Brig. Gen. Travis M. Hetherington,** formerly Comdr, 823d AD, SAC, Homestead AFB, Fla., has been reassigned as Chief, USAF Air Section, MAAG, Japan. . . . **RETIRED: Maj. Gen. Kingston E. Tibbetts, Brig. Gen. Edward H. Porter, Brig. Gen. Richard D. Wentworth, Brig. Gen. Ira D. Snyder, Maj. Gen. Harry G. Armstrong.**—END

ALTITUDE!

A Lockheed airplane set a new world's altitude record, May 7, 1958: 91,249 feet...more than two miles higher than the previous altitude record!

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VIEWS & COMMENTS

How Good Is Soviet Science?

The study of scientific approaches—particularly those of the Soviets—is becoming almost a science in itself. How the Russians seem to be speeding ahead is a question of vital interest to Americans, especially American scientists. James W. Useller of the NACA suggests some interesting answers to the problem in his article "Soviet Science," in the September-October issue of Ordnance, *from which we quote:*

IT APPEARS to be the policy of Soviet educators to foster the "task-force" approach. That is, they will train and organize a group of scientists to study a particular problem, such as jet engine technology. This tends to give a spasmodic or scattered appearance to some of the Soviet research. It emphasizes immediate application to short-range aims—to the possible detriment of fundamental long-range research.

Some Western scientists have suggested that the Soviet educational system has produced a situation under which the Russian scientists can exploit the research findings of the West as long as the Western technicians point out the significant problems. The Soviets, it is claimed, will be able to solve these problems as rapidly and as effectively as Western groups, but the ability of their research groups to uncover and formulate new problems is questioned.

The "task-force" approach leads to the conclusion that although Soviet science can make spectacular gains in particular areas, it is not founded on the broad base of knowledge and understanding needed to sustain a healthy program of technical advancement. . . .

It is nearly impossible to evaluate the quality of [the] vast number of Soviet scientists and professionals. The Soviets probably have as fair a number of first-class scientists per capita as any other civilized country, but the research ranks are judged to be filled by a large number of people of indifferent quality. . . .

Although the political leaders in Russia have recognized that great harm can be done to scientific progress when political control becomes too rigid, they have not completely relaxed their control over the scientists. They maintain that since science is an integral part of the Communist plan, the scientific community also must conform to the basic principles of Communism. . . .

[Yet] despite continuous campaigns to recruit professional personnel into the Communist party, less than one-third of the professional personnel in the Soviet Union are party members. Most Russian scientific personnel appear to be indifferent to politics.

It may be expected that as long as the government of the Soviet Union provides her scientists with good foundations in learning, adequate facilities for operation, and the numerous personal advantages offered today, these scientists will serve their nation well.

Let the Public Know

MAJ. GEN. John Medaris, the Army's ballistic missile chief, is a brilliant and impressive officer—and one of the key figures in this nation's space race with Russia—but we can't agree with him on the need for secrecy in the Army's forthcoming moon probes.

"Wait until there's something to boast about," the General says.

Now our feelings admittedly may not be objective in view of the newspaperman's inherent antipathy for secrecy in any governmental undertaking except projects genuinely involving national defense. And even national defense is too frequently used as a cloak for political censorship.

In general the Army's announced secrecy on the moon probes is based on two contentions: (1) It's better for the country—and the Army—if no announcement is made before launching, and (2) it's better for the scientific-engineering-technical crews involved.

As far as the nation is concerned, we'll acknowledge that the backlash of the Vanguard failure was a stunning thing, but since then the citizens of this country have accepted our space efforts in the proper perspective.

They understand the enormity of the task and the chances of failure before success is achieved, and they certainly think no less of the service that tries and fails. They like a fighter and they'll root for success in the next round.

By cutting the public in on the shot plans and generalities of the project, a military service thereby makes John Citizen a part of the effort. General Medaris himself says the old difference between the military and the citizenry is long gone. The two are now one team, interdependent. . . .

Is the Army afraid the citizens of this country can't take it or that momentary failure will make us look ridiculous in the eyes of the world? Or is the Army itself worried about losing face? . . .

With public understanding—and participation—the military cannot fail to win respect, encouragement, and backing everywhere, win, lose, or draw.

—Excerpted from the "Skyways" column in the Los Angeles Times, August 31, by Marvin Miles, Space and Aviation editor of that newspaper.

(Continued on page 24)

SPEED!

A Lockheed airplane set a new world's speed record, May 16, 1958: 1,404 miles-per-hour...196 miles-per-hour faster than the previous record!

LOCKHEED means leadership

Men and Missiles

AS WE learn more about missiles and prove them out as effective, dependable weapons, they will replace a portion of our piloted force. This I feel sure will appeal to the imagination of those men who are training hard and standing by right now to conduct a bomber attack if called upon to do so. Most of the aircraft commanders in the Strategic Air Command have had the experience of attacking heavily defended targets before. They didn't like it then, and I doubt very much if they would like it again. I am sure [many veterans] have vivid recollections of exactly what I'm talking about.

The point is, however, that we must continue to maintain a force that we know can do the job. There is, for example, a certain and constant inflexibility in intercontinental ballistic missile operations. Inflexibility is inherent in the requirement for precise geographical relationships between a missile's launch site and the accuracy of target locations. Inflexibility also exists in the inability to recall a ballistic missile once it is launched, in the inability to divert the missile from one target to another while in flight and in its known trajectory, which eases the defense problem.

When target values or defensive measures call for a change in strategy or tactics—as they frequently do in war—the attack must be realigned. For this reason, missiles must be complemented by other weapons with a greater degree of flexibility. That other weapon will be a manned weapon system.

—From an address by Air Force Vice Chief of Staff, Gen. Curtis E. LeMay, to the recent annual national convention of AMVETS, held at St. Louis, Mo.

Manifest Destiny

NO matter how great the fears and indifference with which many in our society view the exploration of space, small but resolute teams of scientists and adventurers await anxiously the opportunity to man earth satellites as well as lunar and space-probe vehicles. This achievement, though formidable, is now within reach. It would seem that space travel is this generation's manifest destiny. . . .

The actual schedule of spaceflight achievements will of course be adjusted as data are obtained on present projects and as the exigencies of military support demand. Notwithstanding these factors, which usually tend to be somewhat fluid, it now appears that interplanetary travel will quite likely be attained during the period 1980-2000. Based on the rate of progress of astronautics that has prevailed, man's skill in harnessing the natural forces required to cross the scientific frontier of space travel will soon be demonstrated.

—Ross Fleisig, President of the American Astronautic Society, from his article, "Space Travel—Scientific Frontier," Sperryscope, *Second Quarter, 1958.*

Space for Peace

Henry Cabot Lodge, US Ambassador to the United Nations, announced at the recent convention of the American Legion, this nation's intentions to press for a UN "space for peace" program, analogous to the "atoms for peace" program proposed by President Eisenhower a few years ago, to the UN—and accepted.

Only time and events will tell if the Soviets will "buy" the Lodge suggestion. We reprint excerpts of the Lodge address to the Legion meeting:

NO matter what happens, study and exploration of outer space will go on and will take man where no human being has gone before. This will affect every man, woman, and child in the world—and can be to their great benefit.

Our new space knowledge can be applied to medicine, communications, transportation, and many other useful fields.

Progress in this field would be faster, cheaper, and more efficient if all the nations concerned agreed to work together.

Some practical program for international cooperation must be set up.

We will continue our efforts to reach agreements, consistent with our national security, which will increase the prospects that outer space will not be used for military purposes.

But even as we work for such agreements, an important start must be made now in opening this realm for the benefit of all mankind.

The United Nations, therefore, should immediately consider what it can do in this field; what outer space projects for peaceful purposes can be undertaken under United Nations auspices; and what sort of organization the United Nations can build so that the nations will work together in outer space.

The United States wants to see outer space used so as to enrich the lives of all people who live on this planet. We trust that our proposal will get the support of other nations and that, together, we can move forward toward this goal with the courage and vision of our early pioneers.

The Phoney Revolution

THUS, the prescription given me by the leader of the Soviet Union appears to be that events inside the Communist world are none of the West's business, but the non-Communist world must stand aside while his "new system of society" exploits the nationalist awakening and social unrest in the world, and spreads from country to country.

He is wrong. The peoples of the small countries of Eastern Europe did not choose Communism, it was imposed on them by the Red Army at the end of the war.

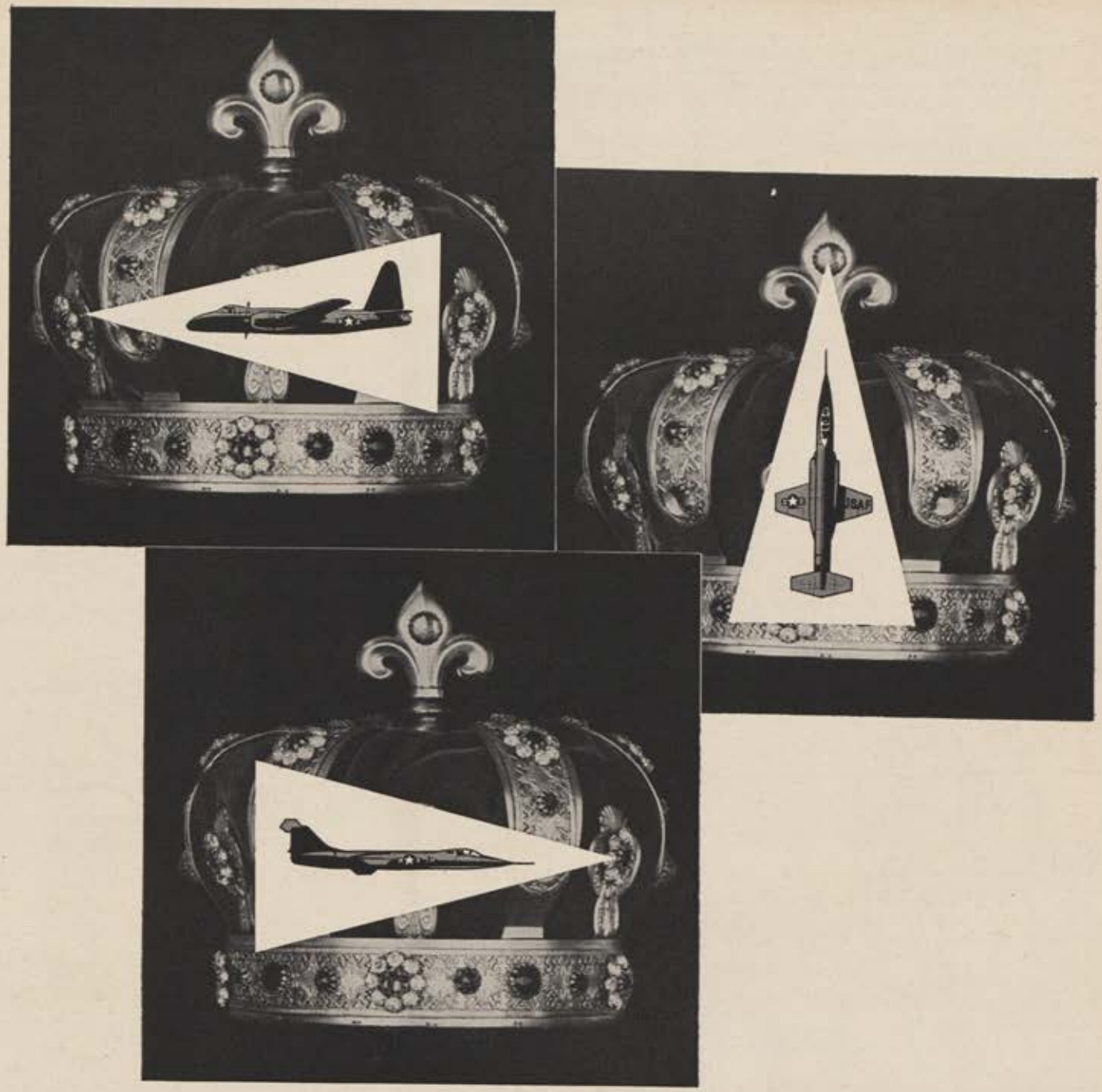
Communism has had its way in Europe only by force and conspiracy, not by choice. The nationalism and the social unrest in so many parts of the world are not a Communist revolution. They are a revolt against foreign domination, feudalism, and misery.

Moreover, the new Russian empire is a jail—you cannot get out once you are in—as Hungary bears witness. Nowadays we live in hope that the peoples of the Middle East may not have to learn that lesson the hard way.

And I might have added that social reform was not a Soviet monopoly; that while they had evidently been so busy trying to make their system work they had overlooked the vast changes in Western society—the redistribution of wealth, growth of industrial democracy, and new concepts of social responsibility.

But I have a hunch they do not want to see what has happened in the West, which makes so much of their Marxist-Leninist bible obsolete and idiotic.

—From Adlai Stevenson's report on his conversations with Nikita Khrushchev during the former presidential candidate's recent visit to the Soviet Union; distributed by the North American Newspaper Alliance, and reprinted with permission.—END



Only once in modern aviation history have *all three* major world records–for DISTANCE, ALTITUDE and SPEED –been held by the planes of *one* company. Lockheed achieved this triple triumph in 1958.

LOCKHEED means leadership

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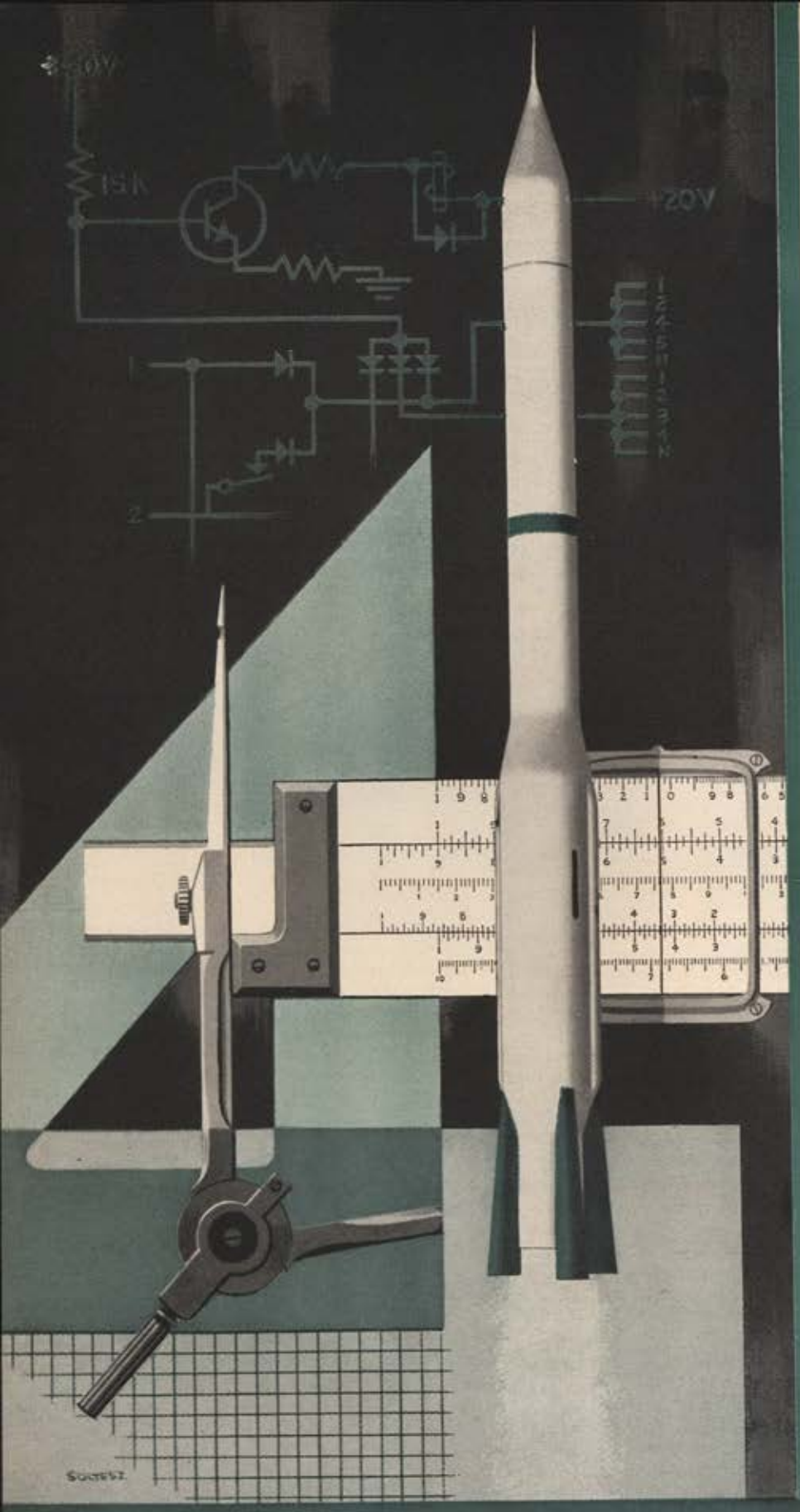

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Only the most highly developed and technically proficient industrial organization can keep apace with America's swiftly changing defense needs. Crosley is such an organization—efficient, experienced, esteemed.

Crosley creative systems management insures speed and discipline during every phase of every project—no matter how complex.

Its extensive design and manufacturing facilities include advanced techniques in stainless-steel contour honeycombing, metal bonding, and chemical milling.

This combination of creativity and technical know-how has already proved itself in many defense projects: in Crosley's MD-9 fire control system, in its *Falcon* air-to-air missile components, in its research and development of the *Volscan* air traffic control system, in fuzing mortars, shells and missiles.

Avco-Crosley Missile Capabilities

Complete facilities for research, development, and engineering design of: *nose cones, air frames, electronics control systems, telemetering, automatic test and support equipment, ground handling equipment and logistics.* Production and manufacture of complete missile weapons.

For further information, write to: Vice President, Defense Products Marketing, Crosley Division, Avco Manufacturing Corporation, Cincinnati 25, Ohio.

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AIRPOWER in the news

WASHINGTON, D. C.

■ Unless our latest experiment with brinkmanship in the waters around Quemoy and Matsu has forced a change in the program, Congress now is home patching fences and digging votes. The Eighty-fifth wound up its sessions with the *Record* pretty well padded with reasonably honest self-examination. Most of the newspapers had a word of praise for the Eighty-fifth as it left town. Of course there were a few growls, particularly about the meager aid given to the nation's educational programs, but the editorial writers were able to list some achievements. Mercifully, few of them, in recording what progress was made, traced it to Russia's Sputnik and the wave of Defense Department policy reversals that started with the advent of Neil H. McElroy as a member of the cabinet.

It was not so under the Capitol dome. The waning days of the session were busy but not so rushed that some of the distinguished men of the Senate did not take time to consider their performance, and the nation's, in what almost everybody agrees is a time of peril. It followed that the debate would spill over and it did, at the American Legion Convention in Chicago. There Mr. McElroy said there is no "gap" in our defense program where the Reds may have an advantage. He got his cue on this from his boss, who gave it out a few days earlier at the White House. Mr. McElroy was followed on the Legion rostrum by a former citizen of this city, Harry S. Truman. The latter disagreed quite violently with Mr. McElroy and quite understandably thought everything was in pretty good shape until the early days of 1953. Among the cheering Legion members was a past national commander by the name of Louis Johnson. Mr. Johnson is an old friend of Mr. Truman's and also an expert on the Pentagon. He ran it during the cozy pre-Korea days when so much fat was trimmed from the defense establishment that its bones were showing when the North Korean Reds struck. At that time, Mr. Truman and Mr. Johnson were more exercised over the condition of the economy than over the growing Red threat. But that was long ago.

To get back to the dying days of Congress, the argument there was for once on a reasonably high level, high enough to make the Legion debate look pretty shabby. To the Commonwealth of Massachusetts, home of the bean, the cod, Harvard, and the Massachusetts Institute of Technology, goes the distinction of providing the most elevated source of material for the *Congressional Record*. Senator John F. Kennedy, who holds eleven honorary degrees in addition to the one he earned (at Harvard), told the Senate there is a gap coming, and the critical years will be from 1960 to 1964. During those years, he said, "our exercises in brink-of-war diplomacy will be infinitely less successful." And the reason for the gap, according to this persuasive young senator, is that we have put emphasis on economic strength instead of military strength. In this, he is arguing with the George Humphrey School, which may not be as dead as it should be.

A week later, the other gentleman from Massachusetts replied in kind. Senator Leverett Saltonstall, who lists no honorary degrees in his biography but has two he earned (at Harvard), said we're in good shape. He is opposed to complacency but also has a terror of panic. And panic

Senator Saltonstall

Senator Kennedy

is what he saw in the words of people like Senator Kennedy, whom Mr. Saltonstall accuses of "selling America short."

Following the Bay Stater argument, Senator Stuart Symington, the Missouri Democrat who once served as USAF Secretary, took the floor in dispute of Mr. Saltonstall's conclusions. Then one of the most learned men in the upper chamber stepped up. From Democrat J. W. Fulbright of Arkansas came a sound dissertation on the morals of America, a defense of eggheads, and the blunt statement that we have gone along too long with "the prevailing tides of know-nothingism."

The next hitter was Republican Homer Capehart of Indiana. It makes him unhappy to hear senators talk about what is wrong with the United States. And somehow, it was Senator Capehart's remarks which seemed to epitomize the great weaknesses of our government at this time. What he appealed for, frankly, was an end to criticism. As Bill White, long-time Washington observer, wrote recently in *Harper's* Magazine, there is a growing tendency to wrap the facts in a cocoon of peanut butter. Some observers say this can be blamed on the growing paucity of competent politicians, and it can be argued with considerable soundness that the Administration itself doesn't have *any* of them. (One of the exceptions to prove this rule is in the Defense Department, where Wilber Brucker, former governor of Michigan, has been astoundingly successful as Secretary of the Army.)

On the side of achievement, the Eighty-fifth Congress deserves a quick rundown on its sound accomplishments. On most of these matters it acted with extraordinary speed.

● Probably the most important piece of defense legislation was the reorganization plan that bolstered power of the Secretary of Defense and the Joint Chiefs of Staff. (The bill was supported by the Air Force Association, although AFA's policy still endorses a single service as the long-range solution to many administrative problems.) It was passed after hearings and a general debate that constituted a liberal education for Americans who had the interest to follow the Administration bill through both houses.

(Continued on page 29)

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• The fiscal 1959 defense budget provided $39.6 billion, several million more than the Administration asked for. As we go to press there are strong indications that the federal deficit is going to be a lot bigger than anticipated early this year, and for this reason alone there will be some economies made. So far we have no idea where the axe will fall, but it's a lead-pipe cinch that the cuts will bring reverberations when Congress reconvenes. Several USAF weapon projects are in danger.

• For the aircraft and missile industry it was a mixed year on Capitol Hill. Nothing has been done about the stumbling blocks and silly contradictions that exist in the procurement regulations and the renegotiation law. Senator Saltonstall did make a move in the right direction by introducing a bill (S. 4294) that would amend the Armed Services Procurement Act of 1947. His amendments would authorize competitive negotiated contracts, encourage the use of performance specifications, discourage cost-plus contracts, and remove limitations on the use of profit as an incentive. Of particular interest to USAF contractors is the proposed formal acceptance of the weapon system concept in ASPR and the exemption of incentive contracts from renegotiation.

• Congress created the National Aeronautics and Space Administration and created permanent committees to watchdog the program. It also created the Federal Aviation Agency to absorb the Civil Aeronautics Administration, Airways Modernization Board, and the safety functions of the Civil Aeronautics Board. After long and tortured consideration, a new pay schedule was adopted for military personnel.

• There were a number of important hearings, some of which resulted in nonsense, but for the most part the testimony was serious and competent. The Military Air Transport Service got a lot more attention than necessary because the major airlines are mad at it. The Air Force Academy program was libeled a few times by committee members and newspapers. But the sessions on preparedness, headed by Senator Lyndon Johnson, as well as the hearings on space, reorganization, the budget, and military construction were conducted in a statesmanlike and profitable manner.

■ Twenty years ago, when we wrestled with type and language on the rim of a newspaper copy desk, Stuart Chase wrote a book called *The Tyranny of Words*. His basic thesis still remains firmly locked in our memory. Chase was a popular writer on economic subjects and in this volume held forth on the idea that too much of our thinking was crooked because we didn't know what we were talking about. The problem, Chase argued, was one of semantics. Frequently, and he cited innumerable convincing examples, conclusions came out the way they did —wrong—because our mental processes were geared to words more than they were to ideas. And language, as Henry L. Mencken proved in a meticulous lifetime study, is a fluid thing.

The bearing of semantics on the subject of airpower may look somewhat remote, but it isn't. A few years ago this reporter tackled one of the toughest writing assignments in his memory. It was to produce a definitive article on USAF's weapon system concept. Several weeks later, still toiling over a bloody typewriter in a hot hotel room at Dayton, Ohio, he came to the conclusion that the Air Research and Development Command and the Air Materiel Command had a real good idea, but they would have to learn how to talk about it before anyone else would know how good it was. Officers in adjoining rooms frequently were lucky that they didn't have to talk with each other for the simple reason that it would have taken a wise interpreter to make the conversation come out right, with an intelligible directive to some other command or to a manufacturer. That the weapon system concept has survived and been adopted by other military procurement organizations probably is due to the eventual wringing-out that the nouns and verbs and adjectives received in those early days at Wright-Patterson AFB.

Boeing B-52G missile platform—first of a USAF family?

A more current example of loose language in action is the careless lumping together of all kinds of missiles and rockets. This carries the danger of creating in the public mind the general idea that there is a similarity between Falcon and Titan, for example. Or that Matador has something in common with Atlas or Genie. Basically, a rocket is a means of propulsion, and when it is fitted with a warhead it is a missile. But not every missile is a rocket, as the manufacturers of jet engines will attest. Perhaps the most accurate statement is that *some* missiles are propelled by rockets, but so are *some* manned aircraft, such as the X-2 and the X-15.

Another area that can disturb an editor is calling an ICBM unit a "wing." Without doing any research on the roots of wings as applied to a group of operational aircraft, it seems likely that the usage goes back to the simple fact that airplanes fly on wings. *The US Air Force Dictionary* does not explore the origins of this application, but it lists more than twenty-five definitions of wing, ranging all the way from a helicopter rotor blade to the combat unit, as now applied by SAC to its new ICBM units. It is hard to avoid the conclusion that we have been pretty conservative about improving military language.

In case you haven't guessed it, this discussion is intended to provoke some thinking about a current and important problem. Both the Army and the Navy, we submit, are making inroads on USAF's field of professional competence in the missile area. One of the major reasons why they are making a public impression is that they are talking in loud voices about the mobility of their missiles in terms of launching sites. Without discounting the value of missiles that can be shot out of Russia's submarines or off the back of trucks, it must be emphasized that the most mobile of all launching sites is airborne.

This is where we get back to semantics. From the time of the Wright brothers, an airplane has been an airplane. Isn't it about time to refer to USAF's newer systems as *manned airborne missile launchers*?

Gen. Curtis E. LeMay, Vice Chief of Staff, has pointed out that the idea of attacking deep within enemy territory

(Continued on following page)

from a safe distance has always appealed to the military imagination. Probably the most substantial step in this direction was taken this summer with the rollout of the first Boeing B-52G, described as a *missile launching platform*. The aircraft has extended range and will be equipped with the North American GAM-77 Hound Dog missile, described in the press releases as boasting a range of "hundreds of miles."

For the future, the military planners have already talked about a 1,500-mile intermediate-range ballistic missile that can be launched from a Mach 3 platform powered by chemical or nuclear fuel. General LeMay suggests the possibility of constant combat control and moves beyond the B-52G to the North American B-70 and Dyna-Soar orbital bomber as the platforms of tomorrow.

But none of these systems should be referred to as *manned aircraft*. They are missile-launching platforms with the most reliable and lightest weight guidance system we have—man.

■ The text for this month's lesson is taken from the Gospel according to St. Luke, Chapter 15.

Put in more crass words by the *Washington Post*, opposition to the President's Pentagon reorganization bill "pays off more than wholehearted support." The paper had reference to an exchange of correspondence between John J. Bergen, president of the Navy League of the United States, and the White House.

The League announced with some pride that Admiral Bergen had written to the President and assured him that the Navy League will support him in carrying out terms of the reorganization bill. Promptly, there was a polite reply from President Eisenhower lauding the League's "largeness of purpose and responsible citizenship." The White House letter was published in the League's magazine with a cover blurb calling it a Presidential "commendation."

The *Post* then pointed out that neither the Air Force Association nor the Association of the United States Army, which supported reorganization from the beginning and differed sharply with the Navy League's nationwide effort to scuttle the bill, had released any such letter.

So far as AFA is concerned, the facts are easy to report. Our files show that AFA President Peter J. Schenk wrote to Mr. Eisenhower on May 6, three months before the Navy League achieved largeness of purpose, pledging AFA's wholehearted support of the legislation. There was no acknowledgement from the White House.

Rejoice with us; we have found the sheep that was lost.

■ Under the Defense Department reorganization plan, which became law on August 6, there will be eight unified or specified commands. US Air Force officers will head four of them; three will be commanded by Navy admirals and one by the Army. The services which head the commands at the outset can be shifted if the Secretary of Defense finds a good reason, but there is no plan to do so or to rotate the jobs among the services. Here is the initial lineup, with full transition to the new setup scheduled by January 1:

- US European Command—Gen. Lauris Norstad, USAF, Paris, France.
- Caribbean Command—Lt. Gen. Ridgely Gaither, USA, Quarry Heights, C.Z.
- Atlantic Command—Admiral Jerauld Wright, USN, Norfolk, Va.
- Pacific Command—Admiral Harry D. Felt, USN, Pearl Harbor, T.H.
- Eastern Atlantic and Mediterranean Command—Admiral James L. Holloway, USN, London, England.
- Continental Air Defense Command—Gen. Earle E. Partridge, USAF, Ent AFB, Colo.
- Strategic Air Command—Gen. Thomas S. Power, USAF, Offutt AFB, Omaha, Neb.
- Alaska Command—Lt. Gen. Frank A. Armstrong, Jr., USAF, Elmendorf AFB, Alaska.

SAC and the naval headquarters in London are specified commands. The other six are unified, containing forces from other branches of the military. Command is from the President through the Secretary of Defense, staffed by the Joint Chiefs of Staff. Forces are assigned to the unified and specified commands by the Secretary. Logistic support remains the responsibility of the Army, Navy, and Air Force. At the same time, requirements are passed upon by the JCS, but the Secretary will direct the support after it is approved.

The JCS organization, which will be doubled in size, will have a "J-staff" system covering six areas of activity. There will be directorates for personnel, intelligence, operations, logistics, plans and policy, and communications-electronics. On top of this, JCS will have a military assistance directorate, a joint programs office, and a joint advanced study group. Director of the Joint Staff is Lt. Gen. Oliver S. Picher, USAF. In general, the six directorates will be headed by men with two-star rank.

Only remaining major appointment to be made under the reorganization is that of a new Director of Research and Engineering. Filling this seat may be the most important task the Administration has cut out for itself under the reorganization plan.

■ Not long before Congress went home, the Senate Appropriations Committee expressed the opinion that the Air Force is the logical agency in the Defense Department to carry out the space program. In fact, the committee expressed the determination to spur USAF into more aggressive activity in this area. It now develops that the Advanced Research Projects Agency, the Pentagon's "upstream" weapons developer, is casting covetous eyes in the direction of USAF's Dyna-Soar orbital-bomber project. It is not clear what would be gained by shifting the contracts, now with the Martin Company and the Boeing Airplane Company, away from Air Force control. Certainly the matter is one that the Appropriations Committee will find suitable for study when it gets back on the job.

Another subject that will interest the committee staff is the Army space program. For the record, its files should contain copies of the October issue of *Army Information Digest*, an official Army publication, that is devoted entirely to "The Army in the Space Age." It has appeared while Pentagon bulletin boards are plastered with arty posters proclaiming that Army missilemen are the true "pioneers of the space age." And on the Pentagon concourse last month there was an exhibit that included a piece of a Jupiter missile, labeled "Stairway to Outer Space."

Congress is concerned about full utilization of Air Force talents and long experience in upper atmosphere research. It is equally concerned about Army failure to direct its efforts more completely toward providing "the finest force in the world capable of victorious sustained *ground* combat" (*see page 59*).

At the same time it is evident that USAF, deep in an established program, is plugging along with something like a gag in its mouth. We recall a quote from a forgotten source:

He trespasses against his duty who sleeps upon his watch, as well as he that goes over to the enemy.

—CLAUDE WITZE

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FMC has designed and produced more military-standardized tracked vehicles than any other company in America. So, when Northrop Aircraft, Inc., subcontractor to Raytheon Manufacturing Company on the Army's new HAWK weapon system, needed a rugged mobile transporter-erector, they came to FMC. The vehicle had to be capable of operating in rough terrain, powerful enough to transport three HAWK missiles, and light enough to be air lifted by helicopter. Northrop and FMC engineers worked out the design concept, FMC engineered and built the vehicle portion of the unit; and today this speedy carrier is in production at FMC as part of the Army's HAWK weapon system.

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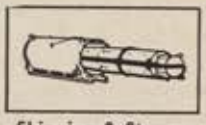

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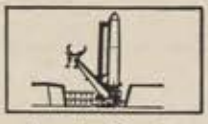
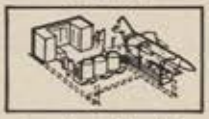


Launcher-Erectors & Power Units



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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 document the information beyond assurance that the sources are trustworthy.

Information from Czechoslovakia confirms that the MIG-15 is the first jet fighter to be operated successfully from grass strips. The countries behind the Iron Curtain, short of cement and reinforcing steel, do not have enough hard-surfaced runways for jet fighters. Therefore, they have to use sod fields, and build aircraft that can operate from them. This the MIG-15, in production in Czechoslovakia until about a year ago, can do.

Grass strips up to about 8,000 feet long are used. The aircraft usually are airborne after a run of 4,000 to 4,600 feet.

MIG-17s can also be operated from grass strips, though they require a little longer run.

° ° °

The TU-114D, newest version of this large turboprop-powered transport built under the direction of Soviet designer Andrei Tupolev, has flown about 5,600 miles nonstop, or about a thousand miles more than a nonstop flight from Moscow to New York.

The bomber on which the design of the TU-114D is based is the Bear, and recent landings of the TU-114D at Vladivostok make it evident that the big bomber could be based at this important port city in the Soviet Far East.

Vladivostok is less than 5,000 miles from Seattle.

° ° °

It is significant that a portion of the recent transcontinental flights of the Russian TU-114Ds were made across the Arctic regions and specific points of contact (though not for landing) were Amderma and Dikson in the Far North, along the Arctic Ocean. It is generally believed that the Soviets have large air bases at these sites.

° ° °

How many transport aircraft do the Russians have for airborne troops? Latest figures indicate the number is something like 5,000 aircraft, mostly twin-engine types of limited range. Most of Aeroflot's once-proud fleet of IL-12s has gone to the Red Army airborne forces, and the IL-14s which Aeroflot now uses are on call by the airborne forces. In addition, the AN-10 four-engine turboprop transport is about to go into production for the military, and there is some reason to believe that the TU-114s will first go into service as military transports rather than on international routes as passenger carriers.

° ° °

Two years ago, in 1956, the Russians showed a new twin-engine Russian transport, the AN-4, powered by two turboprop engines. It was credited to designer Antonov, who since has come up with a four-engine craft based on turboprop engines, the AN-10.

Since then nothing has been heard of the twin-engine variety, and it is reasonable to assume that the AN-4 has been abandoned.

° ° °

The Russians have built rocket launching sites on Franz Joseph Land, far above the Arctic Circle. They say the sites were built in connection with work to be done during the International Geophysical Year, and that twenty-five-mile-high-altitude launchings will be made. Franz Joseph Land is about a thousand miles farther from New York than Thule is from Moscow.

° ° °

The Russians are launching four ICBMs per month in their current testing series. Some of them are being launched from a site east of Rostov and south of Stalingrad.

° ° °

The Russians have hinted that they recently launched a new large rocket with a payload of over 3,300 pounds and that it reached an altitude of 340 miles.

° ° °

Recently elected to the choice position of corresponding member of the all-important Soviet Academy of Sciences, is Semyon A. Lavochkin, Soviet airframe designer who has not been heard from in recent years. He is said to continue his work in airframe design.

° ° °

Russians now are landing four-engine aircraft on the Arctic ice. While this fact has long been suspected, Soviet photographs released to the West never have shown anything larger than an LI-2 (similar to the DC-3) or an IL-12 (a small-size imitation of the Convair 240).

This year, in reporting how they are supplying some of their permanent ice stations in the Arctic, the Russians say they used "four heavy, four-engined aircraft, five IL-12s and IL-14s, seven LI-2s, and one MI-4 helicopter" to bring in supplies for North Pole 6 and 7, two stations they have established on the ice.

"For the first time this year," the Russians declare, "aircraft and ships will have radiophoto and television equipment, on an experimental basis, to facilitate bringing vessels through the ice pack. In addition, the *polar air force* will soon receive powerful IL-18 and AN-10 turboprop aircraft."

° ° °

The annual Soviet air show, held in July of this year, was something of a bust. The display emphasized sports flying and transport types more than military aircraft, and there were no new military aircraft displayed as in past years.

There are two reasons for this. First, the Soviets didn't want to put on a military display at the very time they were making such loud noises about bringing peace to the Middle East. And secondly, it also may indicate that the Soviets haven't done much in the way of developing new military aircraft since 1955 or 1956, when they first began to design and produce their new jet and turboprop transports.

From what is known now of their missile program, it becomes evident that they were far enough along in missile development at that time to shift away from aircraft toward the new weapon.

° ° °

Four Russian nuclear weapons depots in Czechoslovakia are: near Karlsbad, south of Reichenburg, northeast of Olmutz, and finally, one in the province of Moravia. —END

Vought Vocabulary

ac′cu·ra·cy: *guided all the way, this long-range missile pinpoints distant, hard-to-hit targets*

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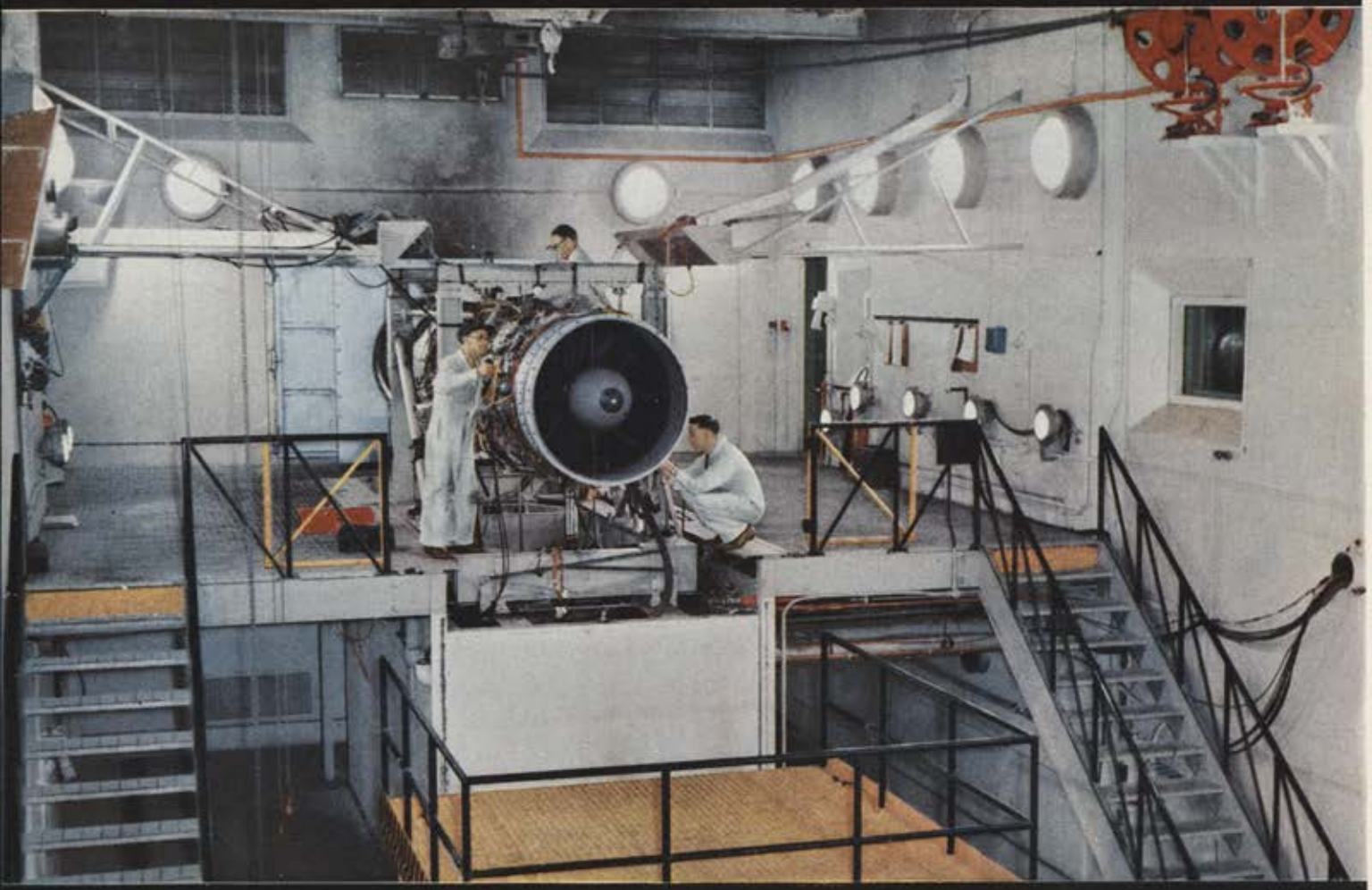

Rehearsal for Mach 3 at 100,000 feet

IROQUOIS development engines have completed over 5,000 hours of bench running in these test cells at Malton and in flight tests.

Over 100 hours were accumulated during a recent series of test runs at the NACA Lewis Flight Propulsion laboratory, Cleveland, Ohio.

Further tests will be conducted in Orenda's new high altitude facility to investigate IROQUOIS performance over the widest range of speed and altitude.

IROQUOIS test results at NACA Lewis Flight Propulsion laboratory, Cleveland, U.S.A.

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SHOOTING THE BREEZE

WITH THE EDITORS OF AIR FORCE MAGAZINE

Recent discussion about the unmanageable number of assistant secretaries that have been piled on top of the Pentagon heirarchy in the past few years recall a number of old jokes about vice presidents. One of our favorites, which kicked around New York city rooms about twenty-five years ago, concerns a widespread report that a certain biscuit company had on its roster of officers a Vice President in Charge of Fig Newtons. An enterprising reporter on an afternoon paper decided this was worth a check. He picked up the telephone and called the company's main offices in Long Island City.

When the switchboard operator answered, our friend said boldly: "I'd like to speak to the Vice President in Charge of Fig Newtons." There was only a brief pause. Then:

"Did you wish to speak to the Vice President in Charge of the Manufacture of Fig Newtons or the Vice President in Charge of the Distribution of Fig Newtons?"

☆

In the best traditions of condescension, the Russian delegation to the recent International Astronautical Federation Congress at Amsterdam indicated that next year's meeting could not be held in Moscow because "there have been too many congresses there lately." The West will get its chance in 1959, with the meeting scheduled for London. For the first time, the Russians injected politics into the meeting by challenging a membership application from a Nationalist Chinese astronautical group. The Russians were annoyed by a Congress rejection of the application of a Bulgarian delegation, which had come up because the number of Bulgarian applicants was too few, according to IAF ground rules.

☆

Author Mike Gladych, whose warmly written, graphic articles have often graced these pages, has taken the long trek from Cape Cod, where he's been living and writing, to the state of Washington, where he has assumed a post with Boeing's Pilotless Aircraft Division. See page 114 for an engrossing account of some of Mike's World War II experiences.

☆

Newspaper reports have it that Brig. Gen. Merian Cooper, USAF (Ret.), who coproduced "This Is Cinerama," is preparing to bring out a film, "Chennault of China," chronicling the exploits of the famed Flying Tigers and Fourteenth Air Force leader. The general-producer is reported also to be planning—with former AFA president Gen. George C. Kenney, USAF (Ret.)—a filmed television series on the new Air Force Academy.

☆

They may be reserved, but once they've been indoctrinated to the charms of charcoal-broiled steaks and rock-and-roll, the British are no squares. USAF airmen at Weatherfield, England, Air Base report that in the last three years more than 250,000 Britons have enjoyed airmen-conducted American-style barbecues at community fetes.

☆

There is a strange fascination about people who rebel against the ordinary social and religious conventions surrounding death. We recall, for example, the New England editor who was laid to rest in the green hills of his native state. While a group of reporters and printers stood with bared heads, his body was lowered into the grave. The foreman of the composing room read aloud the Bill of Rights, without benefit of clergy.

Then Henry L. Mencken wrote an epitaph for himself. In it, he told his mourners, and there were many of them, that they could do the most for his soul by forgiving sinners and winking at homely girls.

Now the Air Force has the story of Maggie McGrew,

(Continued on following page)

First reaction of delightful Dallasite Dorothy Watkins to AFA's "Miss Space" contest (winner must be willing to take trip into space) was: "But I haven't a thing to wear." Now equipped with stylish pressure suit and being indoctrinated by Texas Air National Guard Capt. Bob Weller, she's rarin' to go. Dot was first contestant to enter the "Miss Space" competition, which was open to Texas lovelies—aged from 18 to 25.

Lighter than Air

Our Squadron Maintenance Officer had been crusading for more concise entries on the Aircraft Form 1. His slogan was "Be Clear, Brief, and to the Point." But the day came when even the Maintenance Officer thought one pilot and crew chief had overdone it. The pilot wrote up a discrepancy as, "Evidence of oil leak on left cowling. . . ." The crew chief wrote, in the column showing what corrective action was taken, "Evidence removed."

1st Lt. John H. Frisby
347th Troop Carrier Squadron
Pope AFB, N.C.

This chuckle-and-snort corner is devoted to true, unpublished anecdotes about Air Force life. Send us yours. We'll pay $5 for each one published. All we use become the property of AIR FORCE Magazine. We can't acknowledge receipt of anecdotes and none can be returned.

as related by Milton Bracker of the New York *Times*. Maggie was a physicist and a missile buff. An expert on instrumentation, she worked for the Radio Corporation of America at Patrick AFB, Fla., and was dedicated to her job. She died of cancer early in 1956. Her final request was carried out a few days after her funeral. The ashes recovered from her cremation were put in a Bomarc interceptor missile, fired 40,000 feet over the sea. When the missile exploded, Maggie's ashes were scattered over the blue Atlantic.

☆

Some of former Defense Secretary Charles E. Wilson's pronouncements are as enigmatic as ever. Although most of the world, from kids to kings, is more curious than ever about what's on the other side of the moon, the ex-boss of the Department of Defense told a community meeting recently: "Maybe I'm too old and not as curious as I was. But I think the other side of the moon is much like this side."

At the same meeting, Mr. Wilson suggested that the USS *Nautilus* atomic submarine's feat might not be a good thing, if it were considered as part of an arms race.

He also took exception to critics who are saying we are not spending enough for defense.

"We are spending enough money each year to build 400 bridges of the cost of the new bridge over the Straits of Mackinac," he said.

He misses the point, we respectfully suggest, that spending enough to pay, for—say—401 such bridges could make the difference between death and survival.

"Well, speak up, boy! I'm a busy man!"

☆

In our August issue, in the section "Force in Being—The People," we listed the following statistics: "Air Force chaplains—Protestant Preaching Missions conducted by guest clergymen at AF installations in the US totaled 1,384 with 11,951 attending."

That last figure should have been 101,951.

Personnel of the Air Force Recruiting Service are now wearing the proud new seal of the Service as badges on their uniforms. New badge is worn on the right breast pocket.

We may yet beat the Russians.

The New York *Times* reports that the filter cigarette has finally arrived behind the Iron Curtain.

Name of the new brand: Laika—after the now-famous orbiting dog who gave her all for Soviet space technology.

Samples of the new Soviet smokes were distributed to passengers aboard the French Lines' *Ile de France* by Russian tourists sailing for home after a visit to the States.

One thing the Russians are definitely behind us on is cigarettes. For years they've been smoking long, mostly empty cylinders with small hunks of tobacco at one end.

The new Laika cigarette, packages of which are graced with a drawing of the dog and a rocket coursing through the heavens, are described as much more akin to US smokes. The Russians took back a supply of American popular brands, just to play it safe.

☆

It had to happen.

In Madison Avenue advertising offices, not only do you "see if an idea gets off at Westport" (Connecticut, where many admen live beyond their means), but now you "launch it and see if it gets into orbit."

Oh, perigee!—End

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"OUR new space knowledge can be applied to medicine, communications, transportation and many other useful fields—including even our knowledge of the weather."

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Even as he spoke, American industry and the United States Air Force worked feverishly on the intricate and costly instruments involved in this nation's first attempt to "shoot the moon."

More and more, across the country, new titles out of textbooks are gracing office doors, as industry's new divisions of "astronautics," or "space technology," spring into being.

The vast reaches of outer space, an untapped source of potential wealth and well-being for all mankind, are being translated by progressive management from today's big headlines into tomorrow's big business.

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Of the recent "Space Weapons" issue of AIR FORCE Magazine, General Edwin W. Rawlings, Commander, Air Materiel Command, wrote:

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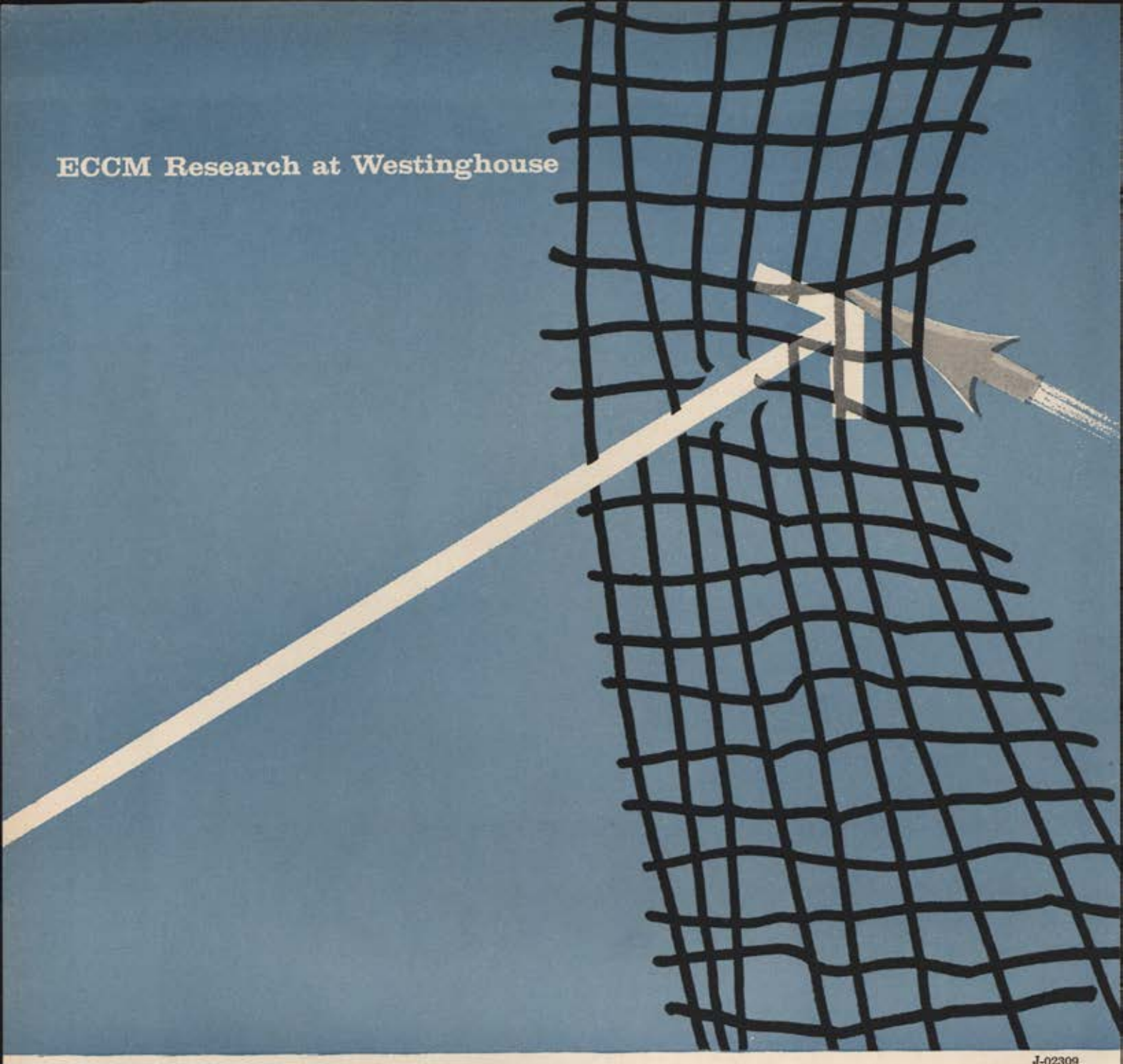

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165 miles northwest of Los Angeles . . . at Vandenberg AFB . . . a new kind of man with a new kind of mission is racing to project the SAC shield into space . . . to add new strength to the deterrent force which has kept the peace of the world for more than a decade. In the new Space Age, Vandenberg is truly the . . .

SPRINGBOARD TO THE STARS

By Ed Mack Miller

THE outthrust jaw of California that juts west from Los Angeles to Point Conception and Point Arguella has a dimple at the point of its chin. And just above this dimple, 165 miles from the City of the Angels, a new breed of man with a new kind of mission is racing to project the shield of the Strategic Air Command into space.

On a lonely, gentle mesa that slopes slowly to the sea (the site of Camp Cooke, where more than a half million GIs learned their combat trade in World War II and Korea), a riot of construction is under way, a "furor without panic," as the Air Force builds its greatest missile base—Vandenberg Air Force Base.

Ringed by the Santa Rita, Casmalia, and Purisima Hills and the Santa Ynez Mountains and lying on a plateau between two flower-filled valleys, Burton Mesa today is crawling with earth-moving monsters that must seem mad indeed to the honey bees and mule deer whose home the area was.

Once this was the heart of the Mission country, where gentle Franciscan friars taught the Chumash Indians how to build with adobe and roof with red tile. Now there is little time for the enjoyment of the manifest beauties of the shell-and-sage scenery. Vandenberg AFB, named for second Air Force Chief of Staff, will become by the end of 1958 perhaps the free world's newest, greatest springboard to the stars.

Its mission is simple: "To develop an initial operational capability for the intercontinental ballistic missile and to train Air Force crews for the ICBM and the IRBM."

At Vandenberg the tempo is *furioso*. The statistics: size, 64,000 acres; capital investment, $75 million; cost of construction, $100 million. What are they building? A vast Air Force base, complete with flying field and Capehart family housing (1,405 units under construction), rehabilitated barracks (converted from open-bay to two-man rooms, with motel refinements), the "furniture" of the spaceport: launch pads, blockhouses, guidance centers, fuel farms, powerplants, LOX (liquid oxygen) plants, and RIM (receipt, inspection, and maintenance) buildings.

Vandenberg will not be a research and development base (like Cape Canaveral), staffed by the scientists who create the missiles, but a training establishment and an operational base, where SAC-ready war teams will be assembled.

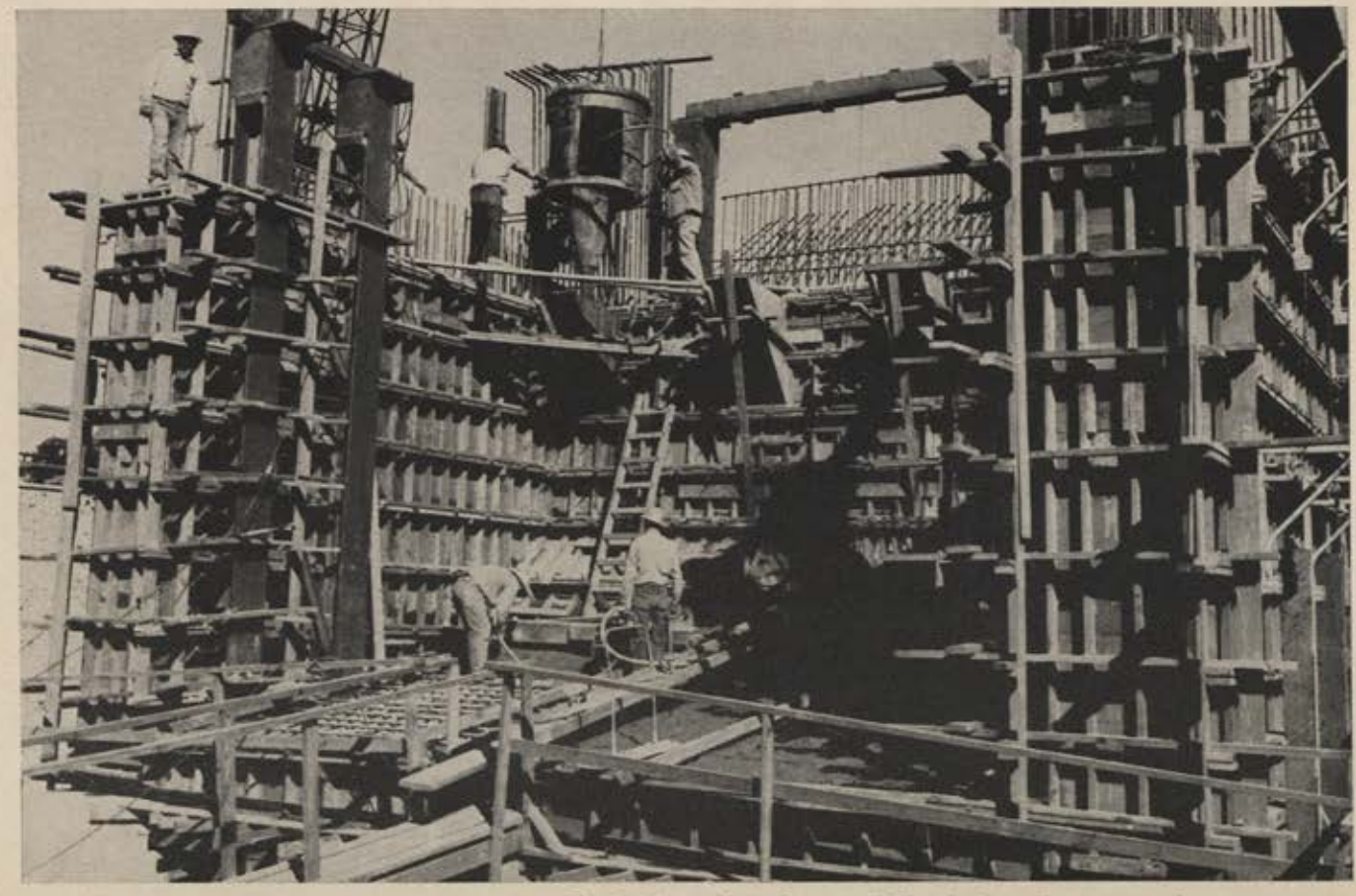
How did SAC get in the missile business? Already possessing the highly trained force and the global facilities of the world's most powerful bomber force, it was designated as the United

(Continued on following page)

Tomorrow's signpost today. This striking marker, designating the headquarters of the US Air Force's 1st Missile Division, now being set up at Vandenberg site, is a symbol of the rapid weaponry development under way for SAC's deterrent force. Strict security is the rule at the space base and applies to everyone.

States' primary long-range offensive missile force on November 29, 1957, inheriting weapons capable of flashing 5,000 miles in scant minutes. With characteristic speed, the next day SAC announced the formation of the 1st Missile Division, incorporating under central control all strategic ballistic missiles.

How many men are at Vandenberg? By the end of August more than 2,000 of the cream of SAC's officers and airmen were hard at work, alongside a contingent of British missilemen in training. By mid-1959, when Vandenberg will be at full strength, there will be more than 6,000 personnel, and other 1st Missile Division sites will be rounding into shape at Cheyenne, Spokane, Denver, and Omaha. The development of Vandenberg is unique in that training of crews is going on concurrently with the development of the "birds" the crews will fire into space. Actually, ATC (the Air Training Command) will handle individual training, and SAC will have the responsibility of crew training (with help, as needed, from the Air Research and Development Com-



Atlas ICBM launch pad construction proceeds at Vandenberg. From here could be fired retaliatory missiles at an enemy.

General Large

Maj. Gen. David Wade's 1st Missile Division holds the same command chain position as a numbered air force—thereby being directly responsible to CINCSAC (Gen. Thomas S. Power). It also has an indirect linkage to SAC Hq. through the organizational person of SAC-Mike (Mike being the airman's phonetic alphabet symbol for M, M standing for missile). SAC-Mike, under command of Brig. Gen. William Large, is the Los Angeles arm of SAC Hq. which acts as liaison between Omaha and Maj. Gen. Bernard A. Schreiver's ARDC Ballistic Missile Division in Los Angeles and SAC field commands—to make sure that R&D plans weapons that SAC can use operationally.

mand's Ballistic Missile Division—BMD).

When will Vandenberg get its first "birds"?

Some are already there. An Atlas was brought in July 1 for use as a training missile and launch-site compatability unit. Six weeks later, the first Thor was delivered. The Atlas' backup ICBM, the Titan, about a year behind the Atlas in development, will be brought in later. The Thor training unit, made up of experienced veterans of three years of Matador operation in Germany, is moving fast, and is expected to meet a tight deadline (before the end of 1958), when the British IRBM units, officers of which are now training at Vandenberg, must be in place in the United Kingdom.

Soon will come the first sky shot, and the Pacific calm will echo with increasing volleys into space. Several Thor pads with blockhouses are under construction. Six Atlas pads are set in two triangles with a blockhouse in the center of each triangle. The launching pads follow the line of the beach, each having an unobstructed lane of flight that will allow the booster units to fall into the ocean during training launches.

Each launch pad is, of course, a huge structure, built to contain terrific blast charges (with an equal and opposite reaction aimed at the bowels of the launch matrix). Each launcher contains 3,800 cubic yards of concrete and from 450,000 to 760,000 pounds of steel, depending on the missile. Each pad has a fabricated flame deflector ("flame bucket") weighing forty-eight tons.

But what about the firing range over the water? Will there be danger to surface vessels and air transports?

Training will consist of both wet and dry static tests, as well as of actual launches. The latter will be made out over the new Pacific Missile Range. The Navy's Point Arguella Missile Base, adjacent to Vandenberg on the south border, will share the range, with the Navy having responsibility for scoring the firings and making sure, before the launchings, that the sea and air lanes are clear. ("Chances of an accident," even if the firings were uncontrolled, one officer commented, "are a billion to one, because the missiles are fired straight up at tremendous speeds—and descend at comparable velocities nearly straight down.")

While the Thor complexes will only be training sites (the Thor, whose range is about 1,500 miles, will be deployed overseas), Atlas sites at Vandenberg will be able to draw an accurate bead on a wide belt of the northern half of the USSR.

With the completion of other continental US ICBM bases, it will be possible to cover all of Red Russia's major targets with Atlas fixed-base missiles. The Bomarc missile will be used for defense of Vandenberg AFB itself.

Boss of SAC's missile effort is lanky, slow-spoken Maj. Gen. David Wade, whose easy-going manner can be completely misleading. (A product of the LeMay school, he was Chief of Staff at SAC Headquarters before coming to Vandenberg to take over the 1st Missile Division. "Likes to talk, has a good sense of humor, but he's a real driver," his men say of him.) Actual training of missilemen will be conducted by Vandenberg's 704th Strategic Missile Wing, under the command of a veteran pilot, Col. William S. Rader, who is credited with having urged SAC leaders to investigate the missile business years before the future of the ICBM became obvious.

The 704th has two training squadrons (the 392d, IRBM-Thor, commanded by Col. Robert W. Christy; and the 394th, ICBM-Atlas, by Col. Allen W. Stephens) at Vandenberg, as well as the 704th Instrumentation Squadron (commanded by Lt. Col. Lucius A. Perry, Jr.) and the 576th Strategic Missile Squadron (commanded by Col. John J. Easton, the latter programmed to be the first operational, long-range missile unit in the Air Force. The 704th also has two Jupiter IRBM squadrons being trained by the Army at Redstone Arsenal.

Problems? Plenty! It's a new base, struggling to accomplish its mission of getting into space—when it doesn't even have its homes and roads in. Of its normal complement of officers and top-grade airmen, only a handful are in place, the others being away at school (Atlas people at Convair in San Diego; Thor people at Douglas' Santa Monica plant; engine men at North American's Rocketdyne Division at Canoga Park, Calif.; armament specialists at General Electric in Philadelphia; guidance control men at General Motors' AC Spark Plug Division in Milwaukee; launch control directors at Cape Canaveral).

There are problems galore, with no fund of experience to call on, no textbooks to explore for guidance. But, if Vandenberg's problems are manifold, no one at the California base thinks they're insoluble.

First, of course, are the operational problems. How many launching pads? Where? Which direction do we fire? What effect will the proximity of the San Andreas Fault (the crack that jolted San Francisco) have on installations? Could a slight earthquake put Vandenberg out of business? Can protection against quakes be designed? How many troops will it take to service and maintain and fire a Thor? An Atlas? A Titan? A Jupiter? Can large chunks of the missile airframes be flown in from the manufacturers in a Lockheed C-130 Hercules? How long and how strong must the air strip be? How many Thor missiles to a squadron? How many Atlas squadrons to a wing? How soon after the first firing can a launch pad be made ready for a second blastoff?

Just getting operational is a tremendous problem. By mid-summer the personnel buildup exceeded by far the work that could be done with the equipment on hand. This posed a tough problem for Vandenberg commanders. The men being sent in, some of the finest minds in SAC, were too sharp for mockup maneuvers. Yet, being top-notchers, their morale tended to drop like a plump bob if they sat idle. Vandenberg is over the hump

(Continued on following page)

on that problem, but for every one solved, a half dozen take its place.

The dilemma of finding family housing, so familiar in World War II, came up again.

The only two towns nearby are Lompoc (pronounced *Lom-poke*), eight miles southeast, population 6,665; and Santa Maria, twenty miles northeast, population something better than 15,000. Both are lovely, tranquil towns, only now awakening to the realization that the jumping-off place for the planets that has been placed in their backyard will probably make both towns thriving cities in a few short years.

Program (headed up at Vandenberg by General Wade's wife) is functioning at top speed. House trailers are one answer, and Vandenberg has a big camp already operating. The Chief of Staff of the Air Force, Gen. Thomas D. White, has ordered that adequate housing be given the same urgent priority as missile requirements. Vandenberg will get the Air Force's first three- and four-bedroom homes for airmen's families. At this time, everything possible is being done to make living conditions second to none for the missilemen.

From an operational standpoint alone, it is absolutely necessary to

The job could degenerate into just one of waiting . . . waiting, once the missiles themselves become perfected.

But, recognizing the problem is half the battle. There are many techniques that SAC can adopt or adapt from its bomb wings. There will be, of course, simulators for procedural and practice training.

"It won't be like the fire station," one SAC commander said. "There'll be no checkers or cribbage." Instead of interminable waiting periods in the isolated, underground blockhouses, there'll be daily practice alerts (much the same as the bomber crews in Spain are geared to). And SAC will

Vitally needed housing for the missilemen of SAC. Shown is a street of Capeharts, high-priority item for Vandenberg AFB.

Already it is painful to see the pitifully inadequate number of salable and rentable housing units in the two towns. Each day a procession of heavy-laden automobiles with out-of-state licenses slowly canvasses each street, tired faces looking eagerly for a "for rent" or "for sale" sign. It is commonplace now to see families sleeping in their cars. Vandenberg commanders estimate that it will take 1,474 houses for military personnel and 2,058 for civilian technicians—in addition to on-base Capehart homes.

"Naturally a man can't do good work," one officer said, "when he's got his family on his back. But once he's got them bedded down—anywhere—the pressure's off. He's ready to dive in. . . ."

Housing is a rough problem. But some good minds are chipping away at it. New homes are going up fast, each issue of the towns' papers gives front-page news of new subdivisions and the progress of bond issues. SAC's tried-and-true Dependents' Assistance

provide the best in the way of facilities and services for the missile people, for in this business morale is of the utmost concern.

Someone has put it this way: "How does a guy keep his pride polishing a stovepipe?"

That, truly, is one of SAC's big problems now that it is in the "Roman-candle industry." There are many ramifications to the problem, perhaps the biggest being a corollary question: "SAC has always prided itself on readiness. It got that way with its bombers—and stayed that way—through a simulated combat. How can you do the same with missiles?"

True, the two things are tied together. SAC bomber missions are glamorous, grueling, dangerous. But the dedication necessary eliminates the weak sisters and welds the survivors into tough, elite crews, combat ready with an unmatchable *esprit*.

Everyone agrees that boredom could be Vandenberg's (and any other operational missile unit's) top problem.

always be working to reduce, through hard, constant training, the time needed to "launch a bird." At present, it takes hours, even days, for the countdown. At Vandenberg they'll start working toward a fifteen-minute deadline, and when the fifteen-minute goal is accomplished, they'll keep striving to attain even better launch capabilities.

In the good SAC tradition, there will be competitions and trophies. Operational teams stationed at sites where it is not possible to fire will be rotated to Vandenberg twice a year to get in some actual range practice.

The danger element, so necessary to the formation of any elite outfit, is, of course, always present. "These big tin cans aren't loaded with cotton candy," one missileman noted with a grin. "They're wild beasts, and have to be treated accordingly."

Just loading LOX can be a harrowing experience. "Spill a drop on your toe. No toe!"

The glamor element is really not much of a problem. "I tell my friends

I'm working with space vehicles," a Vandenberg colonel told me, "and their eyes get big and round. Sure it's glamorous. Sure I enjoy shakin' them up a bit. It's kind of like when I used to take a cross-country home in 1939. You know, flying's lost a lot since the open-cockpit days. Now here's the same feeling all over again; the excitement and the danger add up to glamor."

Smart SAC knows that glamor pays off in a number of ways. It helps build high morale, and it helps the command keep its top personnel. At present, it is estimated that the turnover of highly trained technicians leaving the service is penalizing the nation to the extent of nearly $2 billion a year. With the kind of training a SAC electronics expert gets, he can easily step across the street and get a job in civilian industry at an increase of several hundred dollars a month.

"But if the man can be imbued with a sense of mission, be proud of the job SAC is doing to protect the free world, and find a happy home," says tall, handsome Col. Bob Christy, the Thor training squadron commander, "he won't go for that extra $200 a month. Even after twenty years he'll want to stay. If he's treated well, he'd rather stick where he knows the people, where his stripes and his experience give him prestige. It isn't worth it to him to walk across the street into a new, cold world just for more money."

There's glamor in the garb these men will wear too. For the launch crews there are white coveralls, tailored just like the finest flying suit, with smart insignia and neatly lettered titles. And the units vie with each other in the painting of the colorful, construction-worker "hard-hats."

But the item into which all of the pride of the corps is distilled is the official missileman badge. Long, slim, and silver, it is worn vertically on the left pocket of the class-A uniform, and is truly spectacular. It's tough to come by, too; the missile people knew that, as a symbol of the profession, it had to have prestige similar to wings—an emblem for the world to see, which shows the wearer had to meet rigid training standards, study hard, and face calculated dangers before he became qualified.

Consequently, certain hard rules were set down: Only people working in direct support of the "big birds" can wear the insignia (i.e., launch and guidance crews, maintenance personnel, commanders); a person must have been on an active crew for at least ninety days and have demonstrated his capability; a board of senior officers must pass on the granting of the rating; orders must be cut before it can be worn.

But even these answers tend to pose new problems: Will a missileman who is not wearing aircrew wings be allowed to command a missile squadron, wing, or division? (Down through the years, Air Force custom and regulation have decreed that only pilots would command. Lately, this has been modified in SAC to allow observers to hold top command jobs.) Will pilots-turned-missilemen be allowed to maintain their aircraft ratings? Will it be fair to continue allowing the pilot to draw flying pay while the missileman working beside him at a launch complex draws none?

The question of command has been answered by a pilot-missileman, Lt. Col. William L. Anderson, who is Deputy Director of Personnel at Ballistic Missile Division, under ARDC. Writing in the *Air University Quarterly Review*, Colonel Anderson states his views: "A number of pilots have been assigned, but the total has been considerably less than expected. This does not mean that only a handful of pilot officers will be used in this program. It is simply that many early requirements for specialized officers were circumstantially filled from nonrated sources. Several command positions were filled from rated groups. Again this has not been by design. It is simply that there are more experienced commanders available from rated sources as a result of past assignment policies."

"In general," Colonel Anderson continues, "the question of whether an officer is rated or not is of little interest in this organization. It is just a case where both rated and nonrated talents find an abundance of opportunity. Any debate over rated qualifications is beside the point."

"It is heartening to realize that the demands of the space age will shortly drown out this minuscule debate," he concludes. "There is as much scope as all of them can handle, and the roles of the nonrated specialist and the pilot are going to become so interdependent, each so indispensable to the other, that grounds for argument will be inconsequential."

The question of pilots (assigned as missilemen) retaining their ratings and collecting flying pay is something that will be a more pertinent problem in five years, senior officers at Vandenberg say. They cite the fact that they are getting some high-class brains who are in the sixteen- to eighteen-year service category. "We need these men, but if their flying pay were taken away, they'd leave." If war comes this year, they say, it would

(Continued on following page)

Two men of the 1st Missile Division receive silver missileman badges from Maj. Gen. David Wade, Commander. Recipients: Col. R. W. Christy, M/Sgt. C. E. Gifford.

be a bomber war. The missiles wouldn't be ready. Consequently, the pilot types would probably be shifted back to their alternate skills, flying or commanding operational aircraft units—"driving or pushing."

"Or a man might burn out in this business, might not be suited to its peculiarities, and would want to go back to the aircraft end of it. The bomber force is still the big business in SAC, and a B-47- or B-52-trained man is invaluable. Let's keep the rated men current till the missile is as dependable as the bomber. Then will be time enough to decide this problem."

Allies in missilry. Royal Air Force officer students are already on the scene at Vandenberg for missile schooling. Thor IRBMs will be based in Britain.

These aren't the only problems Vandenberg missilemen have. One they hope won't become too thorny is that of community relations—especially in the area of missile noise.

"By definition," says Col. John Easton, commander of SAC's first operational Atlas squadron, "a missile-launching is a controlled explosion that takes place over a rather extended period of time." It remains to be seen if the noise level will be bothersome in nearby Lompoc, which sits in a low valley and may well be sheltered from the effects of the concussion. Colonel Easton noted that shock waves do odd things. Atmospheric conditions play their part, as do subterranean rock formations. Communities close by may be unaffected, while those many miles away may get curious side effects.

Security is another problem at Vandenberg. Officials feel that it may be expecting too much to hope that the base's natural isolation will daunt determined photographers, for there are too many natural points of vantage on the edges of the reservation where a shutterbug with a long-range lens can get good shots of the launching complexes. In the past, too, the military has had trouble with poachers who felt the Burton Mesa area was public domain when it came time to fill the deep-freeze with venison. But that will change now.

The entire 64,000 acres will be patrolled, and there will be both point and area security. There will be SAC's famed sentry dogs, of course, as well as flying patrols of light planes. There will be no outsiders allowed near the launch complexes. Security will be tight, according to Colonel Rader, the wing commander. And if you'd like to get chewed up by a snarling shepherd at the same time you get shot from twenty directions, just try approaching a missile that's in operational configuration.

The unofficial motto at Vandenberg is: "Press on—regardless!" With this motivation, things are getting done on Burton Mesa. Just as the hills and dunes are being bulldozed by strong men with strong machines, so are the big problems that face America's spacemen being cut down to size.

But all problems somehow seem smaller in the lovely niche of our nation they call Santa Barbara County, where flowers spill across the valleys fringed by great, gaunt eucalyptus sentries. Here, amid palms and the pepper trees, La Fiesta still begins with the full moon in August, polo is still a favorite sport, and the delightful fragrance in the air is a mixture of magnolia, poinsettia, and bougainvillaea.

But soon after the official dedication of Vandenberg Air Force Base on October 4, a new sound, a new odor will be added.

In a letter to the writer of this article, author Martin Caidin, described the sensation as follows:

"At Cape Canaveral for the moon launching—the first crack at the Big Prize in the celestial sky . . . when that bird lifted, screaming into the sky in a perfect launch, I broke down and started to cry. I was astonished. This was before the explosion that tore her heart out. It was a perfect launch. All of a sudden things flashed through my mind. I swear I could see the first caveman staring up into the sky and wondering: 10,000 years of dreams and hopes leading up to this moment when Man gained the intellectual maturity to *try*. And there it was . . . but I didn't feel foolish.

"I came back with the greatest story I've ever had. Not of the technical stuff. The scenes of being underneath the giant. . . . Three men standing in the flame-pit thirty minutes before T-Minus Zero . . . the bird above them creaking and groaning. Sheets of ice falling around them. Ghastly cobalt lights. Alongside them, that combusion chamber. The immensity of its power is terrifying . . . and I mean that word. To them (as I finally found the words) it's being at the foot of an altar, standing at the doorway to a cathedral, the like of which men just don't know, can't know, and don't comprehend. They tell me, making sure no one else is around to hear the words because they might laugh, that they are never closer to God. . . ."

From Vandenberg Air Force Base, America's new, big Springboard to the Stars, man, himself, may first enter deep space.—END

ABOUT THE AUTHOR

Author Ed Mack Miller has been telling the airpower story for numerous years now, and many of his contributions have previously appeared in AIR FORCE. *An Air Force Reserve major, he is author of a book,* Tales of a Flier's Faith, *published by Doubleday early this year. A jet-rated pilot, he has served as an instructor pilot for United Air Lines. Married, he has seven children. He flew as advance man with the Minute Man jet team demonstration during 1957.*

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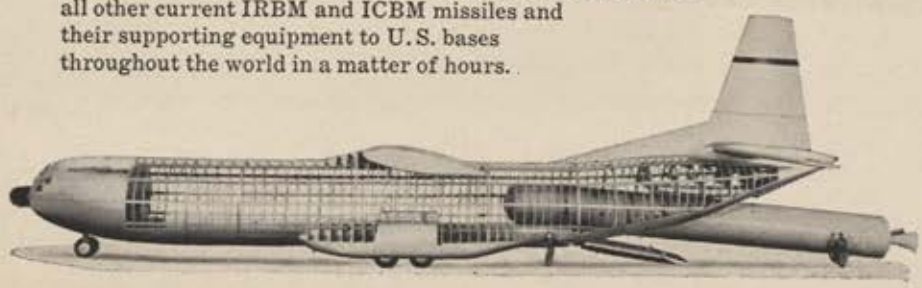
The new Douglas C-133A is the only jet age airplane capable of transporting both IRBM and ICBM missile systems. It dwarfs all other U.S. cargo aircraft in productivity, capacity and range, yet operates at the lowest cost in air logistics history.

This huge turboprop air freighter can airlift 100,000 lbs. of payload more than 1,100 miles; it can transport 42,000 lbs. more than 4,000 miles non-stop. Its cargo ton-mile costs are as low as 5¢ on both short and long haul operations. It has the fastest loading and unloading time per ton of any modern airplane. Yet, despite its huge size and 350 mph+speed, it can operate from short runways.

Because of its ability to move the giant new missiles and their supporting equipment anywhere in the world in hours, the C-133A makes it possible to achieve a major increase in the effectiveness of our overseas bases while decreasing their size. It will buy more protection per dollar for the American taxpayer.

*It more than pays for itself! The turbo-prop C-133A operates at a much lower cost per ton-mile and with far less flight and maintenance personnel per ton-mile than any other air freighter now in service. It is estimated that it will more than pay for itself in reduced operating costs alone in less than 7 years.

Cavernous cargo hold of the Douglas C-133A is capable of transporting the Air Force production IRBM THOR and all other current IRBM and ICBM missiles and their supporting equipment to U.S. bases throughout the world in a matter of hours.



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Cosmic

As Man prepares to enter space, scientists probe for more answers to the question . . .

By William Leavitt
ASSOCIATE EDITOR

FIVE hundred years ago, when the world was a simpler place, you could be sure of some things. Everyone knew the world was flat and that if you sailed westward through monster-infested seas, you would eventually plummet over its edge into the nothingness of space. The earth was the center of the universe, and man was the lord of the earth as God's appointed guardian over the planet. There were, of course, evil spirits that could harm you, but selected amulets and incantations would protect you.

Then man sailed westward and found, not the edge of the world, but a new continent, another part of the imperfect sphere that is the earth. Our planet, we now know, is but a speck revolving around a far greater, fiery speck, the sun. And the sun is but one star in a gigantic cluster of stars—the Milky Way Galaxy, which is, in turn, but a single outpost in a universe composed of countless other star groups. Some of those neighbor star groups are so far off that the light we see from them has taken millions of years to reach us—and what we are really seeing is the dim past, how those stars looked eons ago.

As our knowledge has increased, we have dismissed the evil spirits we had blamed for our ills. We know now of the existence of the minute world of bacteria and viruses, of atoms, molecules, and their parts. The unseen has become visible through microscopes, and what we cannot yet see we have deduced with a reasonable degree of accuracy.

We have learned to travel at miraculous speeds on the surface of our planet, and we have flown higher and higher into the protective atmosphere that surrounds our world. We have reached into the sea and into the earth and have now thrust electronic probes into orbits around the earth to gather knowledge against the day when *man* travels in orbit and to the moon and planets.

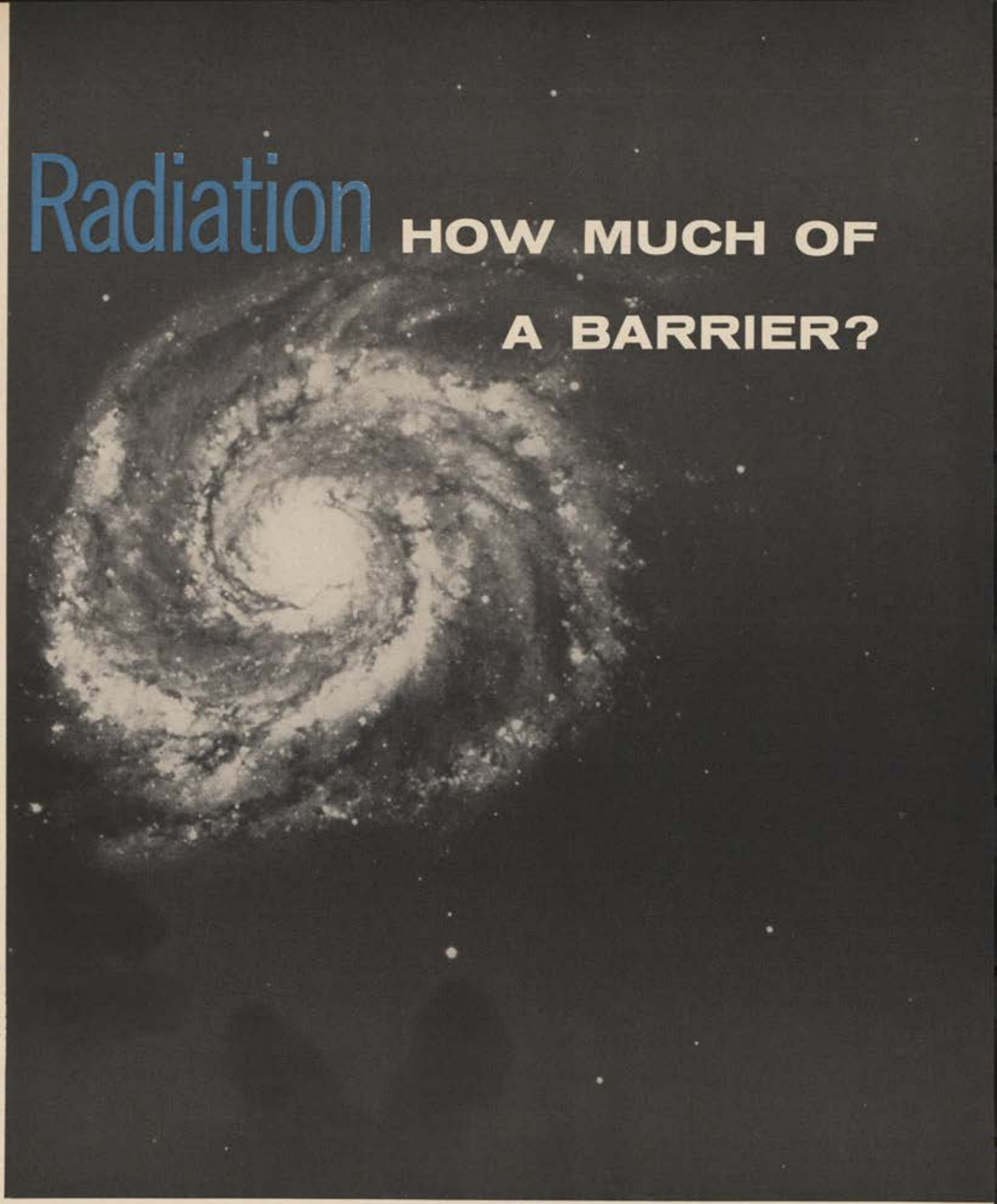
We have new understanding. We know that the atoms and molecules that form the living cells of our bodies and the shapes of all living and inanimate things are expressions of a vast energy, that matter itself is an expression of energy; that it cannot be destroyed but exists always—in different, infinite kinds of arrangements.

But with our new understanding have come new imponderables. As we stand poised on the edge of manned space travel, our instrumented probes are sending back dire messages of what appears to be a deep and intense band of cosmic radiation surrounding our planet, no one knows how deep. This is a phenomenon unexpected in its intensity and a hazard which manned spaceflight planners are now taking into serious account.

What is this newest monster of the deep? Can it be met safely, enabling men to travel in space? Or are we forever earthbound or limited to the aerospace a few hundred miles

(Continued on page 54)

Radiation HOW MUCH OF A BARRIER?



The vastness and mystery of the space of the universe—Man's newest and greatest frontier—is illustrated by this striking photograph of Messier 51, a whirling nebula in the constellation called Canes Venatici.

above the surface of the earth? As of today, there are no final answers to these questions, but we do have knowledge of what the hazard is—and most spaceflight planners *do not consider the cosmic radiation an insuperable problem*, but rather a problem that will tax science's ingenuity.

To understand the general nature of cosmic radiation we must repeat a truth scientists have learned after decades of study. This is that man sees his universe through an exceedingly narrow "window" in a "wall," the rest of which is impenetrable to his senses. There is an enormous amount of electromagnetic activity in the universe—movement at high speed of subatomic particles or "waves"—but our eyes can detect only the small range we call visible light. Some of this movement, radio waves, for example, we can amplify and *hear*. Other kinds of radiation, indeed, most of it—X-rays, cosmic radiation, certain forms of light radiation such as infrared or ultraviolet rays—we can detect only with instruments. Often we feel the effects of this invisible striking of particles against us—the ultraviolet will burn us, although we cannot see it.

The human eye, as marvelous a device as it is, is sensitive only to the narrow band of light radiation falling between the red and violet, the *visible spectrum*.

Radiation, then, simply stated, is the movement of particles through the universe. Light, according to the Einsteinian theories which dominate modern physics, is composed of particles called photons moving at the fantastic speed of approximately 186,000 miles per second in spurts which physicists call *quanta*. These spurts of movement are of such enormous speed that for all practical purposes we consider them as *waves*. This rule of movement applies to heat or radio waves or X-rays. Nothing stands still in the universe. Nor is there really such a thing as "empty space." We cannot see the movement of the particles because of the limitations of our senses.

Cosmic "rays" are part of this whirl of activity. They are believed to be parts of atoms, mostly neutrons or protons, originating at the sun and farther out in distant galaxies, which travel through space toward our planet and enter the earth's magnetic field. At the time of their arrival in our magnetic field, their energy is—in cosmic terms—not much. It is what happens to them in our magnetic field that is significant to astronautics.

A few of these subatomic particles get through the protective shield of our atmosphere. In fact, it was the few that got through that led to the discovery of cosmic radiation, since certain reactions were caused in laboratory experiments which could not be explained except by the postulation of radiations from outer space.

But most of these original particles, called "primaries," remain according to present theories, in the earth's magnetic field and do not get through our atmosphere. In the magnetic field, they are believed to be stirred to increased energy, colliding with atoms of the gases (in the upper limits of our atmosphere) that move about in what we erroneously think of as empty space. Such collisions would also take place with the atoms making up the metal of the space vehicle.

These collisions of the "primaries" with the gas atoms tear parts of the gas atoms away. The torn parts become ionized, electrically charged, and begin tearing about, striking other atoms. The charged particles resulting from the collisions are called "secondary" radiations. A rough analogy is that of a bullet striking a pane of glass, scattering fragments. All of these charged particles—the primaries coming in from outer space, and the secondaries resulting from collisions with gas atoms or with the atoms of a spaceship hull—are *biologically dangerous*—because they can penetrate human tissue and damage the atomic arrangement of living cells.

To explain this potential danger to humans we have to think in terms of a universe where matter is an expression of energy. Our bodies are made up—as is everything else in the universe—of molecules and atoms and parts of atoms, grouped in the specialized arrangements that nature uses for human tissue. These infinitesimal particles are in constant motion, going through the ordered changes we know as growth, repair, and aging. It is an amazing truth that we are today not quite the same group of atoms we were yesterday. The face we saw in the shaving mirror this morning is not exactly the same as the one we'll see when we brush our teeth tonight.

The groups of atoms and their parts which make up our cells can be altered or destroyed by hits or grazes of ionized (or charged) particles. This is the significance of the cosmic radiation problem to astronautics, not to mention the problem of radioactive fallout from nuclear fission on earth, a matter which is engaging the close attention of an army of scientific researchers.

Cosmic radiation, then, is a rush of charged subatomic particles—which, coursing through the human body, can affect the atomic arrangement of human cells structure.

These effects are not entirely known. But experience already available with X-rays and atomic fallout has given scientists some insight into radiation hazards and methods of protection.

We know that radiation damage is a function of *time, amount of dosage, area of hit*. Tissues, cells, vary in their sensitivity to radiation, just as various forms of radiation vary in their penetrating power. The most radiosensitive organs of the body are believed to be the rapidly growing tissues and those which are dependent on a liberal supply of blood. These would include the reproductive organs, the bone marrow and spleen, growing bone, the skin.

The important thing to remember is that it makes little or no difference to the bombarded human cells as to what kind of radiation has affected it. As researchers presently understand the phenomenon of cell damage, a hit by an ionized particle has the same effect, no matter what the nature of the radiation. Thus, an ordinary X-ray hit or a primary cosmic particle would have the same effect, if they both struck the cell in the same way and traveled far enough into the tissue.

A particularly insidious problem of radiation damage is that in many cases, *apparent* regeneration of bombarded cells occurs, yet latent injury persists, to show up years later. There is one recorded case which points this up in a rather frightening manner. A woman received an overdose of X-radiation during a fluoroscopic examination in 1898 and suffered burns which healed shortly after the exposure. But *forty-nine* years later, at the age of seventy, she developed a fatal skin cancer in the areas which had been irradiated nearly a half century before. Similarly, pioneer radiation scientist Marie Curie (and her daughter, Irene) died of delayed radiation effects.

Certain cells, particularly those of the reproductive organs, are especially sensitive to ionization effects of radiation in sufficient amount. Observed effects include sterility, with recovery dependent on time and amount of dosage. Latent effects include damage of the genes and chromosomes which carry the inherited characteristics from generation to generation. This is the area of greatest mystery. The changes in gene arrangement or structure which could be reflected in future generations are called mutations, and the scientific consensus is that most mutations—not all—are degenerative. An interesting experiment in cosmic-ray-

induced mutations is under way under Air Force contract at the University of Florida, where breadmolds are being launched to 100,000 feet in balloons for exposure to cosmic-ray bombardment. Since molds have a much simpler cell organization than highly complicated mammals such as man, it is possible to get a kind of "quick reading" on mutations caused by cosmic rays, particularly because mold "generations" are much shorter lived, allowing the researcher to see the genetic results of the bombardment on the "descendants" of the exposed molds.

Information from this Air Force study can give insight into the number and frequency of cosmically induced mutations and the ability of living cells to "repair" damage caused by radiation. An important question in the "repair" ability is whether damage is ever *completely* repaired.

Probably the best known Air Force cosmic-ray study is the celebrated balloon flight to 102,000 feet in Operation Man High by Lt. Col. David G. Simons of the Space Biology Branch of the Aeromedical Field Laboratory at the USAF Missile Development Center, Holloman AFB, N. M. This flight, in 1957, climaxed years of similar experiments with mice, fruit flies, and monkeys.

Colonel Simons spent thirty-two hours in his "space capsule," subjecting himself to cosmic radiation of much higher intensity than the scattered secondaries at lower altitudes.

The doctor, who has reported extensively in journals, gave a fascinating account of his findings to the recent meeting of the American Astronautical Society at Palo Alto, Calif.

He showed slides of his arms which during the flight were exposed to cosmic radiation. Several hairs on the limbs, in concentrated areas, are now white. Dr. Simons attributes this phenomenon to destruction of the pigmentation ability of the cells forming the hair follicles, caused by primary particle hits. A well known consequence of intense, long-term exposure to radiation is depilation or loss of hair. In some cases, the hair grows back. Dr. Simons believes the graying effect is the result of "grazing" of his cells by cosmic primaries.

The cosmic-ray studies of Colonel Simons' flight of last year will be continued with the now scheduled Man High III balloon flight.

The growing sum of knowledge we now have of radiation effects on man's biological structure has enabled us to provide protection on earth, principally the well known lead shielding. Lead is most widely used because of its high density. Sufficient thicknesses of lead are capable of absorbing most forms of radiation, X-rays, and the gamma and other radiations produced by nuclear fission. Lead absorbs radiation in a manner roughly like the way a thick piece of wood stops a bullet. The fast-traveling particles eventually lose their energy—are "stopped"—in the lead barrier.

Theoretically, lead should do the same trick in spaceflight if it turns out that the "hot" belt of radiation discovered by the Explorer satellites is as hazardous as many observers feel it is. Incidentally, it is hoped that successful Air Force and Army instrumented lunar probes to the moon's vicinity will tell us how far out the hot belt extends. At the moment, there is no real knowledge of its depth beyond the apparent fact that the belt seems to become quite intense at an altitude of 600 miles, increasing to higher intensities further out.

Probably, for the estimated 2½-day manned trip to the moon, heavy thicknesses of lead could provide adequate protection. But leads adds a prohibitive weight penalty in this age of chemically fueled rockets. As matters now stand, such a fantastic amount of fuel is needed to blast a vehicle free of the earth's gravity that the addition of heavy lead shielding might be too much. Yet, if lead shielding is necessary, *enough* of it must be used. Too little lead could be as bad or even worse than none at all. This is because a too-thin lead thickness could allow scattering of secondary particles of smashed lead atomic fragments, creating further radiation. It would be much like creating a shower of shrapnel. The lead must be thick enough to absorb *all radiation* striking the spaceship.

That cosmic radiation is a definite problem that must be understood and licked—particularly in terms of manned flight to the moon and beyond—is recognized by scientists. The more that is known of the nature of the radiation, the quicker will come the eventual solutions.

The Air Force, as its mission advances into space, is especially interested and is sponsoring, through ARDC, many such studies as the important work of Dr. Fred Singer of the University of Maryland (under AF Office of Scientific Research contract).

At the recent meeting of the International Astronautical Congress in Amsterdam, Dr. Singer outlined his theory of the nature of the cosmic-radiation belt and proposed a method of protection.

The Maryland professor believes the "hot" belt extends from about 250 to as far as 40,000 miles out into space with a peak intensity at 6,000 miles, that some of the radiation has enormous energy, that the intensity is greatest around the magnetic equator—and that a few hours of unshielded exposure could be fatal to human beings.

To quote from ARDC's statement on Dr. Singer's studies: "The intensity and location of the radiation belt indicates that the cosmic-ray intensities reported by the IGY satellite flights do not extend throughout space. The belt will propose a problem for manned satellites flying significantly higher than the ionosphere." The report continues: "However, there remains an adequately large region between the ionosphere and the radiation belt for low-flying manned satellites."

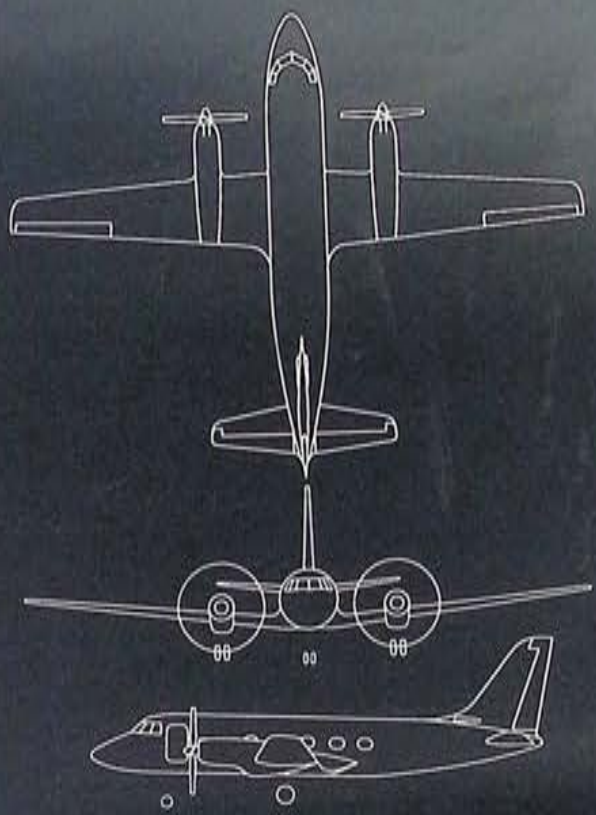
The last statement bears stress. The great spate of publicity on the cosmic-ray problem has engendered in some quarters a kind of throwing up of hands—a feeling that the surprising intensity of the radiation belt marks an abrupt end to man's efforts to enter space. On the basis of present knowledge, there is no reason for such an assumption. It would be a denial of scientific progress potential to make such an assumption.

And, of course, it remains true that—despite the radiation problem—the military and scientific applications of vehicles for such purposes as missilry, reconnaissance, orbital bombers, weather observation and prediction, television relay, and astronomical observation remain valid.

Dr. Singer and many other scientists are already hard at work on ideas to "beat the radiation problem." The Maryland professor, in his report at Amsterdam, suggested that "sweeper" satellites might be launched into orbit around the equatorial areas to "soak" up the radiation sufficiently to afford safe human passage, a suggestion which received wide publicity. Another possibility often mentioned is the use of a magnetic field to be generated by the manned vehicle as it courses through the hot belt, to deflect the onrushing radiation. As further information is elicited from instrumented satellites, new approaches will doubtless be proposed. Although the problems are by no means analogous, it is worth noting that until someone thought of the blunt nose cone, the reentry problem for missiles seemed insoluble to many observers, too. And there are people living today who said: "They'll never get it off the ground!"

Today's enigma is tomorrow's history.—END


N701G
THE GRUMMAN



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AIR DEFENSE SYSTEMS INTEGRATION DIVISION

ADSID

'Make the parts come out even and make them work' is the challenge of complex technological machines for war in the air

By Claude Witze
SENIOR EDITOR

A FEW miles outside Boston, where legends of the Lexington Minuteman mix with stories of modern electronic marvels, the US Air Force has established the Air Defense Systems Integration Division. It is one of the most critical USAF technological efforts since the end of World War II.

ADSID probably is the only US military command that still may be able to make sense and a workable machine out of the mixed-up air defense system as it stands today. Before ADSID can do so, however, the Department of Defense must first make up its mind which air defense concept and what weapon systems this country is going to support.

Congress already is pressing the Pentagon. As described in last month's issue of AIR FORCE (*"The Mix-up in Air Defense," page 37*) both point-defense and area-defense concepts are receiving continued support. The Army's Nike-Hercules is being procured along with the Hawk, another point-defense missile designed for low-level interception. At the same time, USAF's Bomarc, a long-range interceptor guided missile that will destroy enemy aircraft far beyond the range of Nike-Hercules and Hawk, is essential to USAF's area-defense program.

The Senate Committee on Armed Services has told Defense Secretary Neil H. McElroy that it is their opinion both the economy and our defense posture would be strengthened if one of the concepts were discarded. On the other hand, the committee realizes that true defense in depth will require some point-defense weapons. For this reason, it did not close the door on continuation of both programs, and it left up to the secretary the task of determining which missile sites are essential.

The committee believes that the point-defense system has been carried too far; that its costs are a menace to our striking forces; that the Army is neglecting its own ground combat capability in order to push itself into an area remote from its basic mission.

In their criticism of the Army air defense program, the senators point out that Army's share of North American Air Defense Command (NORAD) is the second largest (US) Army combat command in the world, absorbing from seven to ten percent of the entire Army effort.

Harking back a few years to the last major Army-Air Force imbroglio in the missile field, the committee points to the horrible example of the Thor and Jupiter IRBM programs. It says it cannot understand why both systems are being made operational. So far, nobody has jumped up to say that when Charles E. Wilson was Secretary of Defense he reluctantly made a decision—a decision that didn't stick.

Wilson placed a 200-mile limit on Army ballistic missile efforts and ordered Jupiter's development funds cut off and the results of its early test-firing program turned over to USAF. This later was compromised and procurement was ordered for both Thor and Jupiter. It was a political decision, not a military one.

Clearly, the Senate Committee on Armed Services did not want another Thor-Jupiter decision, yet there is no exact parallel in the Hercules-Bomarc situation. Thor and Jupiter essentially are the same thing. For defense in depth, Hercules is the weapon that would be faced by any enemy bomber that penetrated the outer rings of manned interceptors and Bomarc missiles. The decision to utilize each system for the job it can do in this case is military, not political. But their utilization in the defense system and coordination of that system with the entire air war capability creates an integration problem of staggering proportions.

In the creation of ADSID the Air Force has operated entirely within its own family, but it has created a new and necessary wheel for the nation's air defense machinery. Gen. Curtis E. LeMay, USAF Vice Chief of Staff, has pointed up the vital need for integration in these words:

"Obviously, the ultimate in air defense would be to destroy the enemy forces before they get off the ground. The next best air defense is to attack the enemy forces immediately after they have been launched or at least as far from the target area as possible. The least desirable and last-ditch air defense is to attack the enemy when he is at or near his target area.

"It is this belief which is behind the Air Force development of far-reaching early-warning radar, ground-control intercept radar, long-range intercept weapons and now SAGE. These forces, coupled with the Army's point-defense weapons, will present an imposing gantlet to an enemy attack force—a true defense in depth."

Then General LeMay, whose bombers and interceptors today might well fall under attack from Army missiles before they could meet the enemy, called for "the capability to fight a coordinated, well controlled air battle."

Said he:

"Our air offense and our air defense cannot be permitted to interfere with each other. This requires extremely close direction and control to assure protection of our offensive and defensive forces and the most effective destruction of enemy forces. To achieve the greatest effectiveness we cannot have confusion in orders, procedures, or identification.

"To fight any battle, the defensive forces and the

(Continud on page 61)

THE SENATE COMMITTEE ON ARMED SERVICES SITS IN JUDGMENT ON OUR DEFENSE EFFORT AND CALLS FOR DECISIONS THAT WILL STRENGTHEN THE MILITARY POSTURE; THE ARMY, IT SAYS, 'SHOULD TAKE STOCK OF ITSELF'

In a recent report on the fiscal 1959 military construction program, the Senate Committee on Armed Services made some penetrating comments about weapon systems and decision making in the Pentagon. Here are germane quotations from the committee's report:

". . . The air-breathing intercontinental missile Snark . . . is capable of carrying nuclear warheads against distant targets with great accuracy. . . . No new funds were requested in this year's bill for Snark facilities. The committee strongly questions this apparent diminishing of Snark's importance for the committee has become convinced that the addition of further Snark squadrons to our arsenal is highly desirable. . . .

"While Jupiter is an Army-developed weapon, its operational assignment has been given to the Air Force. It has similar characteristics to the Thor. . . . The committee notes with interest and some concern, the duplication of effort between Jupiter and Thor. It can understand the need for some duplication in research and development. It cannot condone duplication in operational deployments. The committee certainly hopes the Secretary of Defense will, if this type of duplication is imminent, make a decision based on the relative merits of the two weapons and not on the understandable service pride in authorship. . . .

"The efforts and resources the country is putting into continental defense systems is tremendous and a little bit frightening. If all the systems are fully developed and deployed, it would not be illogical to assume we might well find certain installations defended by fighter-interceptors, Bomarc, Nike-Ajax, Nike-Hercules, Hawk, and Nike-Zeus, with their attendant SAGE and Missile Master controlling systems.

"The committee has become increasingly concerned over this potential duplication . . . it does not believe that all are essential. The committee is especially concerned about the heavy deployment of missiles requiring stockpiles of nuclear warheads immediately adjacent to heavy centers of population. It can understand the need to ensure the protection of military bases where strike forces are stationed; it cannot understand the heavy concentration in industrial and heavily populated centers with the attendant publicity implying that the deployment of these weapons at such locations constitutes no hazard and provides complete security from attack. . . .

"The committee [two years ago] denied the authorization for the establishment of Talos sites and called upon the Secretary of Defense to make a determination. . . . [He] assigned Talos to the Department of the Army.

"The committee took the action of denying the authorization for Talos not because it believed that Talos was an ineffective weapon; on the contrary, testimony indicated that it gave promise of being ideally suited for a role in the air defense system. . . . Even though qualified witnesses who appeared before the committee had stated that 'Talos ranks with the best in air defense systems—this country needs all it can buy,' the decision now has been reached [by the Army] that Talos is no longer required. Yet had the committee authorized the funds . . . there can be no doubt that Talos sites would now be established adjacent to Nike-Ajax installations.

"Now a similar situation apparently exists with regard to Nike-Hercules and Bomarc. The same arguments exist regarding point and area defense. . . . It is most obvious to the committee that the Army and the Air Force continue to have overlapping responsibilities in the air defense missile field—and that their programs duplicate each other.

"The committee does not intend to imply that complete defense measures should not be taken for certain specified areas; but defense of the fortress or fixed position type can be carried too far, especially if the costs incident to the defensive system in any manner reduce the capacity of the strike forces. In fact, such a policy would well be fatal militarily and equally if not more important, from the economic viewpoint. . . .

"It is the committee's firm and unanimous opinion that decisions must be made to eliminate duplication. Otherwise the annual cost of the defense budget will require increases beyond all reasonable proportions. . . .

"The committee has [reduced] the combined total request for Nike-Hercules, etc., and Bomarc by twenty percent, and authorizes the Secretary of Defense to construct . . . such missile defense sites as he deems essential. . . .

"The committee expects him to make a choice. The committee is of the opinion that the adoption of one . . . while discarding another could have the twofold effect of strengthening both our economy and our military posture.

"In taking this action, the committee emphasizes that it is not establishing the precedent of making all authorizations or appropriations directly to the Secretary of Defense. . . . Nor should this action be taken to indicate in any manner that the committee believes that the Secretary of Defense does not already possess sufficient authority to make decisions in this field. . . .

"The committee is of the opinion that the airlift capability is most inadequate and cannot understand why the Army, especially, has not sought with great vigor to ensure a capability of moving its troops and equipment by air or if it has requested such, why the Department of Defense has not taken affirmative action.

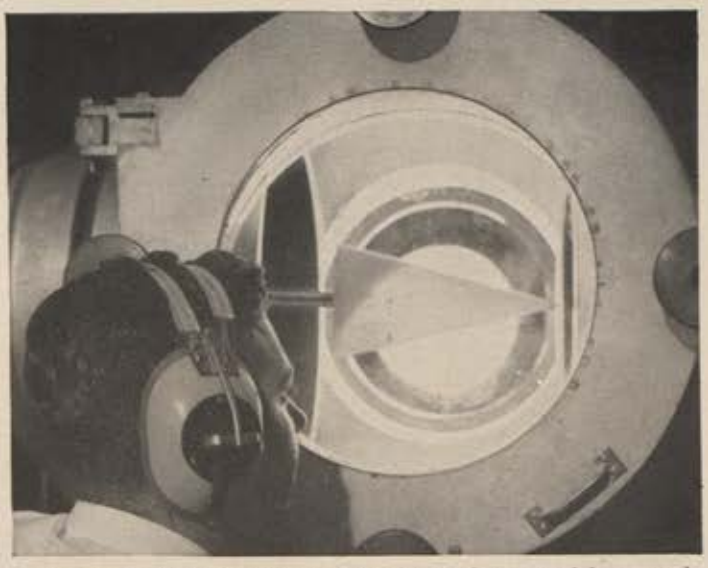
"Obviously, one requirement is the necessary funds. It has been reported that Army officials calculate the Army should have approximately 100 C-133-type turboprop transports available for such use. Each C-133 would cost in the neighborhood of $8 million.

"The committee wonders why some of the money spent on fixed defenses to date has not been utilized for this purpose, for without mobility ground forces have little opportunity of reaching vital areas in sufficient time to merit their existence. . . .

"The committee wonders why the Army has placed such a great emphasis on fixed defense [point] weapon systems which the committee believes has caused a resultant diminution of its ground combat capability (its principal and most important mission). The committee believes that the Army should take stock of itself and redirect its efforts toward providing the US with the finest force in the world capable of victorious sustained ground combat. . . ."

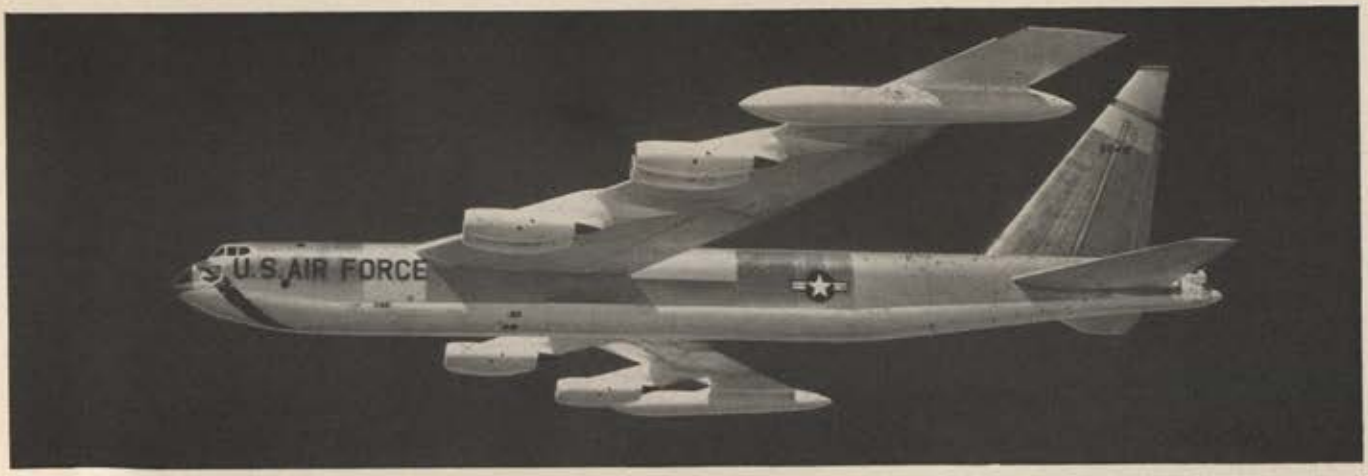
BULLETIN FROM **BOEING**

BLAST-OFF. Supersonic Boeing Bomarc, the Air Defense Command's longest-range missile, can carry nuclear warhead and intercept attacking bombers and air-breathing missiles far from target areas. Advanced Bomarc interceptor missile will have 400-mile range.



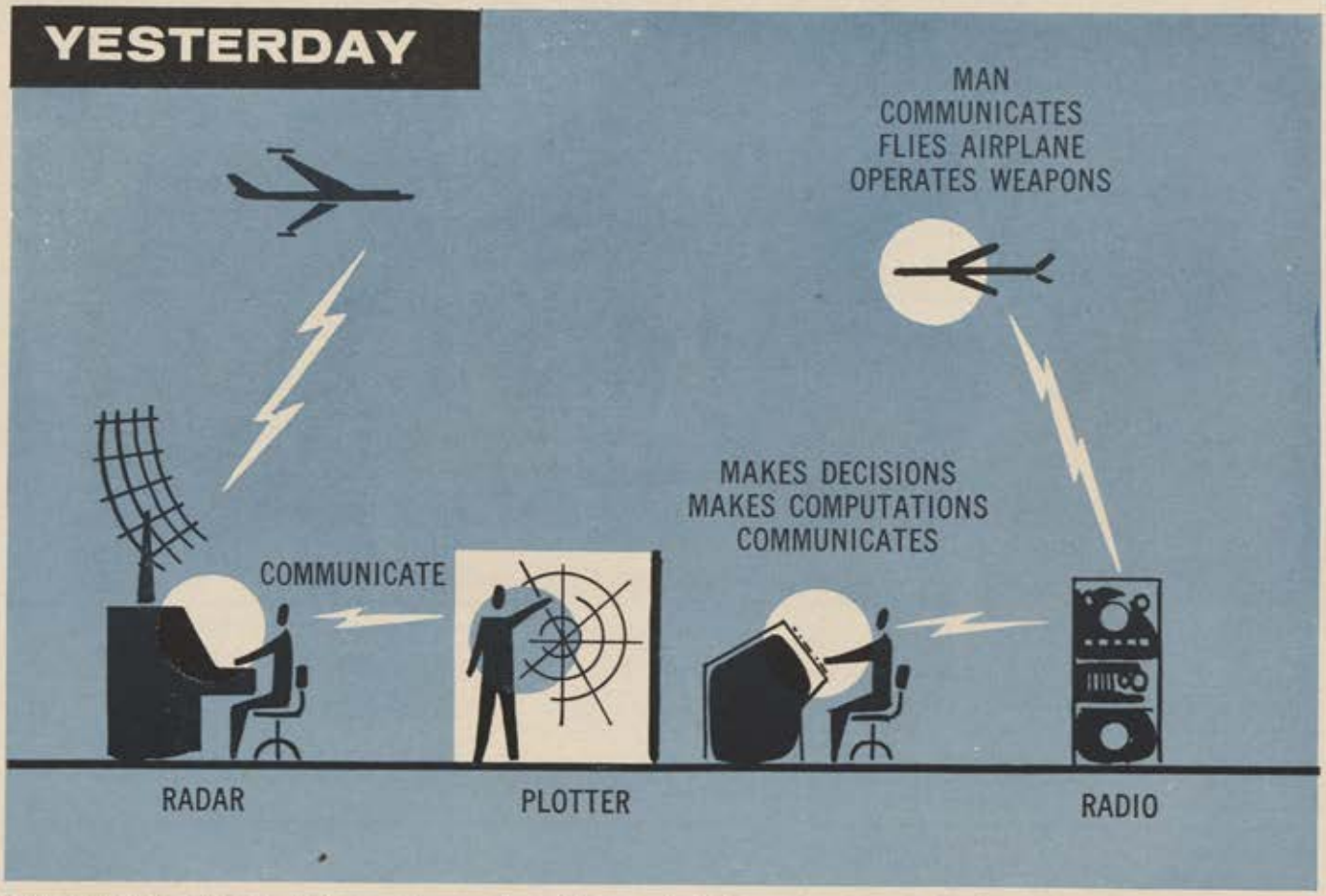
BIG WIND. Boeing's hypersonic wind tunnel tests models at speeds from five to eight times that of sound. Research programs at Boeing cover all fields of space-age technology. Development projects include Dyna-Soar, a manned space vehicle that will orbit at speeds approaching 18,000 miles an hour and be capable of re-entry and normal landing.

JET-GIANT STARTER. Powered by Boeing 502 gas turbine compressor, Turbo-Starter in truck provides fast, sure starts for jetliner and jet-bomber engines, and supplies air for ground operation of pneumatic systems. Other Boeing 502-series gas turbines power aircraft, boats and generators for the U.S. Navy and industrial concerns.



WINGED MISSILE PLATFORM. Boeing B-52 global jet bomber is Strategic Air Command's principal long-range retaliatory defense weapon. Advanced model will carry two supersonic air-to-ground missiles in addition to nuclear bomb load, combining accurate long-range guidance with supersonic weapons delivery. New B-52 will be able to destroy several targets thousands of miles apart on a single retaliatory mission.

BOEING



Now outmoded, early air defense systems such as those used eighteen years ago in Battle of Britain had men in most critical jobs. Helped by simple calculating devices, they did their own plotting and sent instructions to the pilot.

offensive forces must be interrelated and centrally controlled to get the best results. In fighting an air battle, this principle is even more of a requirement because of the great flexibility, high speeds, lethal weapons, and great ranges involved."

Giving the Army point-defense sites their proper role, General LeMay here lays down the law: all segments and components of the air defense system, and this includes anything fired by the Army, must be integrated into an air defense system and subject to control. He is discarding, in toto, the Army contention that each of its missile batteries is "weapons free" and has a responsibility to clear the skies of friend as well as foe. What General LeMay is saying is that the words "identification" and "interception" must go back in the Army vocabulary because they are part of the essential language in fighting an air battle. He is understandably reluctant to have Army missiles fired at friendly aircraft even by mistake.

But the key word is *integration*.

ADSID is designed to provide integration. It knows what must be done and is creating the machinery to do the job. At this writing it is not clear what kind of decision the Defense Department will make, or who will have final authority to do the job. But it is essential, if the right decision is made and implemented, that ADSID's vital mission be recognized and accepted.

The mission is clearly stated. It is "to provide the necessary managerial guidance for command action required to ensure an effective, properly time-phased and technically compatible integrated Air Defense Mission System, in accordance with approved plans, requirements, and procedures."

Maj. Gen. Kenneth P. Bergquist, ADSID Commander, says this means his two main jobs are (1) to ensure technical compatibility—"make it work"—and (2) to guarantee that programming puts the right component in the right place at the right time—"make the parts come out even."

This is an oversimplification. General Bergquist could start with reiteration of a truism applied these days to every weapon system in every branch of the armed forces. The thing is so complex that its design, construction, operation, and maintenance have outgrown the feeble capabilities of ordinary men in both industry and the military service.

It was recognition of this fact that led USAF less than ten years ago to adopt the Weapon System Concept under which it threw new and major responsibilities on American industry. In less than ten years weapon systems have outgrown the capability of a single prime contractor. For the systems now on the drawing boards it is necessary for several major companies to pool their talents and facilities and tackle the problem as a team.

In the field of air defense there are complications that never occurred to the men who designed some of the components. These are the problems of integration, almost complete elimination of the human factor and new important standards of reliability.

General Bergquist is quick to point out that integration always has been a basic military problem. But the fact

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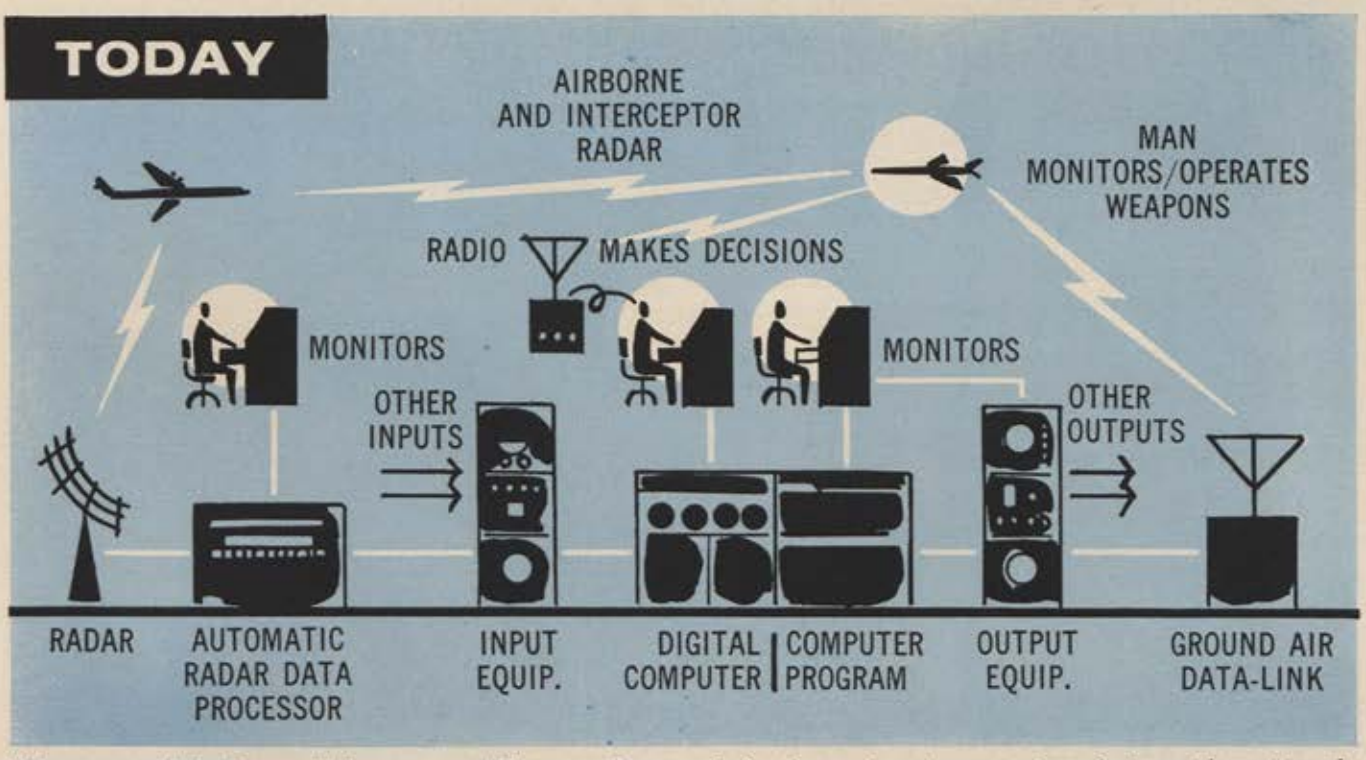

Today many of the human links are gone. The men who remain for the most part are monitors, but must learn to make up for inadequacies when they occur in the equipment. The computer is new; it represents both a component and a man.

that air defense systems are becoming more and more automatic, more and more complex, and more and more dependent on each other makes integration more important than ever before.

In the past, defense system integration was performed by the operational commander. The radar spotted the invader and the information, read by men, was transmitted by voice to a plotting board. Other men read the board, decided what should be done to provide interception as far as possible from the target they were defending. The interceptors were manned, the pilots getting their instructions from other men on the ground. (*See chart on page 61.*)

Of course, the prime example of this system in operation is the Battle of Britain. In the summer of 1940 alone, the Royal Air Force was credited with destroying 1,408 Nazi aircraft. And statistics indicate the job was not too tough, from the standpoint of the hits that had to be scored. Asher Lee, the English military writer, says that in those days any bomber force would be slowed up if the defenders could inflict losses of more than five percent. If they stayed for any time at the ten percent level, it was impossible for the Nazis to keep up with the demand for more men and airplanes. In an age of thermonuclear bombs, of course, such a low percentage of kills is completely inadequate.

It was a feature of the system in World War II and before the advent of the SAGE system that the components were linked by men. If the equipment didn't work very well, the men were there to make up for deficiencies, weaknesses, and misfits. Since the war some automation has been achieved, but we still have mainly a manual system which is just now being replaced by the urgently required SAGE system.

The men were pliable components themselves; they could make the system work. The mechanical components —the radar, radio, and armed airplane—were designed with small regard for each other's virtues or limitations. They were delivered to the operating commander almost haphazardly, and it was part of his job to shake the system down and make it work. He could change procedures and reorganize people to make up for errors and deficiencies. And he had *time* to do these things, time that is not available in the supersonic age.

Another feature of yesterday's equipment was that it could be modified, parts replaced, and new components added without upsetting a lot of military and industrial applecarts. The job of the manufacturer and the Air Materiel Command was to deliver the goods; making the system work was the job of the operational commander. For new systems, operational dates were based on the dates on which components would be ready for use. There never was an operational date for a system, explicitly stated.

By 1958 we are rapidly eliminating a good many of the human links in this setup, a change forced on the air defense system by more sophisticated enemy delivery systems. They fly higher, faster, in greater numbers. They carry more lethal weapons. They carry electronic devices that are widely versatile in their ability to foul defensive electronic systems.

Today's air defense system (*see chart above*) is monitored at points by human beings, but few decisions really depend on one man's judgment. Even the pilot in the interceptor is more monitor than fighting airman. On top of this, it now has become common for the equipment to dictate how the weapon system will be used. There is less and less reliance on the ingenuity of the commanding officer of an interceptor squadron or missile site. The men, General Bergquist points out, are not in series, serving as components of the system. They are in parallel, watching the system work, and many of the operational judgments and

(Continued on page 64)

AiResearch centralized air data computing system...

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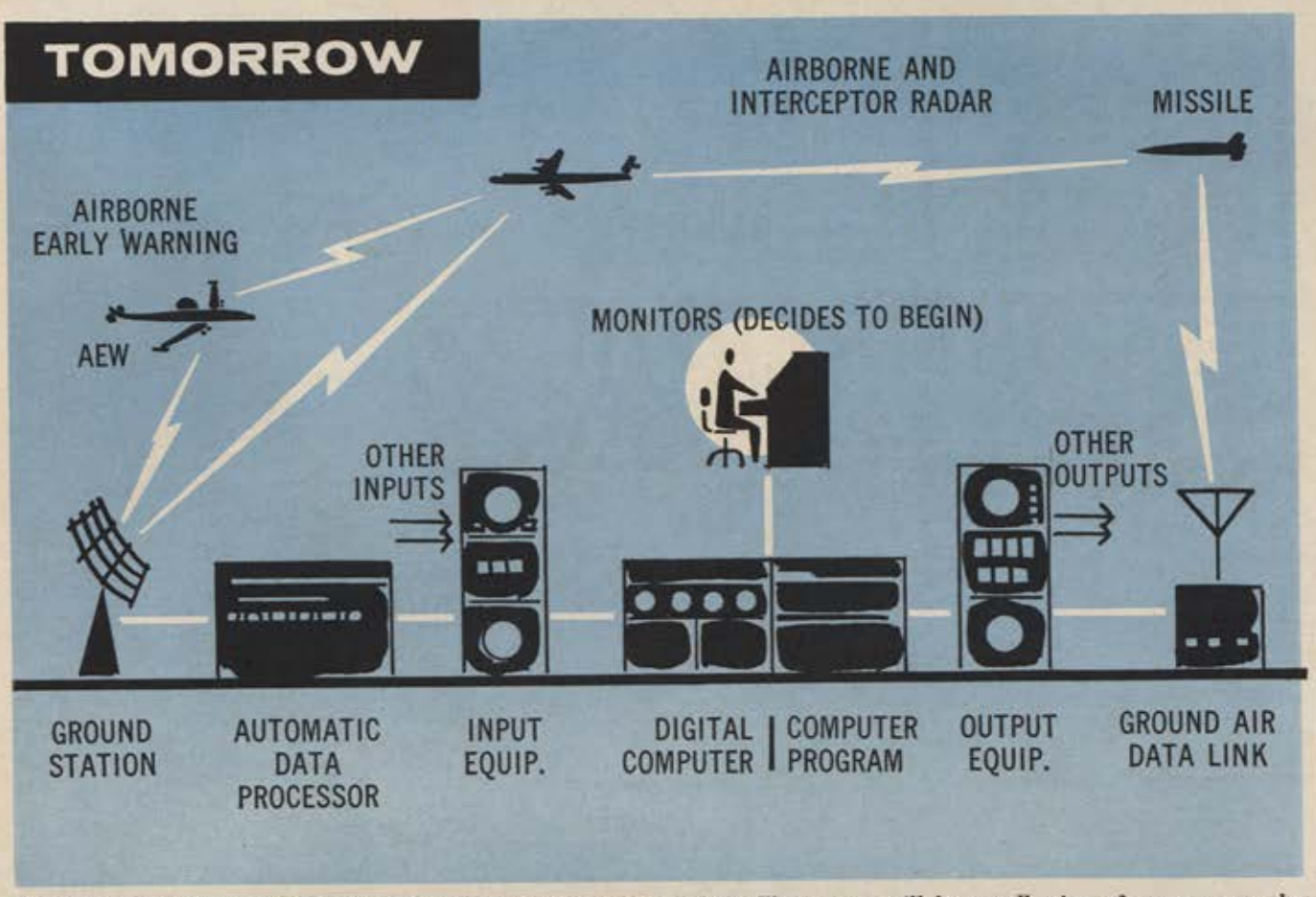

Tomorrow the system will be automatic once the button is pushed. The system will be a collection of components that will work or not; if they don't work there is nothing the man can do about it. ADSID's job is to make sure they work.

decisions, previously made during the "heat of the battle," have to be worked out ahead of time—in fact, designed and developed into the equipment.

Probably the most important addition to the air defense system as now in operation is the computer—the electronic brain that plans the interception. It takes data from a radar data processor and figures out, instantly, the direction and speed at which a given interceptor can get within striking range of the invader.

The computer can be compared both to a human operator and to a piece of mechanical equipment. It is in the latter role that it does mechanical things, like data transformation and figuring out how an interceptor weapon can be vectored in on the target. It also represents an operator when it constrains the system by selecting the tactics to be employed. An example is the case of weapon selectivity. It is up to the computer to know at all times which weapons are available; it "remembers" which missiles and/or interceptors are within reach of the target and their state of readiness.

It is at this point—where the computer is introduced—that three major USAF commands find the boundaries of their missions becoming fuzzy. These factors are introduced:

1. **Air Defense Command** finds that control of the computer program is essential if ADC is to control operational characteristics of the system. This puts it in the equipment business to a degree never before encountered by weapon system operators.

2. **Air Research and Development Command** finds that it is not enough to engineer the components. Even if it takes proper account of the simple things, like making sure voltages are compatible and that plugs will fit, ARDC can't test the system's components without getting deep into the computer program. This puts it closer than it ever has been before to the operations business.

3. **Air Materiel Command** finds that entry of the computer into the system adds vast new complications to the procurement and production of all components. If a change is needed in the computer, it may necessitate the purchase of other new equipment or changes in the specifications for some gadget involved in radar, communications, or the weapon itself. This, in turn, may call for a new kind of demand on industry. The old bugaboos of maintenance and supply become more critical than ever, because there is no computer that can replace a man in finding its way around some tiny part that doesn't work at the critical moment.

These three points indicate that the three commands—ADC, ARDC, and AMC—find it more and more difficult to stay out of each other's backyards as the computer takes over and air defense system complexities increase.

Now take a look at tomorrow's air defense system. *(See chart above.)*

Tomorrow's system will be fully automatic; the last human link gone. There is a monitor who can push a button, but the process is automatic and it will proceed in-

(Continued on page 66)

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exorably to interception. At this stage it is obvious that the system is a collection of components with a minimum of human judgment involved in carrying out the mission. The parts all work or they don't work. They must have been designed, developed, produced, and installed to fit like the pieces of a jigsaw puzzle in accordance with a detailed over-all plan for the whole system. They must be "effective, properly time-phased, and technically compatible"—the job of ADSID.

This can be put very bluntly: The operating command will be stuck with the system as it exists. The smartest general with stars on his shoulder and the most competent technician with chevrons on his sleeve are helpless to do anything with this monster except to tell it when to go to work. The "operator" must have gotten his "licks in" while the system was being designed and developed.

The operational date of the system here becomes more critical. Because men no longer can make up for deficiencies or substitute new pieces or human action to make up for mechanical boo-boos, the operational date is a final thing, speaking for every last link in the system. Thorough testing—component, subsystem, and full system—must be accomplished. If deficiencies are traceable to components that do not work, there must be a way of identifying the faulty part and replacing it with one that does work. If the trouble is due to faulty design, there must be a development program to get improvement, because the system is out of commission until it is corrected. Incidentally, there must be some way of exercising the system to help locate these deficiencies. Except in case of war, it is not likely that missiles will be launched anywhere except at test ranges. Hence the recent successful firing and guidance of a Bomarc under control of a SAGE computer at Kingston, N. Y., but with the launch site at Patrick AFB, Fla., 1,500 miles away, and also the scheduled use of the Eglin complex under SAGE control.

What was once a job that the operational commander (ADC) performed through managing his men and organization will in the future be done by military/industrial technical groups through modifications to equipment. These technical groups will be highly responsive to the operational commander's needs, but may not be entirely under his control.

This is the reason that an experienced operator, General Bergquist, was selected to command ADSID.

ADSID cannot go ahead with yesterday's assumption that it is enough to demonstrate that an interceptor airplane or missile can fly and that the warhead will go off reasonably close to the target. Nor is it enough to show that the radar can find the target, the computer can calculate the interception, and that the interceptor can do its part of the job. The problem now is to prove that the interceptor and the ground system can work together; if they do not, we must know why and how to solve the problem.

It is appropriate that ADSID's activity is being launched at Hanscom Field, Bedford, Mass., around the corner from Lexington and—more important—in the shadow of the Lincoln Laboratory, where SAGE was born. SAGE is the mechanical marvel that can do the fast and accurate thinking necessary to recognize a modern air attack and provide sure-fire interception as far as possible from the target.

From the outset, ADSID has accepted the fact that USAF does not have the talent and manpower to do the job alone. For this reason, ADSID is a close parallel to the Ballistic Missile Division and has sought objective outside advisory services.

In the case of ADSID, this management consultant is a new nonprofit organization called Mitre Corp., being sponsored by MIT. The name derives from the meaning of mitre, to put together, and Massachusetts Institute of Technology-Rand Engineering.

In the short history of ADSID and Mitre it has been clear from the beginning that MIT desires to have Lincoln Laboratory revert to research work appropriate to an educational institution and pass on the systems engineering support to a separate organization. The goal set up by MIT is the assumption of full responsibility to USAF by Mitre Corp. as soon as possible.

ADSID is depending on Lincoln Laboratory for its professional help, and the project is well under way with this kind of sponsorship. It is the understanding of MIT, however, that Lincoln is supplying a technical systems management team to ADSID on an interim basis. There will be a subcontract from MIT to Mitre and a slow transfer of responsibilities from the university and its Lincoln Laboratory to the new nonprofit corporation.

Initial contract with Mitre, signed in July, was for $1.9 million. For fiscal 1959 it is estimated that ADSID's costs will be about $4.8 million, of which $3.3 is for the support of Mitre. The Mitre figure is based on the assumption that the corporation will need a staff of 110 professional civilians and support that will run total personnel up to more than 500.

An important part of the ADSID-Mitre approach is the caliber of the men who make up the new corporation. The chairman of Mitre's Board of Trustees is H. Rowan Gaither, Jr., who also is chairman of the board of the Ford Foundation. More pertinent is the fact that he headed the study of the Russian military potential made earlier this year for the White House. He also is chairman of the Board of Trustees of the Rand Corp., USAF military studies contractor.

President of Mitre is C. W. Halligan, formerly of Bell Telephone Laboratories, where he was director of military engineering, and has been working on air defense problems for the past six years.

Other Mitre trustees are Lloyd Dewitt Brace, president of the First National Bank of Boston; Frank R. Collbohm, president of the Rand Corp.; W. T. Golden, Trustee of System Development Corp.; E. E. Huddleson, Jr., a trustee of Rand Corp. and San Francisco attorney; James McCormack, Jr., vice president of MIT and former AF general; Robert Chapman Sprague, MIT trustee and chairman of Sprague Electric Corp.; Julius A. Stratton, chancellor and acting president of MIT; and William Webster, executive vice president of New England Electric System.

This is a group of dedicated public-spirited citizens desirous of performing a service to the country. They have indicated that their participation in this task is on the assumption that their support and capabilities are available to the whole Department of Defense air defense effort.

ADSID was set up by the USAF to integrate Air Force responsibilities in respect to air defense. The MIT and Mitre technical advice and engineering services can also be available to other Department of Defense agencies involved in other areas of responsibility for air defense.

Assuming that the Defense Department utilizes ADSID to pull together diverse elements of the air defense program, there will be the problem of locating the command in the over-all table of organization. There is wide support for the idea of making it part of NORAD. Another proposal is that it be placed under the new Directorate of Research and Engineering that will be created under the Defense Department reorganization which is now being carried out.—END

X-15 AWAY

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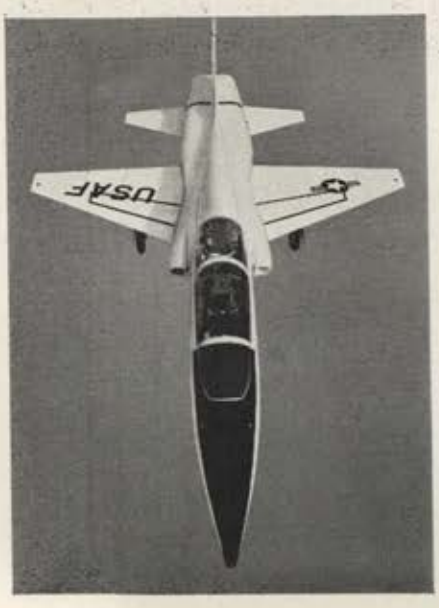

The lightweight T-38 is a compact, high-performance aircraft capable of supersonic speeds in level flight, with a service ceiling comparable to Century Series fighters. It offers airmen of the future the added safety of two afterburning turbojets—with ample power for single-engine takeoff, flight and landing. All of the T-38's systems and components are both simple and accessible, installed "one-deep" for maximum ease of maintainability. Rolled out ahead of schedule, the USAF-Northrop T-38 will begin initial flight tests in the very near future.

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STRATEGIC SURRENDER

An account and review of the Rand research study which stirred a wild Washington tempest of confusion and vituperation . . . especially among those who hadn't read it

Are some US defense officials thinking of our national position after a nuclear attack in which 15,000,000 to 90,000,000 Americans might be killed? Does their thinking extend to consideration of the conditions under which America might surrender? On August 8, almost thirteen years to the day after the atomic bombing of Hiroshima, a Washington news correspondent reported that "three nonprofit scientific agencies working for the Defense Department" were studying the conditions that might prevail after an all-out nuclear attack. Brig. Gen. Thomas R. Phillips, USA (Ret.), the military analyst of the St. Louis Post-Dispatch, *wrote that one agency was "studying the conditions when surrender would be advisable, rather than to try to continue a war that is already lost."*

This news story caused a tremendous furor throughout high officialdom in Washington, and one correspondent said that for two hours the top officials of the Pentagon did nothing but try to locate the sources from which General Phillips could have drawn his conclusions. President Eisenhower himself was reported to be incensed, and he assured the world that we had no plans for surrender and that if any government money had been spent on any such project it would be stopped immediately. Capitol Hill erupted into 500-odd mushroom clouds of oratory, and the Congressional Record *was filled with vivid prose maintaining that the US never had lost a war and that under no conceivable conditions would this nation surrender.*

A few days later it had become apparent that there was no such "report" as General Phillips implied. The book to which he referred, Strategic Surrender, *was entirely separate from other studies done on nuclear attack on the US, and most of the oratory had been, therefore, expended on a target which did not really exist.*

The storm apparently subsided completely as quickly as it had come up. A few thoughtful people went to the trouble of securing a copy of the book, and later editorial comment found the book itself to be what the editors of Air Force *believe it to be, a worthwhile discussion of victory and surrender policies and therefore a contribution to consideration of the means by which the US might achieve its goals if war were forced upon it.*

The following review was written by Michael Amrine, a Washington science writer and editor. He is former managing editor of The Bulletin of the Atomic Scientists, *has been a publications consultant to the Air Research and Development Command, and has previously contributed to this magazine. He is the author of a forthcoming book,* The Great Decision, *which tells the story of the policy meetings and decisions in dropping the first atomic bomb on Hiroshima and arranging the surrender of Japan. This book will be published in November by G. P. Putnam's Sons.*—The Editors

***Strategic Surrender, The Politics of Victory and Defeat*, by Paul Kecskemeti, a Rand Corporation Research Study (published by Stanford University Press, $5).**

Reviewed by Michael Amrine

WAR IS a continuation of politics by other means. This statement has become a crashing cliché in the years since Von Clausewitz first uttered it, but it has not become untrue. Wars begin where politics have failed.

When wars end, politics must begin again. And at that point, which is never so neat as a line on a map, there must be a time when the military and the political objectives of war are thoroughly mixed together—if by any

(Continued on following page)

chance they are not already completely homogenized. Whether there is a negotiated surrender, a revolution, or anarchy, somehow the military must phase out and the civil power phase in, or so it has been in the wars of the twentieth century.

And therefore—or so it must have seemed to the powers who manage Rand Corporation—it would appear to be logical that a research organization which studies war should study that blend of power and parley with which one comes to the end of violence.

How do you end a war?

In the book, *Strategic Surrender*, subtitled, "The Politics of Victory and Defeat," a member of the Social Science Division of Rand Corporation reports on a research study pointed at end-of-war questions. For the most part, any high-ranking staff officer could well consider the questions and answers raised by the author, Paul Kecskemeti. This modest study does not purport to tell anyone just how to end a war, but it does ask many of the side questions relevant to this large and probably unanswerable one.

The author of *Strategic Surrender* does not spend much of his time on the ponderable and imponderable factors of the future. What he does do, for the most part, is set forth some fresh thinking on the subject of goals and methods in war and in victory, backed up by a study of recent history. In most of the book, he reports, with a high degree of objectivity, on four important surrenders of World War II.

There is simply no comparison possible between this study, and *what was said about it,* on the floors of Congress and by government spokesmen in the White House and the Pentagon. Many persons erroneously believed—that somewhere, somehow, a "government agency," or perhaps two or three agencies, were working on plans for ways and means to engineer the future surrender of the United States. Under what conditions anyone was thinking of surrender, the critics never specified.

Some cool-headed persons may suggest that somewhere, somehow, in all good faith, the Defense Department *ought* to have some planners giving thought to this surrender contingency. In the past, it has been standard doctrine that the military should plan for even quite remote contingencies; for example, that under some conditions the British might once again come down on us—from Canada. So, without being a Benedict Arnold, some military planners might suggest a study of a possible US surrender. This review will not go into that subject, for two reasons: One, there is no use in further stirring up the animals, and two, *this book does not happen to mention the subject of a United States surrender.*

As the Rand Corporation said in a public statement prepared following the publicity brannigan on Capitol Hill, "Nowhere does the study or the book deal with any hypothetical US surrender. The question of negotiating with an opponent of the US in a wartime situation is treated solely in the context of a termination of a war in which the US would be victorious."

Mr. Kecskemeti, who is an exceptionally clear writer, and therefore a rare bird indeed among social scientists, has written straightforwardly about two subjects. One is the historical record of four surrender-victories, which takes 184 of his 258 pages. The other subject is the general conclusions which he personally draws from his analysis of that record.

Like most human beings, Mr. Kecskemeti seems to have some biases, and like all social scientists and historians, he deals with subjects in which there must be interpretation. But an ironic note in this episode of charges and countercharges about "plotting to surrender" is that there is nothing invidious or devious about the style of this book. The author is lucid and explicit in what he says. When he is critical of a policy, as he is of "unconditional surrender," Kecskemeti bluntly says so, without any academic circumlocutions.

If a military reader disagrees completely with Kecskemeti's conclusions, he may still find the absorbing story of the four surrenders worth the price of admission.

Now here are some of the things that Mr. Kecskemeti does talk about:

Allied strategy in World War II was dominated by the concept of surrender.

This is the opening sentence of the book and Mr. Kecskemeti says that both the Axis and the Allies took for granted that final defeat would take the shape of mass surrender of forces. Mr. Kecskemeti holds that this is a new idea in the modern era—that previously people had thought that wars ended in other ways, perhaps with the conquest of the enemy's capital, perhaps with a "battle of annihilation." He holds that World War I did end in a final mass surrender, but we came to the strategy by trial and error and the terms of capitulation "came as a surprise." He says one of his purposes is to "throw some light on why surrender became such a dominating concept in the last war." He says the second purpose was to show why "planning of postwar political arrangements was influenced by the Allies' preoccupation with surrender as the epitome of victory."

What is surrender and how does it differ from rout or disruption?

Kecskemeti says that "surrender means that winner and loser agree to dispense with a last round of fighting." He says that when a loser's forces still have some semblance of order but the handwriting is on the wall, it is a rational decision for the loser to save himself the losses of the last battle or the last few battles. By the same token, accepting surrender is a rational decision for the winner. To a great extent then he sees surrender "as an act by which one side renounces any further use of a residual fighting capability," and he distinguishes between tactical surrender, when surrounded or starved-out units give up, from strategic surrender, in which the entire hostilities are brought to an end. He describes the German surrender to the Allies as one in which successive tactical surrenders added up to a strategic surrender. And the German surrender was the only truly unconditional surrender of the examples he gives. Besides the German surrender to the Allies he studies the surrender of Italy, the surrender of France to Germany, and of Japan.

Offering and accepting surrender is a negotiation in which the losers' bargaining power is not absolutely nil.

Kecskemeti says that it is natural that the winner, who is operating emotionally as well as logically, should tend to think that the loser has no strength worth considering, but in this reviewer's opinion he documents very well his thesis that all of these losers, even shattered Germany and demoralized France, had bargaining counters in their surrenders. He says that "it is possible to pay too much for victory and even for stalemate," a concept which he gives new meaning in the nuclear age. But in this reviewer's opinion he goes too far with his very next sentence: "One may safely say that the maxim 'in war there is no substitute for victory' is totally erroneous." However,

(Continued on page 73)

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he has done a very thorough study of the military-political situation in each of his examples. He shows how members of the French government had extremely mixed and sometimes corrupt motives in their surrender, but he makes obvious that reasonable men could differ in their assessment at the time of the French debacle, as to the values of holding out for neutralizing the French fleet, for example. He summarizes this one by saying, "The French succeeded in surrendering on a qualified basis and salvaging partial sovereignty; the Germans avoided time-consuming terminal operations."

The doctrine of unconditional surrender.

Space does not permit an adequate summary of Kecskemeti's masterly discussion of the pros and cons of our doctrine of unconditional surrender. He shows the contradictions and confusions involved in our efforts to deal with the king of Italy and Premier Badoglio when we were trying to wind up the Italian war and to preserve some of their military capability so that it could be used on our side. As things worked out we not only did not wish to annihilate their forces; we eventually gave them the never-never status of cobelligerency. Of this fantastic period, Harry Butcher, Eisenhower's aide, wrote in his book *My Three Years with Eisenhower* that, "Ike regretted existence of rapid communications. If we were still in the day of sailing ships, he thought he could deal more quickly and advantageously with the Italians than is possible when he has to communicate to both Washington and London and wait for the two capitals to concur or direct."

Unconditional surrender and a vacuum of power.

Kecskemeti makes a very convincing case, in the opinion of this reviewer, that rigid application of the doctrine of unconditional surrender leads to a strange impasse in which one is saying that one will never deal in any way whatever with the criminal aggressors who are running the enemy countries. If there is no dealing whatever and one is waiting for that government to fall, one is really hoping for a complete vacuum of power, in which case there will really be no one with any authority to surrender. Kecskemeti does an excellent job of showing the contradictions involved. He holds that the American view of international affairs is that "in the normal, healthy state of national affairs there is no need for the actual or threatened 'use of coercion.'" Then he says things may be unhealthy and someone may commit aggression, and war against them has but one political objective, "the elimination of all political forces responsible for aggression." So he holds that wars waged in this spirit are "essentially crusades." One may note that General Eisenhower called his book *Crusade for Europe*.

Kecskemeti says that this "crusading concept of war" has been vigorously criticized in recent years. At the end of his book he says that in the nuclear age we must learn to be satisfied with more limited objectives.

He notes that even Germany, after the death of Hitler, was not utterly disorganized and that the caretaker government of Admiral Karl Dönitz still had something to gain by the stalling tactics. Essentially the Germans kept on bitterly fighting the Russians in the East while they surrendered in the field very readily to the British and Americans. This permitted many civilians and the military to leave the area which was to be dominated by the Russians. "All in all two and a half to three million German soldiers and civilians escaped from the path of the Russians during Dönitz' tenure."

If we were able to spring 2,500,000 people today from behind the Iron Curtain so that they defected to our side we would count it a major victory in the cold war. Thus we can credit Kecskemeti's convictions that even the Germans salvaged something which they wanted very much by the manner of their surrender, although they were not able technically to secure separate surrender agreements with the West and with the East.

A proper surrender policy might have ended the Japanese war much earlier.

The incredibly complicated story of Japan's effort to surrender is very well told in this study. In his belief the Japanese were not only defeated, but those who desired to surrender were well on their way to winning out before the atomic bombs were dropped. In general he supports the airpower advocates who believe that bombing had already accomplished their military objectives in the Japanese war, but to this reviewer he overstates his case when he says, "The atomic bombs, far from being the 'controlling' factor, caused no significant reorientation of attitudes, no manifest change in points of view."

In concluding his book he gives only thirteen pages to discussion of possible surrender policies of the future. He particularly addresses himself to questions of limited war which have obvious implication for consideration of limited victories. It is here that he discusses the possibility that sometime in the future one or more countries might develop the ability to deliver a first strike that would utterly destroy the significant military capability of the enemy. To him this raises the possibility of a surrender without fighting. It is this passage which has set off pinwheels of oratory, but he does not mention either America or Russia in this connection.

The reader might note, however, that during the brief period of American atomic monopoly we were almost in this position as regards Russia, and today Great Britain, America, and the USSR are in precisely this position toward many smaller countries who are not armed with modern weapons. He is only saying that it is theoretically possible that through scientific and production breakthroughs one of the great powers, for a brief period, might be in this same position toward other great powers. In that case the bargaining power of the underdog would be very close to nil and his will to fight might logically be absolutely nil.

On his final page he says that the new strategic situation, which has been brought about by nuclear weapons, may be put as follows:

"Powers may seek to survive in the nuclear age, either by going to extremes of inhumanity and malevolence never imagined before, or by drastically limiting their expectations of gain from the application of armed power. Adjusting to the new conditions is bound to be particularly difficult for the United States, because both of the available alternatives are diametrically opposed to traditional American political attitudes. Systematic malevolence is as alien to the American makeup as overblown emotional expectations of unlimited gains are congenial to it."

Although this reviewer believes that this book oversimplifies things in some of its interpretations, it is recommended as extremely stimulating reading. Mr. Kecskemeti has done some very clear and provocative thinking, not just about conjectures, but about the realities of our time. It should go on the shelf alongside the books of George F. Kennan, Thomas K. Finletter, Henry A. Kissinger, Brig. Gen. Dale O. Smith, and Sir John Slessor, as important reading for anyone trying to understand what our national policies should be in the future.—END

TV'S STEVE CANYON

Most famous USAF officer comes alive on home video

THE most famous lieutenant colonel in the US Air Force—known to 40,000,000 readers of more than 600 newspapers in thirteen countries—Milton Caniff's square-jawed Steve Canyon, has come alive on NBC television in a weekly Saturday night Air Force adventure series sponsored by Liggett & Myers, makers of Chesterfield cigarettes. The premier show was on September 13, at 9 p.m. eastern time. Starring Dean Fredericks, the new program is designed to provide the video public with authentic airpower information in an exciting and interesting format. Stress is on the greatest possible realism.

Creator Caniff spent four years lining up the production team for the new series, which is staffed by film experts including Mike Meshekoff, original executive producer of "Dragnet," who holds the same spot on the new show, and David Haft, World War II B-17 pilot, who is producer. Pegasus Productions is filming the show.

Star of the show, Dean Fredericks, a newcomer to stardom, is a near-perfect ringer for the King Features-distributed comic strip Canyon and was chosen over several better known actors. Fredericks has the same high-cheekboned ruggedness as his newspaper prototype, is thirty-four years old, weighs 190 pounds, and is six feet, three inches tall. The one item missing—that dark streak in Colonel Canyon's blond hair—is applied by the makeup man.

In addition to his acting prowess, Fredericks is what artist Canyon calls a "good baritone-type guy," much like the newsprint Steve. A veteran who overcame a slight limp that might have

(Continued on page 77)

In the flesh, on television, Dean Fredericks portrays famous airman.

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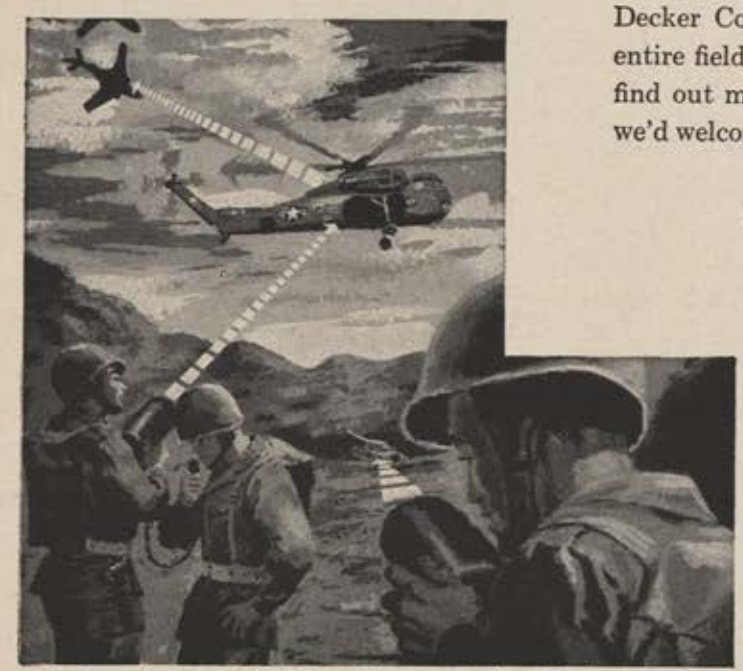

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Reporting for duty, television's Steve Canyon beams from aircraft cockpit in pose matching original drawing by Caniff.

disqualified him for he-man acting roles, Fredericks studied drama under the GI Bill. He's a native of California's Antelope Valley, an area where the Air Force story is told daily in a real-life manner, audible with jet craft roars and sonic booms.

The story of Milton Caniff, himself, Canyon creator and co-owner of the television series, is as fabulous in itself as his adventure strip.

The next of kin to Lt. Col. Stevenson B. Canyon, AO 041044, is a native of Hillsboro, Ohio, who went to New York in 1930, a depression-year graduate of Ohio State, to draw "Dickie Dare" and the "Gay Thirties" for the Associated Press. In 1934 he was hired by Joseph Patterson, publisher of the New York *Daily News*, to create a new kind of adventure strip—the now famous "Terry and the Pirates."

"Terry" caught on like wildfire, but Caniff hankered for a strip he could call his own. And in 1947 he created "Steve Canyon." The faith he had engendered by his artistic and imaginative prowess is indicated by the fact that before Caniff had committed a line to paper, 125 papers across the country had signed up for the new strip.

From the beginnings of big-scale television, Caniff had offers to put Steve Canyon on TV, but only when he was convinced that a team of top-notch producers and the perfect film-Canyon could be brought together for realism and faithfulness to the news strip, would he assent.

The new show portrays Colonel Canyon as an Air Force trouble-shooter. The show has Air Force and aviation-industry approval and cooperation, and a veteran Air Force

(Continued on following page)

Tense moment for Steve . . . "That's all, Colonel, you're dismissed!" General "Shanty" Towne is played by Harry Townes.

flyer, Lt. Col. Frank Ball, has been assigned as technical adviser. Problems of the aborning space age will be featured, and viewers will—after watching—have a better idea of where the Air Force is going in these fast-moving times. Authentic Air Force footage will help provide authenticity.

Although much interest had been shown in making the Canyon story into a movie, Caniff felt television would be the better medium.

"I never could see Canyon as a movie," he says, "probably because it would have ended up as a vehicle for kids. This show will be pointedly adult.

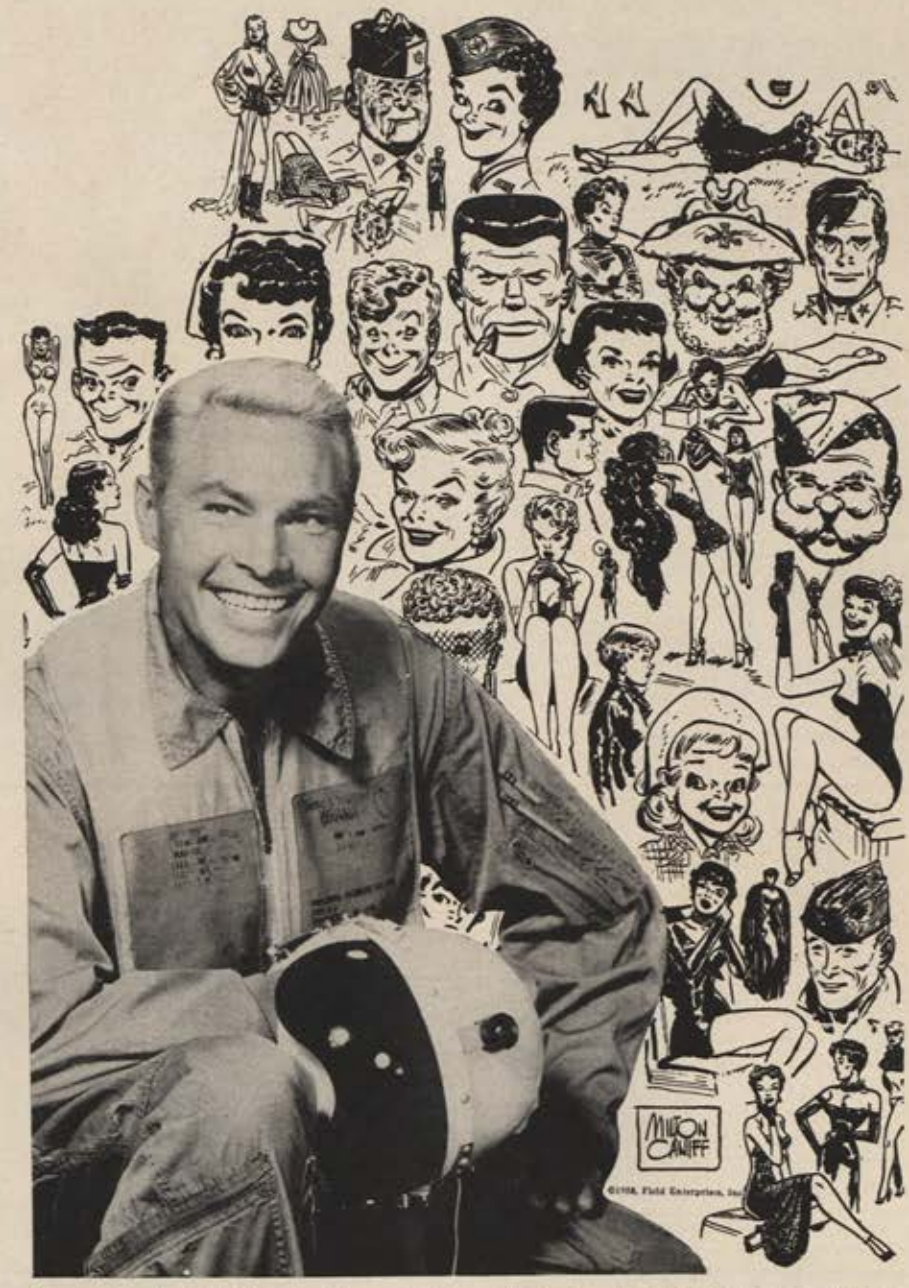
"I think television is just right for a comic strip. Each episode will be like a Sunday comic strip, enough for telling a short story."

Caniff's credo on the new show:

"Entertainment is the first consideration, of course. But there's . . . public service, too. Without being chauvinistic, we want to make the services attractive.

"Although the premise is adventure and romance, the Air Force pledged its support to the series after being assured that there wouldn't be any of that wild-blue-yonder stuff about devil-may-care flyboys. After all, you need responsible characters sitting at the controls of these $3 million hunks of metal.

"As I picture him, Steve's a dedicated guy. All the services have this type. He's flip about his patriotism and his service but he feels it very deeply. Steve isn't the type to get married. He's a freewheeling bachelor with a bulging black book—girl friends everywhere. A lot is suggested—the rest will be up to the knowing viewers. Still, Steve can't be a rake or a libertine. A hero has to be heroic."—END



Show star Fredericks, as Steve, against a beaming background of Caniffiana.

"Kissin' Cousin" Canyon, who's romantic as well as patriotic, will get every opportunity to meet gals, just as in the comic strip.

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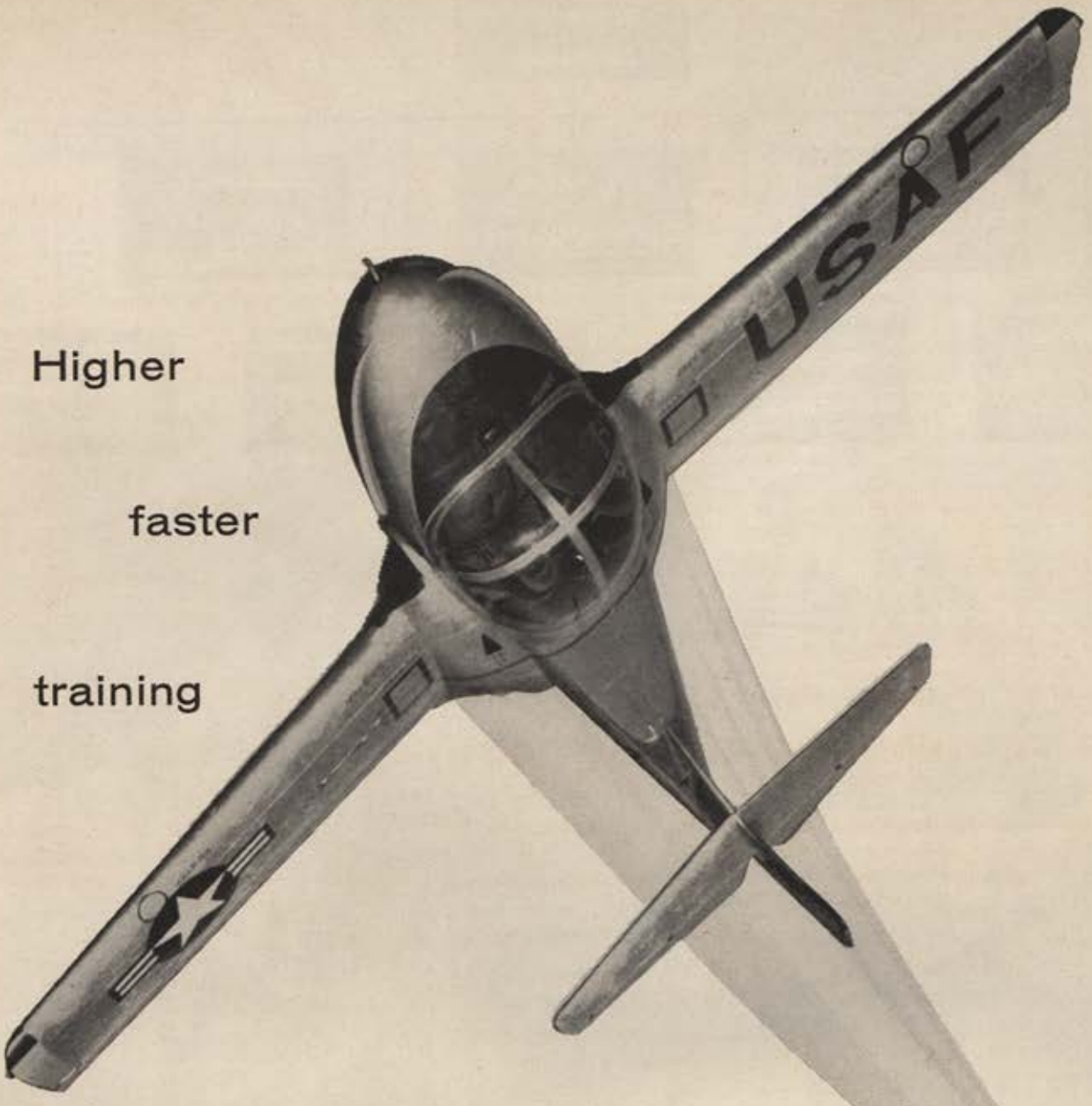

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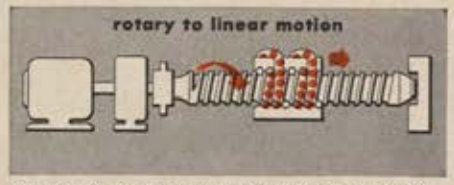

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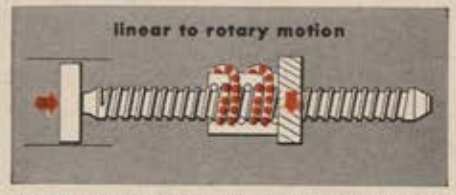

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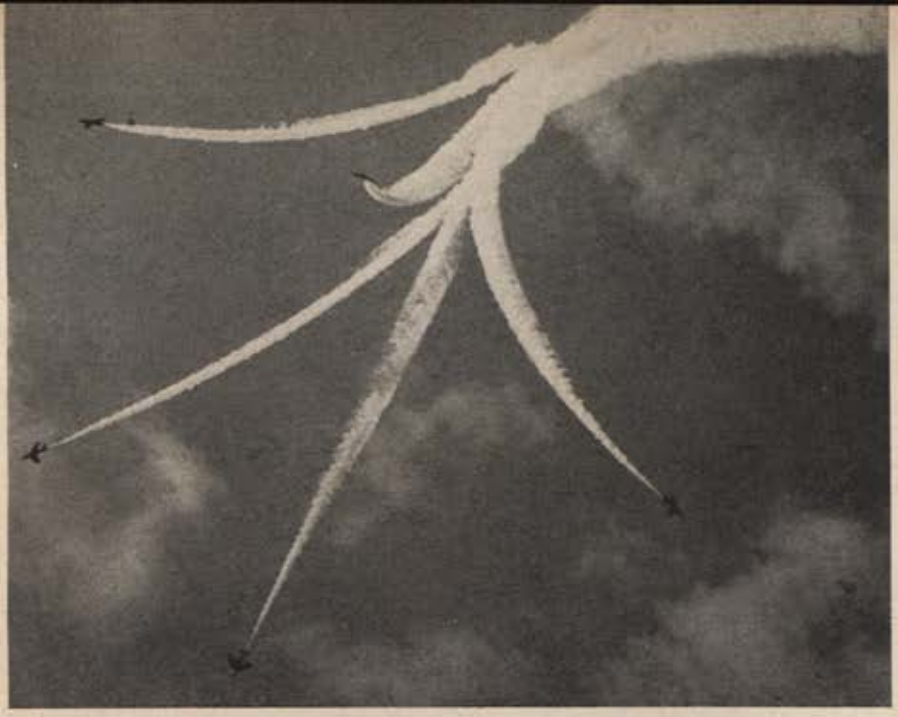


Superb aerobatics were flown daily by members of the RAF's crack 111 Squadron. Opening as a twenty-two-plane formation, they looped, with gradual reduction to a final five, shown here soaring off after smoke-trailing bomb-burst.

FARNBOROUGH '58

By Robert R. Rodwell

PHOTOS BY ROBERT RODWELL AND ROY ALLEN

AEROBATICS by four jet nuclear bombers, loops by twenty-two Hunter fighters in tight diamond formation, and a Mach 0.99 fly-past at thirty feet by six Scimitar naval strike fighters were the military highlights of the flying program at the 1958 Farnborough exhibition, one of the better shows of recent years. In marked contrast to 1957, there were several new types to display, and interesting revelations of civil and military aircraft and missiles. Operational procedures used with Bloodhound and Thunderbird surface-to-air missiles were publicly shown, and the display also recorded excellent progress with rotary-winged aircraft.

Among aircraft making their first appearances, those of military interest were the Blackburn NA.39, a low-level strike aircraft developed for the Royal Navy; the fourteen-ton Westland Westminster flying crane; the Fairey Rotodyne, the world's first VTOL transport; the Fairey Gannet AEW.3 twin-turboprop early-warning aircraft; and the Bristol 192, Europe's first production twin-rotor helicopter, now being built for the RAF.

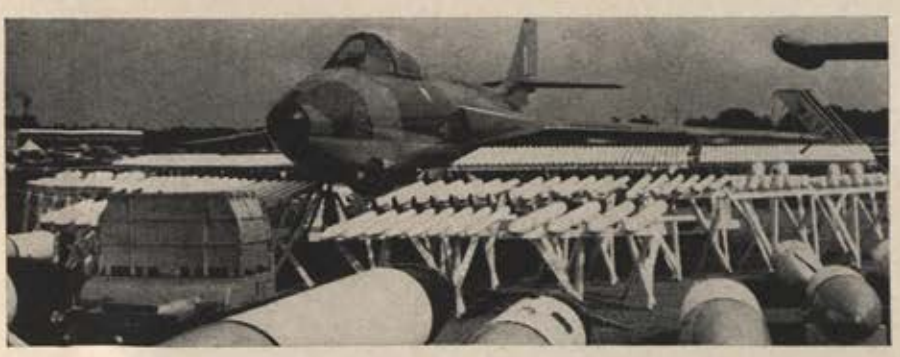
The star of the show, with outstanding military *and* airline potential, was the Rotodyne. This aircraft, for which a license has been taken by Kaman Helicopters in anticipation of US service orders, takes off and lands as a helicopter, but for forward flight is driven by two normal tractor propellers, the rotor autorotating. Stubby wings contribute sixty percent of the lift in forward flight; the ninety-foot rotor provides the rest. Auxiliary compressors mounted behind the two Napier Eland gas turbine engines deliver air to kerosene-burning tip pressure jets for vertical or hovering flight. The Rotodyne has a retracting undercarriage and cruises at about 185 mph. Over a 500-mile stage it carries forty-eight passengers and their baggage, or 15,000 pounds of freight or vehicles loaded through rear-end clam-shell doors.

The big, skeletal Westminster continued the heavy emphasis on rotorcraft. This helicopter has the proven rotor and transmission system of the Sikorsky S-56, for Westland and United Aircraft have operated a technical agreement for years, but otherwise the design is completely new. Two Elands again power this aircraft, and these are mounted side by side on top of the fuselage, driving the single rotor through a common gearbox. The first prototype has a simple uncovered tube fuselage, being essentially a test rig, but a forty-eight-seat transport and a lightened heavy-lift utility, are contemplated for production. Another new craft in Westland's four helicopter "circus" was the Wessex, an antisubmarine aircraft developed from the Sikorsky S-58, with a Napier Gazelle free turbine engine. Two of these engines are used to power the tandem-rotor, twenty-five passenger Bristol 192 transport helicopter, which was also making its first appearance.

Still another new item was the privately financed Saunders-Roe P.531 five-seat helicopter, the prototype of which has a 450-hp Blackburn Turmo free-turbine engine. The transmission and rotor system is designed for engines of up to 650 hp. This aircraft is very compact, although the cabin is spacious, and its makers are hoping that it will be ordered as a liaison helicopter for the British Army.

High-speed honors at Farnborough went again to the English Electric P.1B, now named the Lightning (although there the similarity to Lockheed's famous P-38 ends). Royal Air Force test pilot Jimmy Dell flew the Lightning through shuddering high G

(Continued on page 86)



Brightest sight in the aircraft park, which attracted considerable interest, was this sizable, multicolored array of underwing stores. The collection, from RAF armament, was shown before a Hawker Hunter Mk. 6 ground-attack plane.

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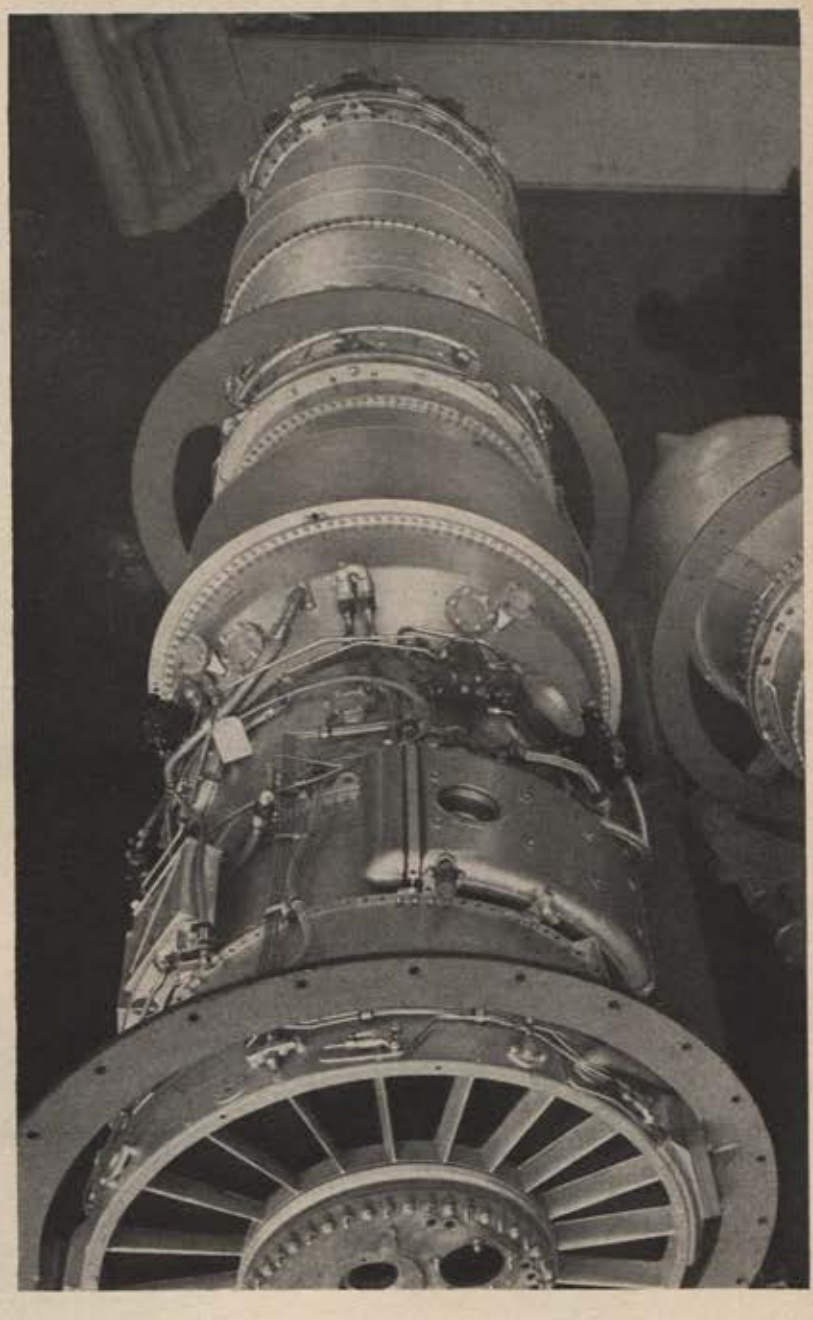


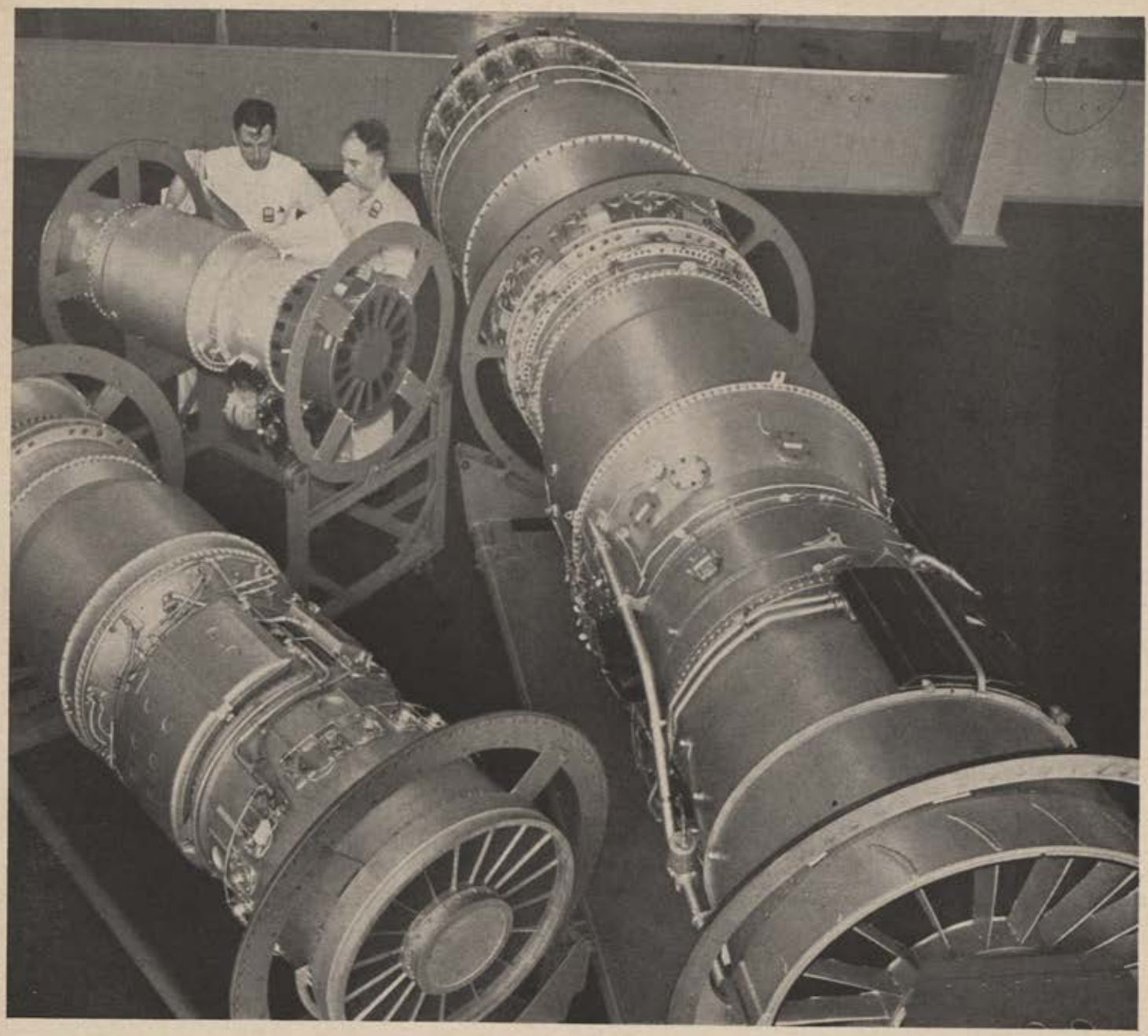
From engines of tremendous power to a smaller new one of 2900 pounds thrust, the world's "first family" of jet power plants bears the name of Pratt & Whitney Aircraft.

No other group of jet engines has achieved comparable prominence . . . won on the basis of design superiority, manufacturing excellence, and uniformly top-notch performance and dependability. And no other group of jet engines has even approached the contributions made by this axial-flow family to American superiority in jet aviation—military and commercial.

Most powerful members of the family now in production are the twin-spool J-75 and J-57 engines. They have accumulated nearly 3 million hours in many assignments . . . in bombers, tanker-transports, fighters and attack aircraft. Their commercial versions, the JT4 and JT3, will power the majority of jet transports ordered by U. S. and foreign airlines.

The smaller twin-spool J-52 is in the medium power range. This 7500 pound-thrust engine is slated to power a new missile, and a new twin-engined attack fighter.

Smallest and newest is the JT12, a simply-built,



rugged, efficient engine that reflects Pratt & Whitney's extensive engine-building experience. The JT12 weighs only 430 pounds, yet due to its advanced design it produces 2900 pounds of dry static thrust. With a single spool and fixed geometry, the JT12 promises outstanding performance, reliability and ease of maintenance for many possible applications.

Meanwhile at Pratt & Whitney Aircraft's research and development centers in Connecticut and Florida development continues on the powerful new J-58 engine, and various aircraft propulsion systems of the future are being explored or developed. When the time comes, they will be ready to take their places as working members of the world's "first family" of power plants for flight.

"FIRST FAMILY" of the jet world now includes four axial-flow jet engines, all pictured here. At left, the famous J-57; with afterburner it develops over 15,000 pounds-thrust. The commerical version (without afterburner) is the JT3. At far right is the big J-75 with afterburner, which produces over 20,000 pounds-thrust. Commerical version (without afterburner) is the JT4. Bottom center is the 7500 pound-thrust J-52. Behind it is the new JT12, appearing almost tiny beside its powerful big brothers.

Pratt & Whitney Aircraft *Division of United Aircraft Corporation*

CONNECTICUT OPERATIONS—East Hartford, Meriden, Middletown, North Haven, Southington

FLORIDA RESEARCH AND DEVELOPMENT CENTER—United, Florida

On display in the guided-weapon park was the Bristol Bloodhound surface-to-air missile. Bloodhound has two Bristol Thor ramjets for sustainers, is to be used in home defense.

Mockup of British stand-off bomb was shown under an Avro Vulcan four-jet V-bomber. The device, under development for the RAF, attracted considerable notice at Farnborough.

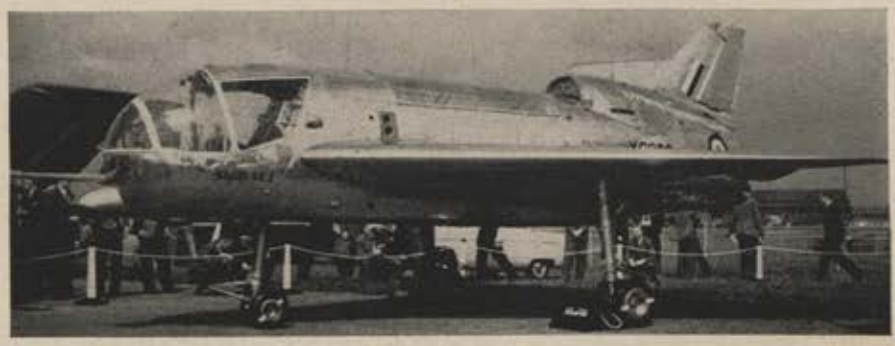
turns at low altitude, and on the closing day scared the control tower staff by bringing the heavy interceptor in a supersonic run a few feet over the grass, causing a shock wave which shattered most of the glass in the tower and office blocks. The Lightning, ordered for the RAF has two Rolls-Royce Avons with reheat (afterburner), giving a total thrust of about 29,000 pounds, and a Napier Double Scorpion rocket in a ventral pack, to give combat capabilities at heights in excess of 90,000 feet. It has a fully automatic fire-control system, and the armament is two Firestreak infrared homing missiles, two thirty-mm caliber cannons, and forty-eight unguided two-inch rockets in retractable packs.

The most eagerly awaited warcraft was the Blackburn NA.39, which flew from a nearby experimental field. This carrier-borne, low-level attacker, with two DH Gyron Junior turbojets, is a complete weapon system, for its development has been hand-in-hand with that of sophisticated electronics to give it very high-speed capabilities at very low altitudes, *in all kinds of weather*. The structure is largely "hacked from the solid." It has full boundary layer control and a unique split tail-cone airbrake, which Derek Whitehead opened as he flew in front of the crowd in a low-speed pass, with everything hanging and blowing full "on." The rate of retraction of the undercarriage was extremely rapid as he pulled the NA.39 up into an accelerating climb.

An unexpected relaxation of security allowed Avro to fly over a mockup of the stand-off bomb (air-to-surface rocket-propelled missile) under development for the RAF's V-bomber force. Visitors could see the yellow weapon nestling under the belly of its Vulcan carrier. It is about thirty-five feet long, and early versions are reported to be turbojet powered, with later developments having liquid-fuel rockets. On the Avro stand there was displayed an "air-launched aerodynamic test vehicle," which was obviously a research missile, about half scale, for the powered bomb. Small, sharply swept delta foreplanes are at the nose of the ogival body, and at the rear are larger delta mainplanes, and both dorsal and ventral vertical surfaces. The ventral fin folds sideways to clear the ground for takeoff, extending before release. The small test vehicle exhibited had pivoted foreplanes for pitch control, with rolling control given by inboard ailerons on the mainplanes. Both the mainplanes and fins had symmetrical lenticular sec-

(Continued on page 90)

The new Blackburn NA.39 twin-jet carrier-borne strike bomber make low passes over the crowd, with tail-clapper airbrake in the open position.



On display in the aircraft park, but not flown during the exposition, was the Short SC.1 jet-lift research aircraft. A small, delta-wing aircraft, it has four RB-108 lift engines and one propulsion unit of the same type. The craft has passed tethered tests in gantry and undergone some forward flight tests.

BURROUGHS "VEST POCKET CREW" PACKS A TRIPLE WALLOP

AIRBORNE DIGITAL ELECTRONIC COMPUTER WILL "TAKE OVER" FOR PILOT, NAVIGATOR AND BOMBARDIER ON NAVY'S NEWEST JET BOMBERS.

The crowded quarters of carrier-based aircraft leave little room for electronic "brains"—a scant few cubic feet in the case of the Navy's requirement for its AN/ASB-8 program: a package computer capable of target-approach pilotage, navigation and precision bombardment. And that's just what Burroughs, working closely with the Naval Ordnance Test Station, China Lake, is doing—cutting a roomful of equipment down to size. Burroughs Corporation, 6071 Second Avenue, Detroit 32, Michigan.

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It is typical that these Big Brothers of ours never are Too Big nor Too Busy to link hands with industry-kinsmen in worthy local, state, and national affairs.

Such was the case in September when Dallas-Ft. Worth hosted a memorable national convention of the Air Force Association.

For AFA, Southwest Airmotive (overhauler of jet engines for the military) worked in harness again as a relatively small but fiercely proud member of this distinguished Texas-American family circle.

So we join pretty Suzanne Adams in saluting this Big Four:

Chance Vought Aircraft, Inc., whose record-breaking Navy Crusader jet fighter she holds in her hand, and whose supersonic Regulus II sub-based guided missile is seen on bottom step;

Convair, developer of the USAF's mighty Mach 2 B-58 bomber;

Temco Aircraft Corp., with its Navy TT-1 primary jet trainer and the XKDT rocket-propelled, high-speed target drone, and

Bell Helicopter Corp., producer of helicopters for industry, the Navy and now, under USAF-administration, a turbine-powered helicopter for the Army.

Thanks, Big Brothers — well done, indeed!

Southwest Airmotive Co.

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The Bristol 192 helicopter is designed to carry groups of about twenty-five troops over short ranges, and is now in production for the Royal Air Force. Powered by two gas turbine engines, the 192's prototype was on display at show.

On exhibition was Britain's largest private-venture helicopter, the Westland Westminster. Picture shows the craft taking off rearward. A kind of flying crane, the Westminster is under development as a forty-eight-seat transport.

Considered by many the most radical plane at the show was the Fairey Rotodyne VTOL transport, a forty-eight-passenger craft with military, civil applications.

Shown with huge underwing nacelles, each housing weapons or 2,040 gallons of fuel, was Handley Page's Victor Mk. 1. The encumbered bomber flew aerobatics.

tions of about five percent thickness.

The flying at Farnborough is always immaculate, but this year was unusually spectacular and imaginative. Handley Page test pilot Johnny Allam brought an eighty-ton, 110-foot-span Victor bomber, with enormous underwing tanks, thundering low over the runway before pulling up into a half loop with a roll off the top at about 4,500 feet—the evasion maneuver for low-altitude toss-bombing. Not to be outdone, Avro pilot Tony Blackman, flying a ninety-nine-foot-span Vulcan Mk. 1, performed the same maneuver immediately after takeoff, while his colleague Jimmy Harrison, in the 110-foot-span Vulcan Mk. 2 prototype, flew long climbing rolls.

The RAF's famous Number 111 fighter squadron, lead by Squadron Leader Roger Topp, opened the air force spot in the program. Treble One, which has officially represented the RAF at international air shows for three years, usually opens with a nine-Hunter formation, which reduces to a five-man team for the second half of the routine. Something new was expected for Farnborough, but nobody expected Topp to appear over the far end of the airfield, on the preview day, leading a tight twenty-two-airplane formation. Two loops in this formation, then six Hunters peeled off, sixteen aircraft barrel-rolled and flew wing-overs, seven more disappeared, leaving the usual nine-aircraft diamond-shaped group. After more routines, the rear four in this formation bomb-burst around the other five in a vertical dive. The five went on to complete the show, before disappearing in a beautifully judged vertical bomb-burst, each Hunter trailing smoke as it sped low over the horizon. It was superbly staged performance.

More than 300,000 people visited Farnborough during the six-day show; nearly 250,000 of them during the three public days. They, and the thousands of official guests from scores of countries, saw an unsurpassed display of British technological skill—a vigorous demonstration by an industry which only a year ago was talking of a gloomy future.—END.

Author Rodwell, a close observer of British and international aviation, is one of the staff of the British Aeronautics. *His reporting has several times graced the pages of* AIR FORCE, *most recently in last month's account of the British Swallow, polymorph aircraft. An earlier article was on the V-Force.*

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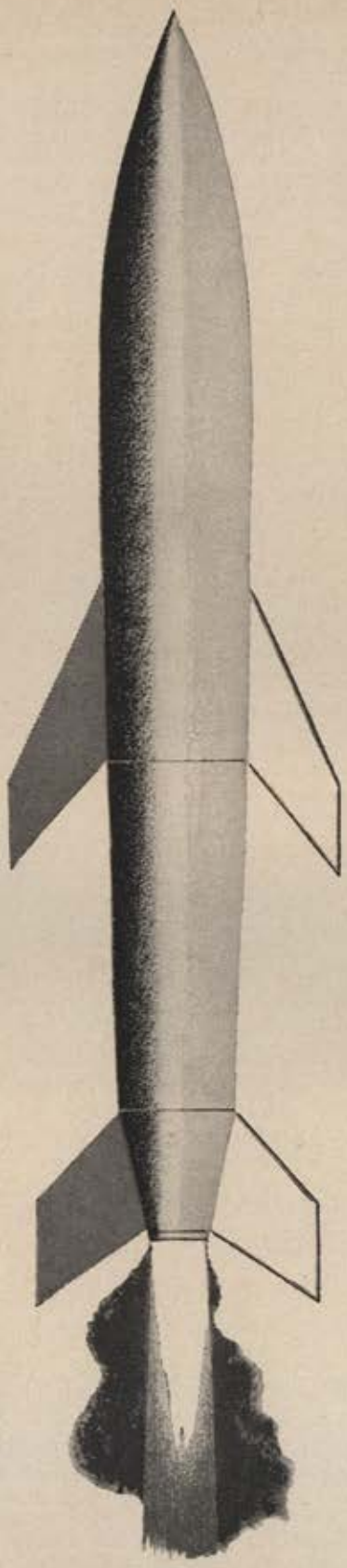

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Gathered for photo portrait after the presentations of the Space Education Foundation's awards at ARDC's Fifth Annual Science and Engineering Symposium, held at Andrews AFB, Md., were, left to right, Dr. George Valley, Chief Scientist of the Air Force; Lt. Gen. Samuel E. Anderson, Commander, ARDC; Murray A. Schwartz, one of two first-place winners; Laurence C. Mansur, who read third-place paper; Hari K. Sen, second-place winner; Peter J. Schenk, AFA President.

ARDC's Fifth Annual Science Symposium

Scientific Papers Earn Space Education Foundation Honors

SPACE age topics ranging from ballistic missile defense problems to artificial modification of the upper atmosphere filled a two-day technical agenda at the Fifth Annual USAF-ARDC Science and Engineering Symposium.

More than 400 Defense Department and service R&D specialists were on hand to hear the series of presentations, held July 22-23 at the auditorium at Andrews AFB, Md., ARDC Headquarters.

Keynote address at the meeting, an annual event designed to provide ARDC engineers and scientists an opportunity to present their ideas to a large, specialist audience, was given by Dr. Hugh L. Dryden, after opening remarks by Lt. Gen. Samuel E. Anderson, ARDC Commander.

Included in the first day's scientific papers was a report by the late Capt. Iven C. Kincheloe, Jr., who died in a jet crash a few days after the symposium.

Three of the forty papers delivered (each highly classified) were chosen for the annual Research and Development awards of the Space Education Foundation, affiliated with the Air Force Association.

The winning paper was "Zirconcia: Its Crystallographic Polymorphy and High Temperature Potentials," by Berthold C. Weber and Murray A. Schwartz, of Wright Air Development Center. The authors received cash awards and the first-place trophy.

Air Force scientists at the Cambridge Research Center won second and third in the Space Education Foundation competition. The second-place paper was. "The Role of Radiation in Shock Propagation with Applications to the Altitude Scaling of the Fireball," by Hari K. Sen and Arnold W. Guess. Third place went to "Production and Measurement of Extremely Large Gas Temperatures," by Dr. Heinz Fischer. These winners also received cash awards and plaques.

AFA President Peter J. Schenk made the presentations on behalf of the Space Education Foundation.

Judges for the awards, along with Schenk, were Dr. James T. Gray, Director of Research and Development, and Dr. Hugh Miser, Office of Assistant for Operations Analysis.

On hand as chairman of the symposium was Dr. George Valley, Chief Scientist of the Air Force.

Among the papers presented at the meeting were these:

"An Assessment of Soviet Science," by Dr. John Turkevich, Princeton University.

"Strategic Space Force," by Richard S. Cesaro and Robertson Youngquist of ARPA.

"European Science," by Lt. Col. Albert C. Trakowski, European Office, ARDC.

"Human Performance Problems in Ground Support of Space Vehicle Systems," by Dr. Ralph W. Queal, WADC.

"Utilization of Satellite Observations in Weather Analysis and Forecasting," by W. K. Widger, Jr., and C. N. Touart, WADC.

"An Approach to Automatic Language Translation," by George A. Shiner, RADC.

"Extended Storage Capability for Nuclear Weapons," by Lt. Benjamin E. Bader, AFSWC.

"On Metal Whiskers," by Charles Yost, AFOSR.—END

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AIRMEN OF NOTE

Music, the best, is the Airmen's happy stock in trade.

Sax section adds strong emphasis, earns extra applause during Airmen concert.

Trams, smooth or hot as the score requires, add mellow content to the Airmen's famous best-in-business sound.

Airmen's featured vocalist, Duff Thomas, who's been singing since teenage, wows any crowd with pop tune.

Photos by John Gorman

WHETHER they like it hot, cool, or just smooth, music lovers from Norway to Istanbul, Turkey, have a treat ahead of them as the Air Force's official dance band, the Airmen of Note, under the baton of Johnny O'Seekee, makes its rhythmic way across Europe on a goodwill tour sponsored by the USAF and the US Information Agency.

The aggregation, sixteen men strong, plus vocalist Duff Thomas, includes veterans of the great Tommy Dorsey, Les Brown, Harry James, Gene Krupa, and Ralph Flanagan bands, and was the group seen by millions in "The Glenn Miller Story," hit motion picture that featured James Stewart.

Their current tour—which follows their traditional appearance at the AFA Convention—includes stands at the Brussels World Fair in the American theater there, shows in Norway, Denmark, Germany, France, Italy, and Turkey, with plans for radio and television broadcasts. The band's first appearance is scheduled at Weisbaden, Germany, on October 4.

Formed to continue the traditions of the great World War II Glenn Miller Air Corps Band, the Airmen of Note are a component of the Official USAF Band, Washington, D. C., commanded by Col. George S. Howard. —END

THE MAN BEHIND THE GREASEGUN . . . The exploits of the fliers and aircraft that are keeping our nation secure can not be written without proper credit to the unheralded man behind the greasegun. He is a member of a maintenance crew . . . a crew chief . . . a plane captain who is content to enjoy the reflected glory of his ship. Something of him flies with every aircraft, and when ship and crew return safely he knows his job has been well done. For he knows that nothing could fly, no pilot could climb aboard without his contribution. Kaman Aircraft recognizes the job these men are doing and gives them a tangible salute by designing helicopters which require minimum maintenance and make the man behind the greasegun whistle while he works.

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RESERVE AND AIR GUARD NEWS

Congress has come closer than ever before to realization of a separate budget for the Air Reserve. The House Appropriations Committee, in the military construction legislation separated the Air Reserve construction money from the over-all Air Force construction monies. This position, however, was overruled by the Senate in the final bill.

• • •

As a result of an AFA resolution, the Air Force has agreed to a joint study of the "employment of Air Force Reserves as a military augmentation of civil defense."

At the same time the Air Force rejected another AFA resolution which would have provided incentive pay for Reserve airmen.

• • •

Aircrews, key support personnel, and others in key managerial positions in the air transport industry are eligible

Bloodhounds on the air trail are Calo Queen and Annie Oakley, here being airlifted with their master from San Francisco to Denver on emergency mission by the 302d Air Reserve Air Rescue Squadron, Williams AFB, Ariz. S/Sgt. Ken Dutton serves hot coffee in flight as the rugged SA-16 crosses the mountains of Colorado at 13,000 feet.

for Ready Reserve assignments as the result of a recent policy revision by Hq. USAF. Previously, they were screened from Ready positions due to their nonavailability in event of national emergency. Current requirements are the same as for any other Reservist engaged in a critical civilian occupation.

• • •

Air National Guard and Air Reserve pilots and navigators—in limited number—are eligible for voluntary recall for extended active duty with Strategic Air Command. This recall program is open to captains and lieutenants who are qualified pilots or navigators of SAC aircraft. These include B-52 and B-47 bombers, and KC-135 and

Col. Russell W. Tarvin, new Executive Secretary of the Air Force Reserve Policy Committee, has succeeded retiring Col. William Westlake in that job. Colonel Tarvin is a veteran AF pilot and has been a public relations and business executive.

KC-97 tankers. Reservists recalled will be eligible for career Reserve service or for Regular Air Force appointments.

• • •

"The Air Force in Space and the Related Information Problems Involved" will be the theme of the fourth annual Information Services Seminar sponsored by New York's 9215th Air Reserve Squadron on November 6 and 7 at Gotham's Hotel Manhattan. The big feature of this year's seminar will be an illustrated presentation by members of the 9215th on "Solving a Typical Public Relations Problem." Approximately 100 active-duty ISOs from all major commands are expected to attend the seminar which also will highlight discussions by public relations, newspaper, magazine, and radio and television executives.

• • •

Maj. Gen. Winston P. Wilson, chief of the National Guard Bureau's Air Division, has disclosed that all combat squadrons of the Air National Guard are now jet-equipped. Last of the Air Guard's combat squadrons to relinquish propeller-driven aircraft is the 149th Fighter-Interceptor Squadron of Richmond, Va., which is turning in its Douglas B-26 light bombers in favor of the Republic F-84F Thunderstreak jet fighter.

"Changeover of the 149th to jet aircraft marks a significant milestone in the evolution of the Air National Guard into a front-line combat element of American airpower," General Wilson declared. "The development of an all-jet Air Guard combat force is a result of teamwork between the US Air Force and the adjutants general of our states and territories. Together, they have brought about improvements in airfield facilities and technical proficiency of our personnel to support and operate this modern combat equipment."

• • •

CONAC has given eighteen Reserve troop carrier squadrons the green light to conduct Arctic Indoctrination Flights during October through March of each year. Determined to be the first Reserve unit ever to take part in an actual arctic training flight, the 302d TCW, Clinton AFB, Wilmington, Ohio, scheduled its takeoff for the first day of this month. The wing's itinerary called for touchdowns at Great Falls, Mont.; Edmonton, Alberta, Canada; and White Horse and Fairbanks, Alaska.

(Continued on page 101)

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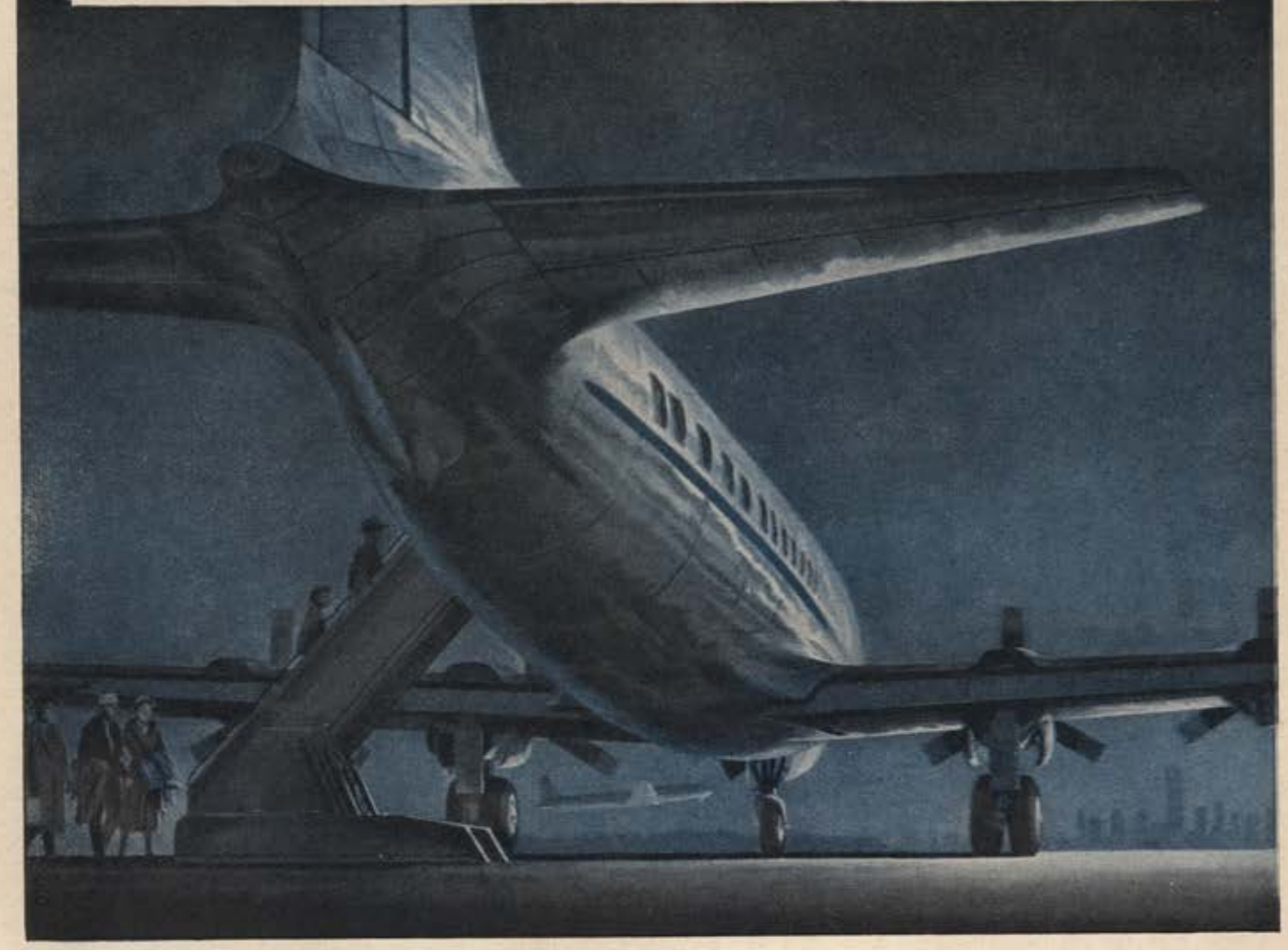

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Approximately 250 key Reservists will attend the first annual Chief of Staff's Reserve Forces Seminar in the Pentagon theater on November 7. The seminar will exploit greater understanding of Air Force objectives, plans, and programs among members of the Air Force Reserve and auxiliaries of the Air Force.

Gen. Thomas D. White, USAF Chief of Staff, will set the tempo for the seminar with a short discussion of the "Air Force Family." Key USAF agencies will follow with discussions covering "Air Force Worldwide Operations," "Changing Plans with Changing Times," "Air Force of the Future," "Financial Support of the Air Force," "Manning of the Air Force," "Air Force Hardware," and "Air Force Legislative Program."

° ° °

Air National Guard and Air Reserve "super-grade" quotas have been firmed for fiscal year 1959. The Air National Guard announced it will promote 1,400 to the grade of E-8, Senior Master Sergeant. The Air Reserve's super grade quota for the same period calls for 294 E-8s and 136 E-9s.

° ° °

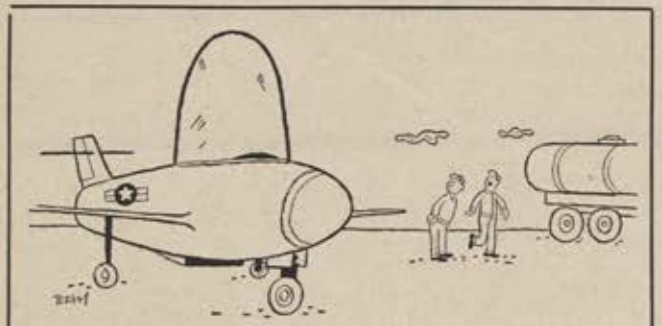
The diversion of active-duty troop carrier wings to Lebanon dumped a surprise package on the 442d Reserve Troop Carrier Wing of Richards-Gebaur AFB, Mo. The mission, by way of Operation Swiftlift—the scheduled Reserve ferrying program—involved the pickup of a 7,000-pound fully instrumented Army Jupiter IRBM nose cone from San Juan, P. R., International Airport. It had been fished out of the south Atlantic and carried to Puerto Rico by naval units, then flown by the Mohawk Wing to its final destination, the Army Ballistic Missile Test Center at Redstone Arsenal, Huntsville, Ala.

° ° °

It was an eventful summer for the 445th Troop Carrier Wing of Dobbins AFB, Ga. This year's encampment at Memphis, Tenn., found the Reservists putting finishing touches to their transitioning from C-119 Flying Boxcars to C-123 Providers. The 445th is the nation's only Reserve troop carrier wing currently converting to the new aircraft. The C-123 is designed to operate from short fields. It is powered by twin 25,000-horsepower engines, has a top ceiling of over 25,000 feet, and can hit a top speed of 240 mph. Cargo-wise, the plane can carry 16,000 pounds or sixty troops.

° ° °

Lt. Col. Cambell Y. Jackson, AFRes, is the nation's first Air Reserve Technician (ART) commander. In keeping with the new program's concept, he also has been appointed executive officer of the 459th Troop Carrier Wing out of Andrews AFB, Md. Under a stipulation of the ART program, currently being implemented at thirty-five Air Reserve flying units throughout the US, the ART commander must be either the wing commander or its executive officer.



"I was here when he landed. He's from some Texas Guard outfit!"

Brig. Gen. C. R. Bullock, commander of the 136th Air Defense Wing, Texas Air National Guard, accepts Continental Air Command Flight Safety Plaque from Maj. Gen. Robert E. L. Eaton, 10th Air Force commander, at Love Field. Witnesses are Vernon S. Smith, Mayor pro tem of Dallas, and Maj. Gen. Harry Crutcher, Jr., Texas Chief of Staff for Air.

° ° °

"Providing guidance to the Air Reserve centers in training, administration, supply, and information services matters is the chief function of the Reserve Training Wing commanders," Lt. Gen. William E. Hall told his audience at the opening of the first Reserve Training Wing commanders conference held recently at Mitchel AFB, N. Y.

Under the new setup, a wing headquarters must be considered as primarily a supervisory rather than an administrative headquarters, General Hall added, cautioning the commanders to avoid becoming "immersed in administrative details."

° ° °

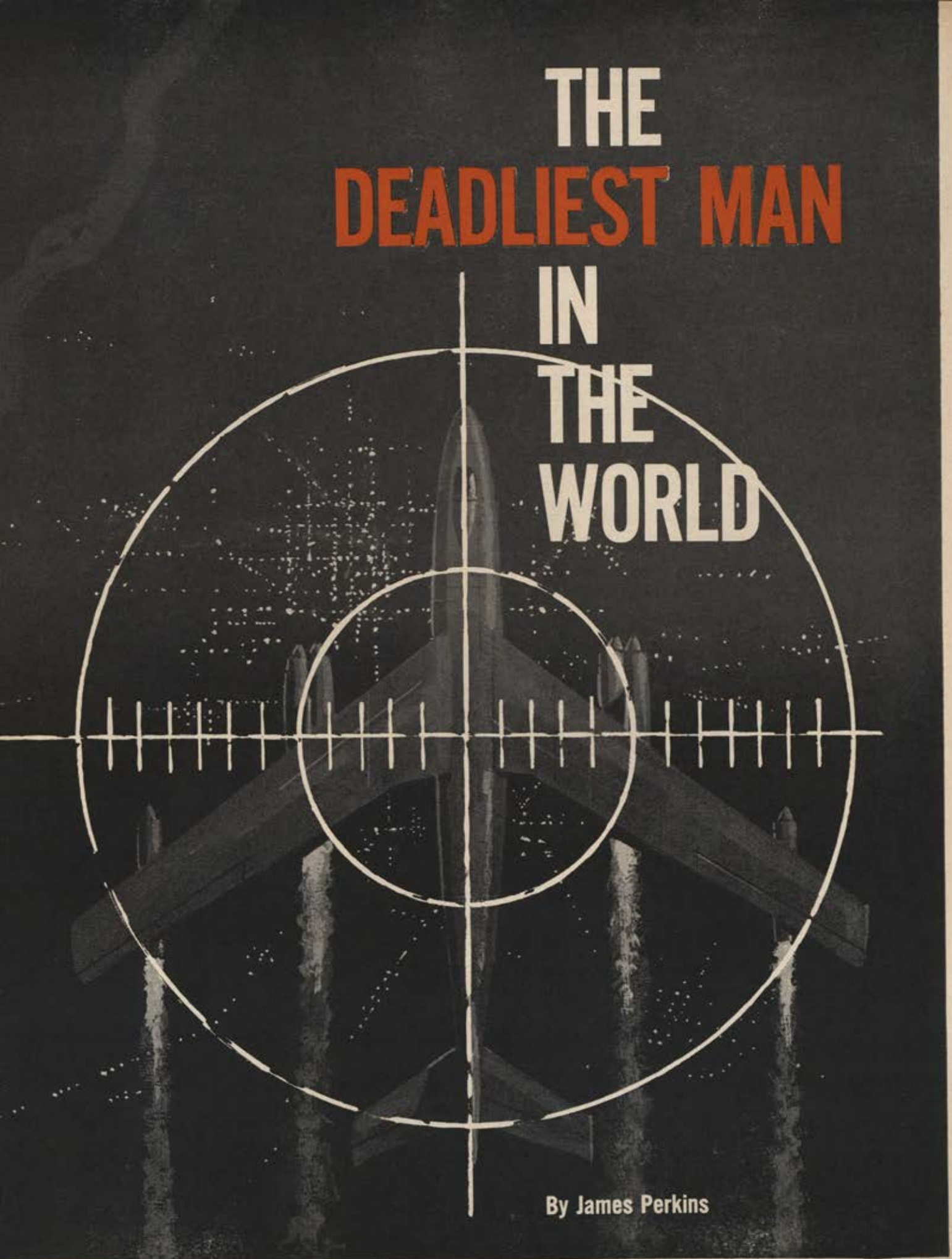
The 136th Air Defense Wing, Texas Air National Guard, has been awarded the semiannual Continental Air Command Flight Safety Plaque and Certificate of Meritorious Achievement *(see cut)*. Pilots of the 136th flew 10,957 hours during the six-month period without a single accident. The Texas unit was selected over twenty-four other Air National Guard wings for achieving the best flying safety record. Significantly, the winners were transitioning from F-80s during the prescribed period.

° ° °

Flying time took a back seat to flying training during the recent encampment by the 121st Fighter-Interceptor Wing at Travis Field, Savannah, Ga. The wing is composed of units from the District of Columbia, Maryland, Delaware, and West Virginia. Upgrading proficiencies was the byword as Col. Willard W. Millikan, the wing commander, established a rating system which provided daily reports on each fighter squadron's progress in aircrew training. Final returns for the fifteen-day period showed that a total of twenty-seven pilots had been advanced to the next higher phase of training, including eleven who qualified as fully ready. An additional sixty-three pilots lack only gunnery for operational readiness qualifications.

—By the Staff

THE DEADLIEST MAN IN THE WORLD



By James Perkins

MAYBE you'll hear him again tonight, somewhere high above you in the upper stratosphere. You are conscious of the insistent thrum of an approaching jet bomber as you sit in your living room, looking at the late show on television. At the same moment, nine miles overhead, a Martian-like figure in crash helmet and oxygen mask is hunched over his radarscope in the bomber's nose, looking down at you.

Your city, on his screen, is a recurring blip of light that fades out as fast as the revolving baton wipes it back onto the scope. He's closing in for his attack, and your city is the target. He has selected it tonight because its topography resembles a secretly assigned target-city deep in the Russian homeland. Concealed in a building in your downtown business district—you've walked past it unsuspecting a hundred times—a photoelectric device is waiting to catch the pulse of energy which he will release, to score the accuracy of his simulated bomb drop.

He works swiftly in his cramped forward compartment, in the eerie red glow of the instrument lights. Drift killed; plane on course; over target in thirty seconds. He swivels from radar screen to bombsight, clicks his mike to the airplane commander: "Give me second station." The pilot surrenders the controls to him; it's all his airplane now. He holds the stick, opens the bomb-bay doors, reaches for the release button.

Perhaps you hear a faint click on your television set, or a zigzag of static momentarily distorts your screen. At that instant, if this were the real thing—if your city were Leningrad or Moscow—he would have released with deadly accuracy a thermonuclear weapon.

He is the key man in today's strategic bomber force: the triple-rated navigator who can guide the plane to its destination, pick out the aiming point on his radar, and with the help of a prismatic bombsight, put the bomb on the target. For the past ten years, the deterrent force his skill represents has kept the world at peace.

Despite the recent successes of our IRBMs and ICBMs, the era of push-button warfare is still far in the future. According to Gen. Thomas D. White, Air Force Chief of Staff, we will have at least *two more generations* of piloted bombers before we become a missilized striking force. Meanwhile, the burden of keeping the United States safe rests squarely on the shoulders of the man who calls the nose of a B-47 his office.

Though your own life depends on him, chances are you don't even know he exists. He's never been the hero of a movie, nor is his picture usually featured on recruiting posters. He is the unassuming crewman whose meticulous know-how makes Strategic Air Command the strongest air-strike force in the world.

SAC builds its whole crew around the navigator. He's the triple-threat star of the aerial combat team—the man who quarterbacks the plays, carries the ball, and scores the points. He does so many things they haven't even found a name for him yet. They used to call him observer, but that sounded as if he stayed on the ground and watched the planes fly over. They call him navigator now, but it would be just as accurate to term him radarman or bombardier. The pilots good-naturedly nickname him "scopehead" or "blip-chaser," just as he refers to his colleagues as "cab drivers" or "gorillas." He's even been called the three-headed monster.

Gen. Curtis LeMay, former boss of Strategic Air Command, now the Air Force's Vice Chief of Staff, has no doubt about what to call him. Says the flying general, who once was a navigator himself: "He's the most important man in the Air Force today."

Not only in SAC, but in all the commands, he has assumed a vital role. Seated in an air defense all-weather interceptor, he homes in on a bogey approaching over Greenland or Alaska. He guides a flying tanker to a prearranged pinpoint in space to keep a split-second rendezvous with a 600-mph jet bomber whose fuel is running low. In a MATS air-sea rescue amphibian, he sets up a search pattern, and locates a life raft that is a mere dot in mid-ocean. His navigational know-how leads a record-breaking flight of B-52s around the world to demonstrate the long "reach" of US airpower.

Where does the Air Force find this man? In nine cases out of ten, he didn't want to become a navigator in the first place. He took it for granted when he signed up for ROTC or Aviation Cadets, that he'd be a pilot some day. He'd always paused in football practice whenever a streaking fighter went over, watching it hungrily until the last wisp of contrail faded away. It came as a bitter disappointment to him when he was eliminated from flight training because of an eye defect and sent to navigational school instead. "Washed out," they called it—the Air Force way of saying he was better qualified for other duties; but in the lexicon of a young man his age the word "washout" means failure.

It was even harder to explain to his folks back home. They'd never heard there were navigators in the Air Force. His mother thought it meant he had been transferred to the Navy. He had tried to explain to her, over the long-distance phone from San Antonio, that he'd still be a member of the airplane crew. "I'm supposed to tell the pilot where he's going."

When he arrives at Harlingen Air Force Base, the only primary-basic training center for navigators, he might well have an acute sense of inferiority. The school is in the steamiest part of Texas: flying clothes get black with sweat from morning to night, the student's head swims as he climbs into the 120 degree heat of the T-29 Flying Classroom out on the line in the broiling sun. He's surrounded by a bewildering array of radar altimeters and driftmeters and loran sets, gadgets it would take an Einstein to understand. Even his tools are unfamiliar: an astrocompass, a Weems plotter, and an E-6B computer, the ubiquitous slide rule they call the "navigator's wife."

Now his schooling starts. Days and weeks and months of it without a break, the most intense precision training in the Air Force. Nine hundred hours of classroom work alone, plotting, charting, computing, thumbing through air almanacs and hydrographic tables, filling out log after log. He must learn to use his instruments, then learn the corrections that apply to them, then learn the corrections that have to apply to the corrections. Subtract east and add west, distance over time equals ground speed, true heading check, alter heading, Bellamy drifts, azimuths, astronomical triangles. Gobbledegook; double talk.

Endless practice missions, takeoff at dawn and back after supper, too tired to talk to his wife. To sleep at nine, up again at midnight to home in on the high-frequency wail of a three-week-old daughter in the adjoining nursery. Spending Saturday afternoons studying vacuum-tube diagrams; all day Sunday in a kitchen chair on the back porch, taking sun shots.

The grind goes on for forty-two weeks, and then one day, the day that wipes out all memory of the long hours and the sweat, he marches across the ceremonial platform and receives the coveted navigator's wings.

Still his schooling has only begun. After pinning on the emblem of his hard-won skill, he graduates to advance training at Mather Air Force Base in California. Here he learns to diagnose the complexities of high-speed, high-altitude flight, in those elaborate million-dollar "idiot boxes" which can simulate the effect of winds up to 300 knots and speeds up to

(Continued on page 105)

RYAN FIREBEES TEST AMERICA'S AIR DEFENSE IN FIRST WEAPONS MEET TO USE JET TARGETS

Ryan Firebees are the exclusive flying "bull's-eyes" for the Air Force Project "William Tell"—first weapons meet to use free-flying jet targets. 100 Firebee jet drones will test the pilots, planes, and missiles of America's air defense system under the most realistic "combat" conditions ever achieved.

Firebees will not only draw the fire of the nation's crack Air Force pilots: they will score the results in mid-air with a new electronics system. A running record of hits, misses, and near-misses will be instantly transmitted from Firebees to scorekeepers on the ground. Other Firebees will photograph missiles boring in—or streaking away if they don't score a "hit."

Pitted against the Firebees in this world-wide weapons meet will be the top Air Defense Command squadrons, flying Convair F-102, Northrop F-89J and North American F-86L interceptors. They will fire deadly Falcon guided missiles, and Genie and "Mighty Mouse" rockets.

Only the Firebee—the most advanced target drone—has the high performance, reliability, and extended duration needed for realistic weapons evaluation. In service with the Air Force, Navy, and Army, Firebees are flying in greater numbers and for more hours than any other jet target drone.

The Firebee is another outstanding example of Ryan skill in blending aerodynamics, propulsion, and electronics knowledge to produce a superior product.

RYAN BUILDS BETTER

AIRCRAFT · POWER PLANTS · ELECTRONICS

Ryan Aeronautical Company, San Diego, Calif.

1,500 nautical miles per hour. He masters the mysterious black box maze of K-system bombardment. He has his first taste of bombing, on a practice range out over the Pacific Ocean. He moves on to survival school at Stead Air Force Base in Nevada, and then to crew-training at McClellan, and, finally, to assignment with an operational unit in Strategic Air Command.

He no longer has the feeling that he is an inferior crew member. He is a specialist when he arrives; he doesn't join a crew, the crew is built around him. If his bombing runs are consistently accurate, it may become a select crew, and all its members advanced a grade in rank as a reward. His fellow crewmen, whose admiration for his ability is coupled with certain practical considerations, guard him with jealous care wherever he goes. "Keep your hands off that navigator," a B-47 pilot growls to a rowdy group at the officers club. "He's my spot promotion."

Every select crew in SAC is assigned a particular strategic target overseas, its primary objective if and when the red alert sounds. Combat intelligence furnishes the navigator with all available maps and charts of the enemy area. He pores over them, studying foreign names and memorizing obscure checkpoints until he knows them thoroughly. He is given a small-scale model, made of copper melted onto a square of Plexiglas, which he places behind a radarscope. The odd-shaped pattern of blips it produces on his screen resembles the radar return of the actual target complex which he must commit to memory.

Last but not least, he is given an American city—perhaps your city—which has a similar radar return, and night after night, nine miles above the earth, he practices bomb runs from every conceivable approach and in every kind of weather, until he and his crew, working with intuitive coordination, perfect their timing and score consistent hits with zero-zero error.

You may hear the drone of his bomber tonight, somewhere high overhead as you sit watching your television. It's not a bad sound to hear. You're safer in your living room as long as he's up there, watching you.—END

Author Jim Perkins lived *much of the training described in this article, having attended navigation school before assignment to USAF information services in the Pentagon. A Reserve first lieutenant, Jim, his wife, and their two daughters live in Sugar Hill, N.H.*

Temco | AIRCRAFT DALLAS

Now on Duty with the Navy . . Temco's TT-1 Primary Jet Trainer

Now on duty with the Navy, Temco's TT-1 Pinto is an advance-guard aircraft . . first to introduce the concept of an all-jet syllabus for aviation training. And already, while still under evaluation, the Pinto is *growing* . . stepping up greatly in power, agility and safety.

Designed from the very beginning for *growth through simple modification,* the production Pinto will be equipped with a Continental J69-T-25 engine in place of its J69-T-2. This engine changeover will be accomplished without noticeable change in outward appearance, without significant internal changes. Further modifications will extend the Pinto's ability to carry more equipment . . let it grow with the man . . make it capable of performing almost the entire primary/basic syllabus at considerably less than half the cost of any other jet trainer available or under development.

This sleek, speedy jet trainer was designed, developed and produced entirely by Temco. And while it is a prime example of the unusual talents and capabilities Temco possesses, it is just one phase of Temco's widely diversified work. Other phases are research and development in the field of advanced weapon systems . . new developments and fabrication techniques in stainless steel, titanium and other high temperature materials. All part of Temco's continued pioneering of the "total package" concept of design, tooling and production of aircraft and missiles . . of its complete weapons systems management capabilities.

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AFA NEWS

SQUADRON OF THE MONTH

First Reserve Squadron of Long Beach, Calif., Cited for its sponsorship of the Air Age Symposium for the Long Beach State Teachers College Aviation Workshop, contributing to the success of the Workshop, and to a better understanding of the Air Age.

Arthur C. Storz, AFA's "one-man gang" in Omaha, has done it again with an outstanding salute to the **tenth anniversary** of the **Strategic Air Command** in Omaha. On August 9, he headed a local committee which staged an event the good people of Nebraska are still talking about.

Gen. Thomas S. Power, SAC Commander in Chief, represented SAC at the dinner, held in the Sheraton-Fontenelle Hotel ballroom, scene of AFA's 1954 National Convention. **Mayor John Rosenblatt,** on behalf of the city of Omaha, presented a citation to Power, for the command's "contributions to world peace" (*see cut*).

The double-tiered head table, covering the entire end of the ballroom, included top representatives of just about every phase of the nation's airpower activity. Among those present were **Gen. Curtis E. LeMay,** Vice Chief of Staff, USAF, and **Gen. George C. Kenney,** USAF (Ret.), who, with Power, represented all three commanders since SAC was organized in 1947; **Gen. Carl A. Spaatz** (Ret.), first AF Chief of Staff; **Gen. Edwin W. Rawlings,** Commander, AMC; **Lt. Gen. Elwood R. Quesada,** USAF (Ret.), Special Assistant to the President; **Gen. Laurence S. Kuter,** Commander, Pacific Air Forces; **Homer Gruenther,** a Nebraskan who is one of President Eisenhower's Special Assistants; **Peter J. Schenk,** AFA President; Maj. **Alexander P. de Seversky,** noted aviation designer and lecturer; **Sen. Roman Hruska** (R., Neb.); **Lt. Gen. Frank A. Armstrong, Jr.,** Commander, Alaskan Command; and **Lt. Gen. W. F. McKee,** AMC Vice Commander.

Also on hand to toast SAC were top figures of the aviation industry, including the following company presidents: **Donald W. Douglas, Jr.,** Douglas Aircraft; **J. L. Atwood,** North American; **Lester Faneuf,** Bell; **W. F. Gwinn,** United Aircraft Corp.; and **Richard S. Boutelle,** Chairman of the Board of Fairchild.

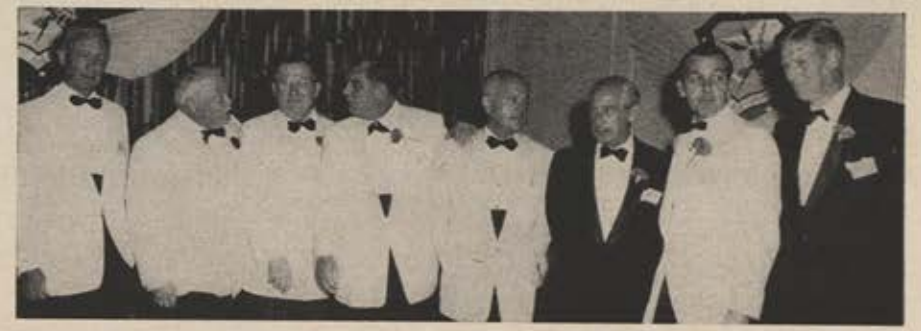
The 400-plus who attended this affair heard addresses by Generals Power and Quesada. Both speakers recognized Storz' contributions as chairman of the program and commented on his efforts in AFA, which include assisting in the formation of three active Squadrons, one of which—Ak-Sar-Ben in Omaha—is AFA's largest.

Mrs. Ruth Young of Pittsburgh is a broadcaster for radio station WEDO in McKeesport, Pa. She's also a very active member of the **Pittsburgh AFA Squadron,** and, in the past three or

(Continued on following page)

Omaha's Mayor John Rosenblatt, left, and Arthur C. Storz present special citation to General Power, SAC Commander, on SAC's tenth anniversary in Omaha.

Twenty-seven AF stars are shown above. From left are Lt. Gen. E. R. Quesada, Special Ass't to the President; Gen. L. S. Kuter, Pacific AF Commander; Gen. George Kenney, USAF (Ret.); Gen. Curtis LeMay, AF Vice Chief of Staff; Storz; Gen. Power; Gen. E. W. Rawlings, AMC Commander; Gen. Carl Spaatz, USAF (Ret.).



Industry presidents and chief executives included J. L. Atwood, North American; Wellwood E. Beall, Boeing; Storz; Richard S. Boutelle, Fairchild; Lester P. Faneuf, Bell; Maj. Alexander P. de Seversky, Electronatom Corp.; Donald W. Douglas, Jr., Douglas Aircraft; and W. F. Gwinn, United Aircraft Corp.

four years, has become one of the most effective "boosters" of USAF activities in the eastern US. She holds the distinction of being the second woman to fly faster than sound.

It was only natural, then, that her airpower interest should blossom out into one of the most interesting and effective programs that has been staged by an AFA unit in some time.

Her interest in the feminine angle led her to believe that a great deal could be accomplished by showing other women that aviation is not only becoming rapidly more necessary, economically, but also is as safe as driving a car. To reach the largest number of women, Ruth contacted the various women's organizations in the Pittsburgh area, and on June 9 the presidents of sixty organizations took off from Greater Pittsburgh Airport, bound for the then **Air Force Academy** site at Lowry AFB, Denver. In addition to Mrs. Young, the escorts included **Mary Jane Long,** wife of AFA Director **Carl Long; Nettie Richardson,** wife of Pennsylvania Wing Commander **Chester Richardson;** and **Mrs. Robert Patterson,** President of Pittsburgh's fine Auxiliary Unit.

Part of "Operation Chick Lift" gets set to leave Greater Pittsburgh Airport.

"Operation Chick Lift," as it was called, had two objectives, according to Mrs. Young: to give the ladies a first-hand look at the USAF careers, and to demonstrate to them that their sons and daughters entering Air Force

Kay Patterson, Nettie Richardson, Mary Jane Long, Ruth Young, Maj. Warren DeLatte discuss "Chick Lift" Flight.

AFA's Carl Long and Col. R. E. Fancher, left, Base Commander, wish Ruth Young and group a successful journey.

service were joining a safety-minded operation.

The ladies visited the Academy at Lowry and viewed the Colorado Springs site, into which the cadet class of 1959 moved last month. Following this, they were given a thorough briefing at North American Air Defense Command (NORAD).

Mrs. Young has a collection of wonderful letters of gratitude from the women who were treated to the tour. We want to add our congratulations. Every paper in the metropolitan Pittsburgh area carried feature stories on the program and in each one AFA was given prominent mention, since the Pittsburgh Squadron was a cosponsor of the program, with the USAF.

The **Minneapolis Squadron,** led by **Sherman Kleckner,** Commander, has emphasized its youth aviation education program in the past few months, concentrating on Air Explorer Troops and other organized activities.

In March, for example, Scouts of **Air Explorer Troops** at Faith Lutheran Church and Messiah Episcopal Church, both of St. Paul, were shown films on Tactical Air Command and the Air Force Academy, and addresses were made by Air Force officers assigned to these commands. The P-TA of Keewaydin School was also the recipient of an Air Defense Command presentation, arranged by the Squadron.

In April, the **Eagle Scout Troop** of the Roosevelt Branch YMCA, and their fathers, were taken on a tour of Minneapolis-St. Paul International Airport, and given a briefing on the Air Defense Command installation there. The same month, **Edwin A. Kube,** Minnesota Wing Commander, escorted the second and sixth grade students on a tour of the base, and showed the

(Continued on page 111)

T/I 'electronic escorts' bring all-weather travelers safely home

Soon now, TI-built and TI-modernized airport surveillance radars will meet air travelers far outside congested airport areas and escort them electronically to an ideal approach fix. The Civil Aeronautics Administration has already ordered this potent safety factor for more than *seven dozen* major U. S. airports. Able to keep tabs on large numbers of aircraft operating in airport approaches (up to 60 miles distant), TI radars will log all aerial moving objects over video maps pinpointing navigational aids and hazards. In "ducks only" weather, the traffic controller can switch from linear to circular polarization for a clear look through clouds and precipitation.

Close kin to Texas Instruments military and industrial electronics, TI airways radar benefits from the most advanced technologies practiced today. Details on this new aspect of TI's 28-year-old capabilities may be obtained by writing to: Service Engineering Department . . .

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systems management

systems — reconnaissance, airways control, anti-submarine warfare, anti-missile, countermeasures, airborne early warning, navigation, attack control, missile systems, engine control.

equipments — radar, infrared, sonar, magnetic detection, computers, timers, telemetering, intercom, microwave, optics, detector cells, engine instruments, transformers, time standards, and other precision devices.

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TEXAS INSTRUMENTS
INCORPORATED

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Famed pilot Paul Mantz, lower left, spoke to August meeting of Orange County Sqdn. Top: George Sanchez, Cmdr. Ed Hall, Bill Druitt, and George Floyd. With Mantz is Brig. Gen. Claude Duncan, USAF (Ret.), a Squadron member.

detailed operations. As a result of the latter trips, Kube received a stack of letters written by the students, in which they described their trips, and commented on their impressions. These letters were "graded," and prizes were awarded to the winners.

AFA's fastest-growing Wing these days is **Virginia's,** which wound up the first phase of its organization program in August with a Wing Convention, during which officers were elected for the remainder of the program.

The meeting convened at the Jefferson Hotel in Richmond. Each of the four Squadrons in the state was well represented. On hand were several members from communities which are in the process of forming Squadrons. **H. Bentley Hahn,** Richmond Squadron Commander, served as the acting chairman, and was elected the first Wing Commander.

The meeting consisted of morning and afternoon business sessions, a luncheon, and a dinner. Following the dinner, the entire group trekked out to Richmond's new Air Reserve Center for an open house program, and furnished the speaker for the special program there. He was **Lt. Col. Paul A. Newman,** from the Office of the Assistant Chief of Staff for Reserve Forces.

California's First Reserve Squadron, at Long Beach, cooperated with the Long Beach State College Aviation Workshop to stage a Jet Age Symposium on August 27. **Miss Joanne Affronte,** Squadron Commander, was in charge of the program, which included presentations on "Commercial Jet Operations," by **J. B. Edwards,** Douglas Aircraft Co.; "Missiles," discussed by **Col. H. F. Boone,** for the AF Ballistic Missile Division; "Missile Operations," by **Col. Harold L. McKean,** SAC-Mike, SAC's liaison office in the Ballistic Missile Division; "Missile Logistics," by **Col. Peter DeLonga,** AMC; "Spaceflight," by **Maj. John E. Richards,** BMD; and "Future of Manned Aircraft," by **Lt. Col. H. W. Martin,** SAC-Mike.

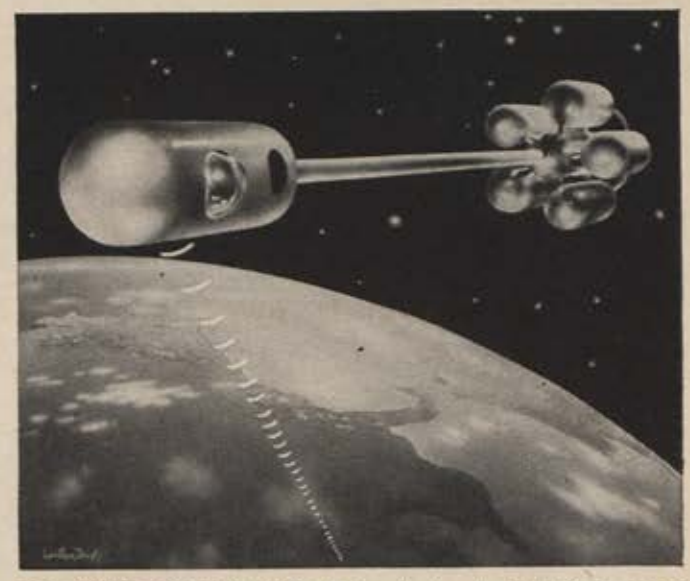
Charles O. Morgan, Jr., San Francisco, a National Director of AFA, delivered the keynote address.

This was the 7th annual Aviation Workshop sponsored by the college.

CROSS COUNTRY. . . . During the recent **Ohio Wing** Executive Council meeting, Wing Organization Director **Glenn Mishler** unveiled a state map, divided into sections by counties, which gives each Squadron now formed a specific territory. It also emphasizes the areas that lend themselves well to organizational effort. **Columbus, Springfield,** and **Steubenville** are the first three territories to be given added emphasis. . . . A new Squadron, number seven in Pennsylvania, is being announced by Wing Commander **Chet Richardson.** It's located in **Erie,** and the charter, which was dated September 2, is the result of well-coordinated effort by Richardson, Director **Carl Long,** and **Lee Smith,** Deputy Wing Commander. Commander of the new Squadron is **Clark H. Specter,** 3036 Marvin St., Erie. . . . Providence, R. I., has come back into the AFA picture with an organized Flight, headed by **Marcello A. Tropea.** This new unit was assisted in its organization by **Phil Coury,** New England Regional Vice President.

—Gus Duda

TEST INSTRUMENTS Bulova's rugged Tachometer Tester for all jet and reciprocating systems meets MIL-T-945A requirements—is accurate to 0.1% with engines on or off. Simple to operate and maintain, this field unit also serves in maintenance depots. Precise Bulova testers include the dual purpose Torqmeter—a dynamometer or calibrated torque source



RECONNAISSANCE SYSTEMS Bulova-developed miniaturized sensor packages, geared to specific tactical missions, feed combat surveillance data to Bulova analysis and display systems. Camera, infra-red, TV and radar techniques, combined and integrated, aid decision-making on land and in space. Satellite applications? Unlimited!

Bulova's capability helps to solve today's most challenging problems

To conceive, develop and manufacture a broad range of advanced electronic and electro-mechanical devices...this is the Bulova capability.

Meeting the needs of defense and industry is an unusually creative group of scientists, engineers and technicians, backed by 80 years' experience in precision production.

With dynamic imagination, Bulova's capability has invaded the often uncharted technological areas to originate many modern-day miracles in miniaturized systems and components.

Here is a proven capability ready to assist you from concept to mass production. For full information, write Department G.I.S.-2.

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BULOVA PARK — JACKSON HEIGHTS — NEW YORK

INFRA-RED COMPONENTS Bulova's advanced IR projects include mosaic cells that will automatically filter out unwanted wave lengths and picture targets clearly against any background. Bulova infra-red R&D covers lead selenide and lead sulfide cells, missile seeker cells, reticles, filters and thermistor bolometers...for defense and industry.

INFRA-RED SYSTEMS Bulova's IR illuminators put unseen spotlights on night objectives. Bulova's development capability extends to fire control systems that detect, track and automatically lock on target. Designed for accuracy and simplicity, these high resolution units will serve our nation's land, sea and air forces.

THUNDERBOLT!

As an AIR FORCE *bonus, we're happy to reprint the following excerpts from the ETO air war memoirs of Bob Johnson, twenty-eight "kill" ace, and twice AFA president. The first selection is Bob's account of just three of his air victories, and the second is the amazing saga, as told by Bob, of his air comrade, Michael Gladych. (From THUNDERBOLT! by Robert S. Johnson, with Martin Caidin. Copyright, 1958, by Martin Caidin and Robert S. Johnson. Reprinted by permission of Rinehart & Co., Inc., N. Y., publishers.) The $3.95 book was published September 25.*

Bob Johnson in his P-47.

BACK ON the Flak Highway! March 15 [1944], a bomber escort to Brunswick, but flown along the less familiar, flame-and-smoke route chopped out of the sky by the enemy antiaircraft batteries. The German fighter pilots had chosen Dummer Lake as their favorite point to tear into the Big Friends. And with good reason; their past success had littered German soil with the wreckage of many twenty-five-ton bombers.

Leading a squadron of eight fighters, I cruised far to the left of the Fortresses, orbiting wide so that we could break up oncoming German attacks, and still have time to shout for help before the enemy fighters reached the Big Friends. Far to the north, in the direction of Bremen, contrails streamed high above our own level. At least fifty, and by their looks they were Focke-Wulfs. I led the squadron in a fast climb to block their approach, calling for help. Every time the radio channel quieted I called, as slowly and distinctly as possible, "Forty-plus bandits, nine o'clock, high to the lead box of bombers now over Dummer Lake."

Damn, they were high! The Focke-Wulfs rushed toward the lead bomber formation at a height of at least 38,000 feet. They had found their previous attack wedge successful, and were hopeful for a third repeat performance. Fifty fighters and more as top cover at 38,000 feet, and two boxes of fifty-plus Focke-Wulfs, line abreast, at 23,000 feet. At 27,000 feet I turned the squadron and we dove, racing head-on into the fifty-odd fighters directly in front of our own eight airplanes.

Our formation opened wide, the Thunderbolts spreading out, straight in as we accelerated in our downward rush. Every plane's wings flamed, eight heavy guns roaring in short bursts, bullets spilling into the midst of the German fighters. They scattered! We hurtled through the formation. The other fighters glued themselves to me, eight Thunderbolts clawing around at tremendous speed to hammer at the trailing Focke-Wulfs. The Krauts had enough; a dozen fighters snapped over and dove away.

Sucker bait! I looked up—and there they came, the top cover of more than fifty fighters, eager for an easy kill. *If* we had taken the bait and dived. I yelled over the radio, "Okay, pull straight up—*now!* The top cover's coming down." Eight hands jerked back; eight Thunderbolts reared nose high and soared, leaping in vertical climbs. I've never been so close to so many airplanes! We zoomed straight up and the German fighters plunged straight down. I swear that some of us must have grazed the Focke-Wulfs; one pilot stared in horror at me as we flashed by, wings almost colliding. There wasn't room enough for a small butterfly in that area.

But the line-drive attack worked beautifully. The tight formation of Focke-Wulfs fell apart at the seams as the fighters flung themselves about wildly to avoid our zooming wedge. The fight assumed even more incredible proportions—here came the other fifty fighters to help the first group beat off our attack of eight airplanes! We had done to them exactly what they had been doing to our bombers.

Friendly fighters had heard my call. Hard after the diving German top cover came a dense swarm of our planes, a group of twin-boomed Lightnings and several groups of Thunderbolts. I still swear I flew through the tail booms of several P-38s as their pilots screamed down after the Focke-Wulfs! In the time it took us to zoom upward through the German formation, some ninety of our fighters pounced joyously into the fray. For several seconds our eight Thunderbolts separated from the central mass, and I've never seen the like of that fantastic struggle.

A mass of nearly three hundred fighter planes fought savagely in a wild, screaming battle, all with their engines wide open and firing almost steadily. The sky dissolved into a twisting and churning nightmare, planes struggling fiercely from 30,000 feet right down to the very ground, and all within a tight area of five square miles. Tracers flashed through the weaving maelstrom, and I saw flame blossoming, explosions, the white flash of cannon, from both the Focke-Wulfs and the big Lightnings. It was a wild, macabre scene, a duel to the death of agile warriors.

Not four miles to the south rumbled the gigantic train of Big Friends, twelve hundred giant Flying Fortresses, marching resolutely through the flame and smoke of intense flak. Bombers as far as one could see, stretching far to the horizon, and disappearing out of sight. The avalanche of steel and explosives, more than thirteen thousand men at war, miles over the Reich. From the Big Friends the pilots and crews stared gratefully at the savage battle north of their own marching ranks; gratefully, for not a

(Continued on following page)

single German fighter broke through our own defensive wall to reach the bombers to wreak carnage like that of a week before. On this day three of the giants went down; two to flak, and a third from an oxygen system failure. Not one suffered a single bullet hole from a German fighter. Twelve hundred bombers—enjoying a badly needed respite.

There was no time to wonder at their good fortune. I turned and plunged directly into the swarming mass of fighters. I never knew from one moment to the next exactly what was happening. My feet and hands and head and eyes moved constantly within the cockpit, working rudder pedals, stick, throttle, trigger. I skidded and slipped, dove, zoomed, twisted, slewed wildly, turned and rolled, anything to survive and avoid collision with the fantastic mass of twisting fighters. Time and again I missed by bare inches collisions with other airplanes.

One moment I was pulling up in a climb; a Focke-Wulf slid from beneath my fighter, skidding wildly to the left. He wasn't more than fifty yards away. I worked stick and rudder, trying to slide around onto his tail. Just as I started the turn another plane skidded under me, a red-nosed Thunderbolt piloted by Flight Officer Klibbe. His wings blazed as he fired steadily at the FW-190, forcing me to snap roll away from his fire. Klibbe really plastered the Kraut, who at that moment looked for all the world like a yellow cur dog running with his tail between his legs.

A second later a Focke-Wulf seemed to jump directly in front of me. I squeezed the trigger and he disintegrated almost at once; I nearly ran into the exploding pieces. My twentieth victory! I looked around; there—a Focke-Wulf pouring cannon shells into a P-38, diving steeply. A slight movement of stick and rudder, the proper lead, and a two-second burst. The Focke-Wulf's canopy dissolved into spray. Flame billowed from the tanks. Twenty-one!

And then—they were gone. In a miraculous second, the battle was over, the sky below us smeared with greasy smoke trails, with tumbling and burning airplanes, parachutes drifting gently toward the earth. In the few minutes of intense combat, planes had fallen like flies, far and away the majority of them German planes. Thunderbolts of the 56th Fighter Group cut down twenty-four enemy ships, losing only one man.

The Thunderbolts and Lightnings hadn't quit, however. As the Germans dove frantically for safety, racing over the clouds far below, our fighters rushed after them in pursuit of the whipped enemy force. I searched the sky in vain, seeking one German fighter that didn't have a Thunderbolt or Lightning glued to its tail. I wanted one badly. I'd never scored a triple kill for a mission, and today was the perfect opportunity.

For a moment I thought of my wingman, a young pilot on his very first mission. I thought: "Poor Holtmier! He's probably had it by now." In the melee I hadn't had the chance to look after him as I dodged other fighters. I've never worked harder in my life than I did in those few minutes. I made the Thunderbolt do things that were impossible; no German fighter could stay within me, and I was certain that no one else could, either. With most of the Focke-Wulfs running for their lives, I looked around me.

I gasped. There was Holtmier, tacked onto my tail as if he were glued there! How he did it, I'll never know, but there he was dogging my tail. He later told me that, in his battle to stay with me, he hardly remembered seeing a Focke-Wulf. He said he was afraid to get lost from my wing, and I can understand that. What a battle for a first mission! Holtmier did one of the best jobs that any wingman had ever done.

I waved to him and turned to look for anything that even resembled a target. I had almost given up hope of racking the third kill for the day. Six Thunderbolts far below us had grouped together in a climb for altitude, and I radioed them that I would cover their climb. And there, darting from cloud to cloud below them, came a single Messerschmitt ME-109, trying to sneak up on the six Thunderbolts. That boy had nerve, but now he was mine. I called the other fighters. "Cover up; I'm going down after a 109. He's directly beneath you."

I had nearly a ten-thousand-foot dive on the Messerschmitt; the Thunderbolt wound up like a demon and hurtled earthward. I came whistling in on his tail as he skimmed through the cloud tops, confident that he hadn't been spotted. Just as my finger went down on the trigger—he disappeared, swallowed in a cloud. Damn! Here was a perfect setup for a triple and he was gone. There was still a chance; he might decide to stick his head out of the clouds. I must have grinned from ear to ear. Not only did he burst out of the clouds, but he loomed barely 150 yards in front of me, and, obligingly, directly in the center of the gunsight.

It was awfully nice of him to cooperate, I thought, as I hit the trigger. The Messerschmitt went to pieces and exploded as it disappeared into the clouds. And there was the triple!

Suddenly it had happened. Less than a year before this mission—an impossibly long time, it seemed—my fellow pilots were convinced that I would be the very next man to be shot out of the sky by a German fighter. And now . . . I was the leading ace of all Europe. I could hardly believe it was true. Twenty-two kills, the highest-scoring American fighter pilot in the European Theater!

THE AMAZING MICHAEL GLADYCH

The editors of AIR FORCE *have often chatted with author Mike Gladych, a frequent contributor to this magazine. He is a mild, markedly soft-spoken man, and it was with some astonishment that we read Bob Johnson's account of some of Mike's experiences with the 56th Fighter Group. After the Nazi assault on his native Poland, Mike fought the Luftwaffe at every chance—with no apparent care for his own safety. Here are excerpts from that story:*

Early in 1944 the operations of the 56th Fighter Group were "imperiled" by a single fighter pilot. The amazing thing was that he flew in a Thunderbolt instead of fighting against them. So fiercely desperate was Flight Lieutenant Michael Gladych to kill Germans that often we feared for his life as he tore after enemy aircraft. Prior to his "temporary visit" with the 56th Group, Mike Gladych had flown in combat with the Polish, French, and British air forces.

We did not envy Gladych his past experience. When Mike joined our ranks for temporary flight duty, he had just completed five years of close brushes with death. When German troops assaulted Poland, Mike flew like a madman in an obsolete PZL-11 fighter and managed to shoot at least

(Continued on page 117)

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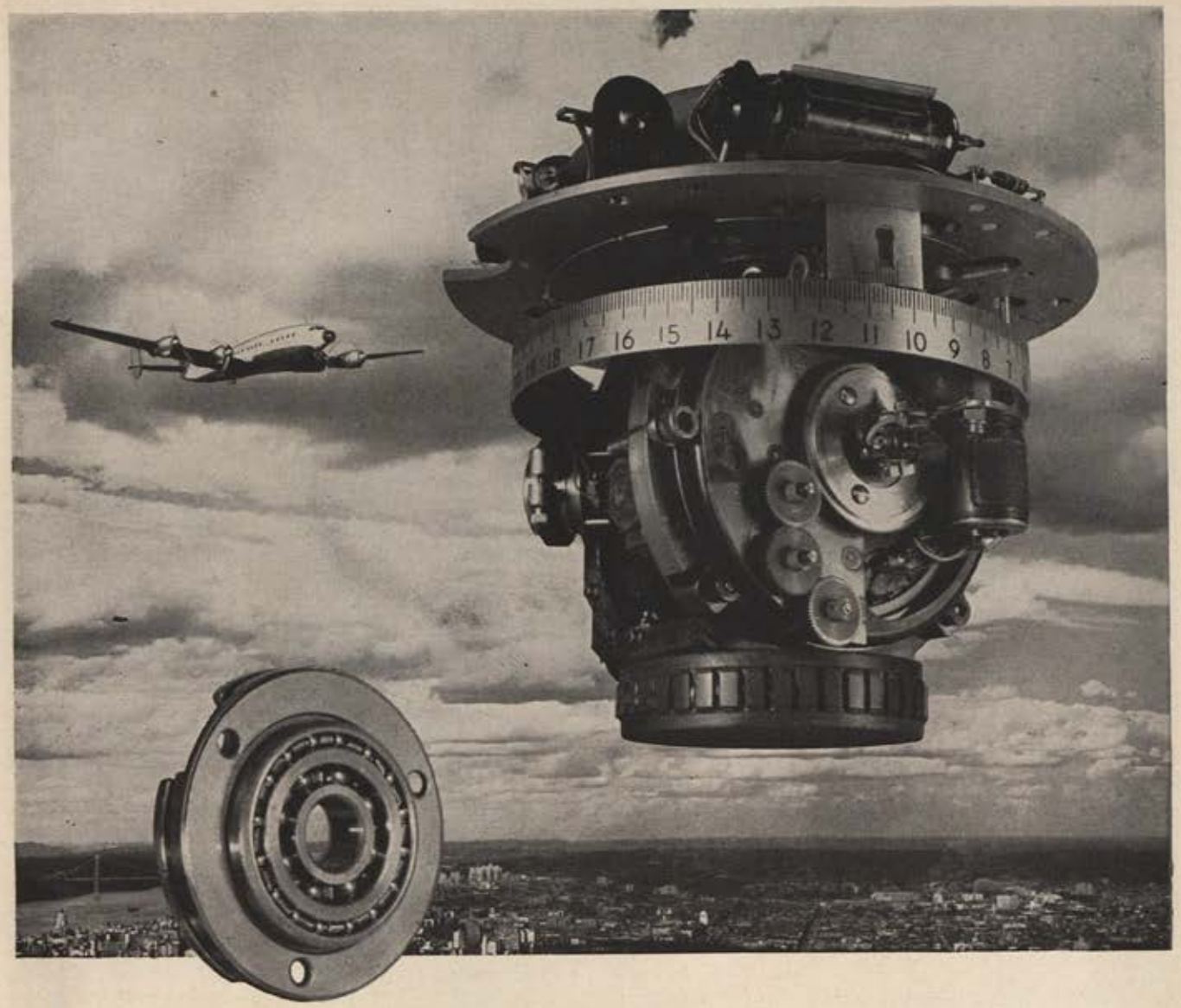

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five German planes out of the air before his country collapsed. With several other pilots Mike then fled to Rumania, where he was thrown into jail by pro-Nazi police. The Polish flyers escaped and, barely one step ahead of the Gestapo, reached France. But the Gestapo never gave up its quarry that easily, and one night in a dark Lyons alley a trained German killer went after Mike. In a savage hand-to-hand struggle Gladych killed the German, but paid heavily for his victory. He fell unconscious—blind.

He came to in darkness, bound hand and foot, a captive in an insane asylum. For five days and nights the horror-stricken Gladych endured the tormented shrieks of the inmates. He felt he, too, was going mad. Five days after his capture a French doctor explained that his commitment to the asylum had been in error. In his towering anger Mike felt pain stabbing his blinded eyes.

"Go ahead!" the doctor shouted. "Open them; *open them!*" And Mike Gladych, miraculously, could see. He owes a tremendous debt to that doctor, who had wisely diagnosed Mike's blindness as acute strain on the optic nerves, which could be cured only by a sudden and great shock.

After his recovery Mike flew obsolete French fighters in a courageous but lost battle against the Luftwaffe. He fled to England and with other Polish exiles joined the Royal Air Force. He was obsessed with the urge to kill Germans, and his fellow pilots predicted that his frenzy for battle to the death with anything of German origin would soon cause Mike's own demise. Over France in a British fighter, Mike lost his squadron and single-handed ripped into three German fighters. In a furious battle he shot down two and then ran out of ammunition. Blazing with anger he rammed the third plane. Pieces of wreckage burst into the canopy, slashing Mike's head and eyes. He set course for home, and fainted.

He returned to consciousness two days later, swathed in bandages in a British hospital. Luck not only rode with Gladych, it hugged him tightly. In a fantastic flight his fighter droned in a gentle glide to England. With Mike unconscious at the controls the airplane touched ground at high speed, in almost level altitude. It tore itself to pieces as it skidded out of control and came to a stop—two hundred yards from the hospital! After repairing his skull, which was laid open to the bone, the doctors told Gladych he'd never fly again. Mike just didn't believe them; several months later he was in a Thunderbolt over Berlin.

• • •

On February twenty-sixth the boys went to Happy Valley, our name for that charming area known as the Ruhr, where it seemed possible to step out of your airplane and walk on the flak bursts. I stayed at home and sweated them out, and I mean sweated. Mike Gladych had my airplane, and I was convinced that I'd never see it again, or that Gladych would drag himself home in a wrecked Thunderbolt. Unbelievably, the airplane came home in flyable condition. Mudge and Barnum had flown off Mike's wing; somewhat dazed about the entire event, they related the proceedings.

Mike flew Number Three to Barnum, and they noticed early in the flight that Gladych maintained a perfect position. No one ever worried when they had The Killer with them. Mike could see enemy planes, it seemed, when they were still out of sight. Suddenly, they noticed that Gladych was no longer in formation. Dismayed, they circled, trying to locate the missing Thunderbolt. They were at 18,000 feet, and just east of the Ruhr Valley. And down below, 18,000 feet below, in fact, was a Thunderbolt hell-bent for leather after a Messerschmitt ME-109. Mudge and Barny dove after the two planes; sure enough, it was my fighter, the HV-P lettering standing out clear and sharp.

The book says a Thunderbolt can't hold a turn at low altitude with the ME-109, but Mike never read the book. He clung to the tail of the German fighter, moving in closer and closer. They were right on the deck, actually flying beneath the tops of trees. Mudge and Barny couldn't understand why Gladych didn't cut down the Messerschmitt; he had plenty of lead but refused to fire. When the German pilot saw the other two Thunderbolts, he ran for safety, skimming the trees as he fled down a valley. He had good reason to run, with the three big fighters on his tail. Halfway down the valley was an opening to the right, and several miles farther a gap on the left. Mudge took the first turn, and as the Messerschmitt burst out of the valley, snapping to the left, he stared almost into the guns of Mudge's Thunderbolt. He and Barny cut loose at the same time; the Messerschmitt splattered along the ground for several hundred yards in a shower of flame.

Mike throttled back and circled the burning fighter, he wanted to be sure that the pilot was dead. Had that German survived the crash and run from his plane, Mike was prepared to cut him down with his propeller or wingtip. When Mike returned, and I'd heard the tale, I asked him why he didn't fire. He couldn't; the gun switch was broken. Not being able to shoot down the ME-109 so infuriated him that he tried to spin the German in, or run him out of gas. He was actually trying to run the Kraut out of gas over his own home, 350 miles from our base!

• • •

Mike Gladych helped to keep things from getting *too* boring. Mike never quit; he always stayed in the middle of a fight until he figured he had just enough gas to get him home. But not until his fuel reached the critical point would he even think of ending his one-man war with the Luftwaffe. And sure enough, we had regrouped and were on the way home and . . . no Mike. Gabreski yelled for him, "Hello Keyworth White Three, what is your position?" After three calls and no reply we began to worry. That was a foolish thing to do with Gladych.

The radio crackled and Mike's voice came back in a monotone, "Hello Gabby, hello Gabby, this is Mike. I'm okay. I am being escorted out by three Focke-Wulfs over Dummer Lake." Gabby muttered something unintelligible as he racked his fighter around to try and reach Mike in time to help. He might as well have saved the fuel. Gladych turned into the three German fighters, and exploded the leader. And at that moment his fuel reached the critical stage; if he fought a minute longer he'd never get back to England. There's always one way to get home in the Thunderbolt, and Mike took it, gunning for the deck in a screaming power dive, the two Focke-Wulfs hot on his tail. Mike dropped below treetop level, engine howling, trying to shake his pursuers. As he flashed over a clump of trees, an air base loomed before him. No one could ever accuse Gladych of being a slow thinker; he poured a long burst of bullets into the German planes and crewmen as he thundered overhead. The first man in a surprise strafing attack rarely ever gets hit; the ones that follow usually catch all kinds of hell. Later, a grinning Mike told us, "You know, it's funny thing, they no bother me after I cross the field." The Germans had blasted both of them out the sky.

Mike didn't have the fuel to get back to England. In a solid overcast above the Channel the engine sputtered and died. At the last possible moment Mike bailed out and jerked open the chute. Two hundred yards off shore, he dropped into the water, shucked his harness, and swam to the beach. That same day he was back at the field.—END

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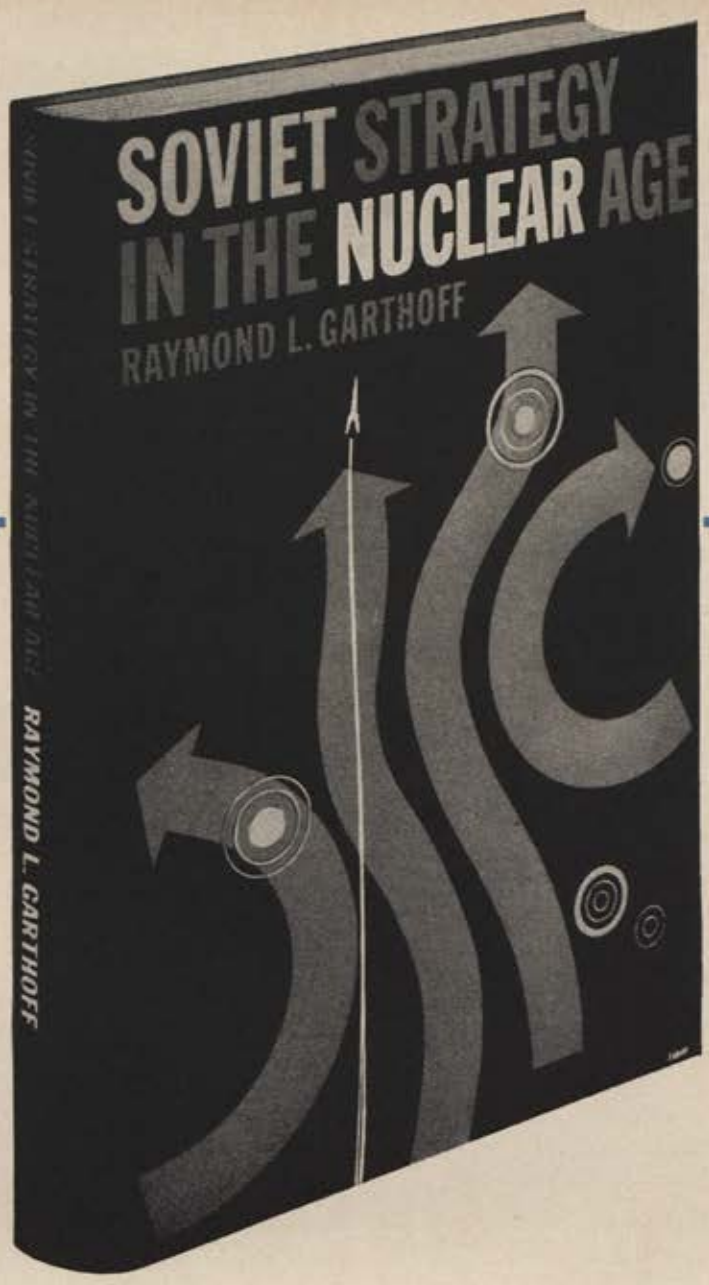

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"Will power means that one is going to do whatever he wants to do most at any particular time . . . bravery is when a person does what he honestly believes is the best thing for him to do at any particular time."

This credo – his own – has guided World War II Marine ace Col. Gregory "Pappy" Boyington (Ret.) through the bizarre career related in his autobiography *Baa Baa Black Sheep* (Putnam's, $4.50).

Pappy hated authority of any kind. He left the Flying Tigers (where he got his first five kills) primarily because of conflict with "the great stone face," the late General Chennault. He rejoined the Marines by special direction of the Secretary of the Navy (against the advice of numerous Marine and Navy officials) and eventually was given a squadron—"The Black Sheep"—in the Russell Islands, SWPA. There he skyrocketed to fame as leader of a motley crew of hard-fighting, hard-flying cronies who idolized their unconventional commander. After his twenty-eighth kill in 1944 Pappy was shot down and picked out of the sea by a Japanese sub. He sat out the rest of the war in a POW camp, as stubborn and brusque to his captors as he had been to his comrades. While a prisoner of war he learned that he had been awarded the Medal of Honor and that the Navy had dedicated a small carrier to him.

On return to the States he received a hero's welcome. He was ushered into top government sanctuaries and escorted down main streets across the nation in a flurry of ticker-tape parades. Banquets by the score, attended by "curiosity seekers" soon took on proportions of "insincere flattery" and Pappy's riposte was in the form of insults thrown at the press and his guests. He retreated into a search for fun, and, after a time, sank into oblivion.

Pappy Boyington was a great combat air artist. His description of aerial battles is excellent in spots. But in the main, his book is too heavy with harangue at people who didn't agree with him.

"The majority of my life," writes Boyington, "can be linked up with show-off or daredevil. . . . I'm not trying to change the world any more—people can go on writing and thinking what they damn well please—but for my own peace of mind I have to realize the truth about myself. . . ."

An exciting story.

• • •

The first of several Air Force career books for the teen-ager to appear this year is the work of World War II and Korean veteran M/Sgt. Lawrence C. Landis, of the New York Office of Air Force Information Services.

The Air Force: From Civilian to Airman (Viking, $2) takes the reader through recruiting procedures, using four typical candidates to show the high standards and qualifications required for Air Force service.

Much research has gone into Landis' presentation of the wide variety of Air Force technical training leading to specialist assignment. This duty is then described within the framework of the major Air Force commands and deployed units overseas.

Air Force history and traditions are given special treatment. The Air Force future is outlined in broad terms.

Landis has done an admirable job, packing a wealth of fact into a short, attractive narrative. It should find wide reception among high school grads facing military duty and career decisions.

• • •

A new, revised edition of *High Horizons*, by Frank J. Taylor (McGraw-Hill, $4) brings up to date the story of United Air Lines—a company chronicle which includes much of the history of commercial aviation and of airmail flying from Varney Air Lines in the early 'twenties through the Boeing Air Transport to today's UAL.

The new edition covers the intricate operational and financial problems brought about by modern expensive equipment such as the DC-6 and DC-7 and peers into the future, looking at the thirty new DC-8 jets UAL has on order. Sixty-four pages of halftones tell the picture story. A table of UAL milestones, plus end-papers delineating aircraft genealogy and route expansion are interesting extras.

A chunk of rarer aeronautical history is found in *Thaddeus Lowe: America's One-Man Air Corps*, by Mary Hoehling (Messner, $2.95). Before the Civil War, Thad Lowe traveled with a side show expounding his theories and dreams of ballooning. Finally he built a rude gas-filled bag and put his theories to test, thrilling crowds with ascents to more than 5,000 feet.

When the war broke out in 1860, Lowe was conducting a cross-country balloon test flight over South Carolina in preparation for a transatlantic venture. The Union forces accepted his services and Lowe balloons provided aerial intelligence to the Federals. The bloody Confederate victory at Chancellorsville, despite Lowe's accurate aerial reconnaissance of enemy troop movements, disillusioned the "Professor." He gave up research ballooning and in subsequent years invented an artificial ice machine (the first), an incandescent gas mantle, a coke oven, and a water gas system. In addition to building a sixteen-inch telescope and designing plans for an airship that would circle the globe in thirty days, he was working on a mammoth telescope to explore the universe when death came at age eighty-one. This short biography of one of America's first aerial pioneers is an easily read, informative chapter in air history.

• • •

The Robert R. Longo Co., of 1318 Beaumont Drive, Wichita 4, Kan., is now exclusive distributor of the classic *Von Richthofen and the "Flying Circus,"* by H. J. Nowarra and Maj. Kimbrough S. Brown, USAF, edited by Bruce Robertson (Harleyford, $7.50). This complete, definitive, thirty-chapter story of the fabulous German Baron ace of aces and his combat career contains many rare photos. Appendices include line drawings and photos of the aircraft he flew and a glossary of German Air Service terms.

A second Harleyford publication now handled by Longo is *Aircraft Camouflage and Markings 1907-1954* ($7.50). A narrative picture history of more than 275 markings and insignia of aircraft, in peace and war, from the early days through the Korean War.

• • •

Rutherford Montgomery, award-winning writer of boys books, has published the first in a new series of Air Force novels. *Kent Barstow: Special Agent* (Duell, Sloan & Pearce, $5) establishes the main character, Capt. Kent Barstow, jet pilot extraordinary, Air Force intelligence agent, and general trouble shooter. Kent's first assignment is testing the air defenses of the Bamboo Curtain with an F-102.

Montgomery obtained authentic

(Continued on following page)

background by visiting Air Force installations in Japan and Korea, to provide a first-class mystery experience for the lads. TV serialization of this series is being planned.

° ° °

The life of Cadet Frank Burton during his first year at the Air Force Academy is depicted in fiction in *Wings of Tomorrow*, by Marian Talmadge and Iris Gilmore (Dodd, Mead, $2.75). The air cadet argot that spices the story will interest teen-agers. The authors portray the Academy's wide variety of academic and military training, the sports program, and the social life enjoyed by the cadet corps.

° ° °

The Human Element, by John Forbes (Doubleday, $3.95)—An adventure novel about a flight from London to Nairobi, Africa, with vivid description of flight and a taut tale of survival after a crash on the African desert.

Cargoes in the Sky, by Walter Buehr (Putnam's, $2.75)—A small picture history of air cargo movements from the early days of flight to the Berlin Airlift. For the youngsters.

Missiles, Astronautics, Space

In February 1957 the Air Force Office of Scientific Research, in cooperation with Convair Division, General Dynamics Corp., sponsored the first Astronautics Symposium. The papers read by top military and civilian scientists now appear in Vol. I of *Vistas in Astronautics*, edited by Morton Alperin, Marvin Stern, and Dr. Harold Wooster (Pergamon, $15). The volume surveys scientific and technological progress of astronautics and points to lines of research needed to speed the exploration of space.

General subject headings are: Reentry, Tracking and Communications, Environment and Measurements, Propulsion, Orbits and Human Factors. Foreword to the book by Maj. Gen. Bernard A. Schriever, USAF, discusses the ICBM as a step toward space conquest. The material itself is technical to semitechnical and is tailored for the scientist, specialist, and the intelligent, interested layman. Vol. II contains the papers of the April 1958 Symposium. It is now on press.

Symposium proceedings of the Conference on Chemical Aeronomy, sponsored by the USAF's Air Force Cambridge Research Center, is included in *The Threshold of Space*, by M. Zelikoff (Pergamon, $15). This highly technical material includes subjects

(Continued on page 125)

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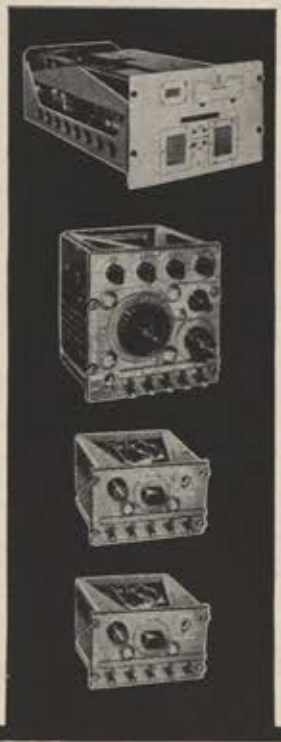

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The plan does not cover losses due to a criminal act of the AFA member, or resulting from bodily injury occurring while in a state of insanity (temporary or otherwise); or from mental or nervous disorders; or from officially certified "fear of flight"; or caused by intentional self-injury, attempted suicide, criminal assault committed by the member, or fighting, except in self-defense; or from failure to meet flying proficiency standards unless caused by or aggravated by or attributed to disease or accident; or accidents caused while riding or driving in any kind of race; or by alcohol, drugs, venereal disease, arrest or confinement; or by willful violation of flying regulations resulting in suspension from flying as a punitive measure; or sentence to dismissal from the service by a general court-martial; submitted resignation for the good of the service; or suspension from flying for administrative reasons not due to accident or disease; or voluntary suspension.

The plan does not cover losses to any member resulting from a disease or disability pre-existing the effective date of coverage, or a recurrence of such disease or disability, whether or not a waiver has been authorized by appropriate medical authority in accordance with regulations or directives of the service concerned. Loss of life shall not be deemed as a loss for purposes of this plan.

In the event that you receive the total limit of twenty-four (24) months' indemnity for loss of flight pay due to aviation accident, or twelve (12) months' indemnity for loss of flight pay due to accident other than aviation accident or to disease, your coverage is automatically terminated. You may thereafter reapply for insurance coverage in the same manner as a new member. Coverage and the payment of indemnities end with the termination of membership in the AFA, or with resignation, retirement, or pensioning from the service, or at age sixty.

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Application must be accompanied by check or money order for annual premium. The annual premium charge is two percent of ANNUAL flight pay.

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like Atmospheric Photochemistry—Earth and Venus, Spectroscopy and Photochemistry, Rocket Probing of the Upper Atmosphere, and Phenomena Produced by Hypersonic Flight.

° ° °

Dr. Harlow Shapley, Director of the Harvard Observatory, explores the academic question of existence of life on other worlds in the universe. In *Of Stars and Men* (Beacon, $3.50) he suggests there are at least 100 million planetary systems similar to ours, containing up to 100 trillion stars with planets large enough and with sufficient elements of water, atmosphere, and warmth to support environments capable of generating life.

Reference Volumes

Missile Engineering Handbook, by C. W. Besserer (Van Nostrand, $14.50)—Design data and formulae of guided missiles with graphs, tables, equations, and engineering glossary of missilry.

Atmospheric Explorations, edited by Henry G. Houghton (Wiley, $6.50)—Highly technical papers of the Ben Franklin Memorial Symposium of the American Academy of Arts and Sciences.

Aircraft and Missile Propulsion, Vol. I: Thermodynamics of Fluid Flow and Application to Propulsion Engines, by M. J. Zucrow (Wiley, $11.50)—Discusses the principles of technology of engines employed for propelling high-speed aircraft and missiles.

° ° °

Earth Satellites, by Patrick Moore (Norton, $3.95) is a new, revised edition, first published in 1956. Updating includes the story of the Russian Sputniks, the American Explorer and Vanguard, US lunar probes, and speculation on man's first actual step into space. For the layman's understanding, it is one of the best of the many satellite books that are flooding the market today.

Related Professional Reading

Hoisting a curious set of facts to the publishing yardarm, the US Naval Institute, the reputable but pro-Navy military writer George Fielding Eliot has come up with a panacea for US military ills.

The gist of *Victory Without War* ($2) is that what the Air Force has been able to do successfully since World War II (deter major war and preserve the peace through SAC global deterrent airpower) the US Navy, with its giant aircraft carriers,

(Continued on following page)

can do better from now on. Therefore, says Eliot "we must make the decision now that sea-based power is our chosen deterrent force. . . . We must quit wasting time in producing weapons which are unsuited to our needs..."—(the B-47, B-52, B-58, etc.).

Eliot claims *one* aircraft carrier can equal the flexible, versatile, and proven capabilities of *one* SAC Wing. But the cold, hard facts of carrier operations do not jibe with fireside theory and here is where Eliot fails to separate fact from fiction. He strains to prove his case by emphasizing only the positive features of sea-based airpower while at the same time hammering away only at alleged negative features of land-based airpower—mainly vulnerability of SAC fixed bases.

There is real need for a logical, objective, dispassionate public study of the two weapon systems—land and sea based—and a reasonable solution to combining the positive features of each into a single national strategy and a single offensive strategic air force.

Such a study must be based on—first of all—a deep understanding of the strategic deterrent concept. Without this basic foundation, the book would be parochial, flamboyant, overdramatized. Such is the case in *Victory Without War.*

• • •

The Phantom Major, by Virginia Cowles (Harper, $3.95)—A stirring account of British Maj. David Stirling and his small mobile "Special Air Service" detachment which harassed Rommel's desert force and created havoc in bold, brazen strikes on airfields, supply dumps, fuel storage areas, etc.

The March of Conquest: The German Victories in Western Europe, 1940, by Telford Taylor (Simon and Schuster, $7.50)—Excellent analytical narrative of the German Wehrmacht from its early victories, which laid the groundwork for World War II, through its moments of high victory against the Allies. An indictment of the German General Staff for their stubborn emphasis on the decisiveness of land warfare.

No More War, by Linus Pauling (Dodd, Mead, $3.50)—American Nobel Prize winner discusses nuclear tests and warfare and pleads for ending of T-N weapons testing by international agreement.

The Blockhouse, by Jean-Paul Clebert, translated by Jonathan Griffin (Coward - McCann, $3.50) — Novel based on the reportedly true and in-

(Continued on page 129)

Capt. Boling with
His Single Engine
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On August 1st, 1958, Captain Marion ("Pat") Boling landed at Pendleton, Oregon, after a non-stop flight from Manila, P. I.—a distance of 6,856.32 miles in 45 hours and 42 minutes, thus establishing a new long distance record for light aircraft. His plane was a single engine Beechcraft Bonanza.

"My navigation", says Captain Boling, "was accomplished almost entirely with an Aircraft Radio Corporation Type 21-A Automatic Direction Finder. At check point after check point this instrument functioned perfectly. The dependability of the ADF all along my route gave me a real feeling of confidence."

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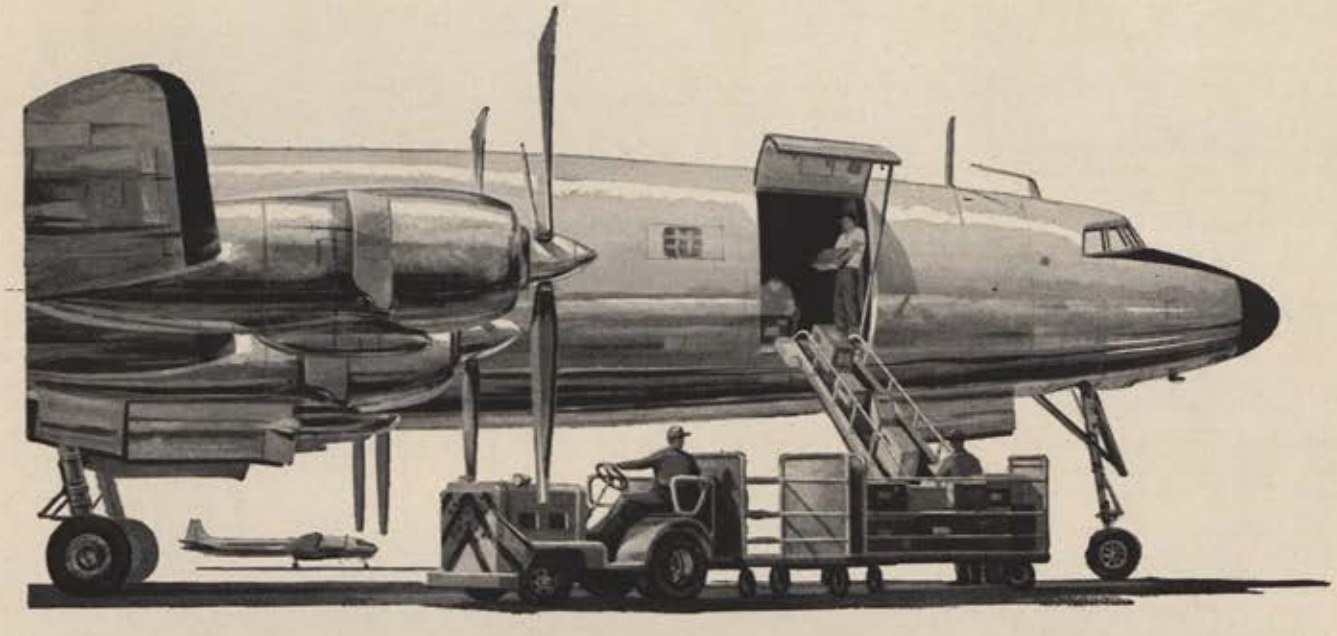

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credible story of six Nazi soldiers, walled up in a concrete fortification in France during World War II and discovered six years later. Only two of them survived this nightmare ordeal and were rescued, blind and delirious.

° ° °

Latest aid to the aviation writer, editor, and researcher is *An Airpower Bibliography 1955-1956*, by Raymond Estep (Research Studies Institute, Air University). This comprehensive annotated bibliography supplements a volume of the same title published in 1956 and covering the years 1950-1954. Entries included are books, periodical articles (official and commercial), speeches, interviews, official unclassified documents. All pertain to aviation, airpower, space, astronautics, and directly related subjects. Entries are by number and subject category with a complete, detailed, cross-index for easy reference and location. Published primarily for the students and faculty of the Air University, it receives limited official Air Force distribution.

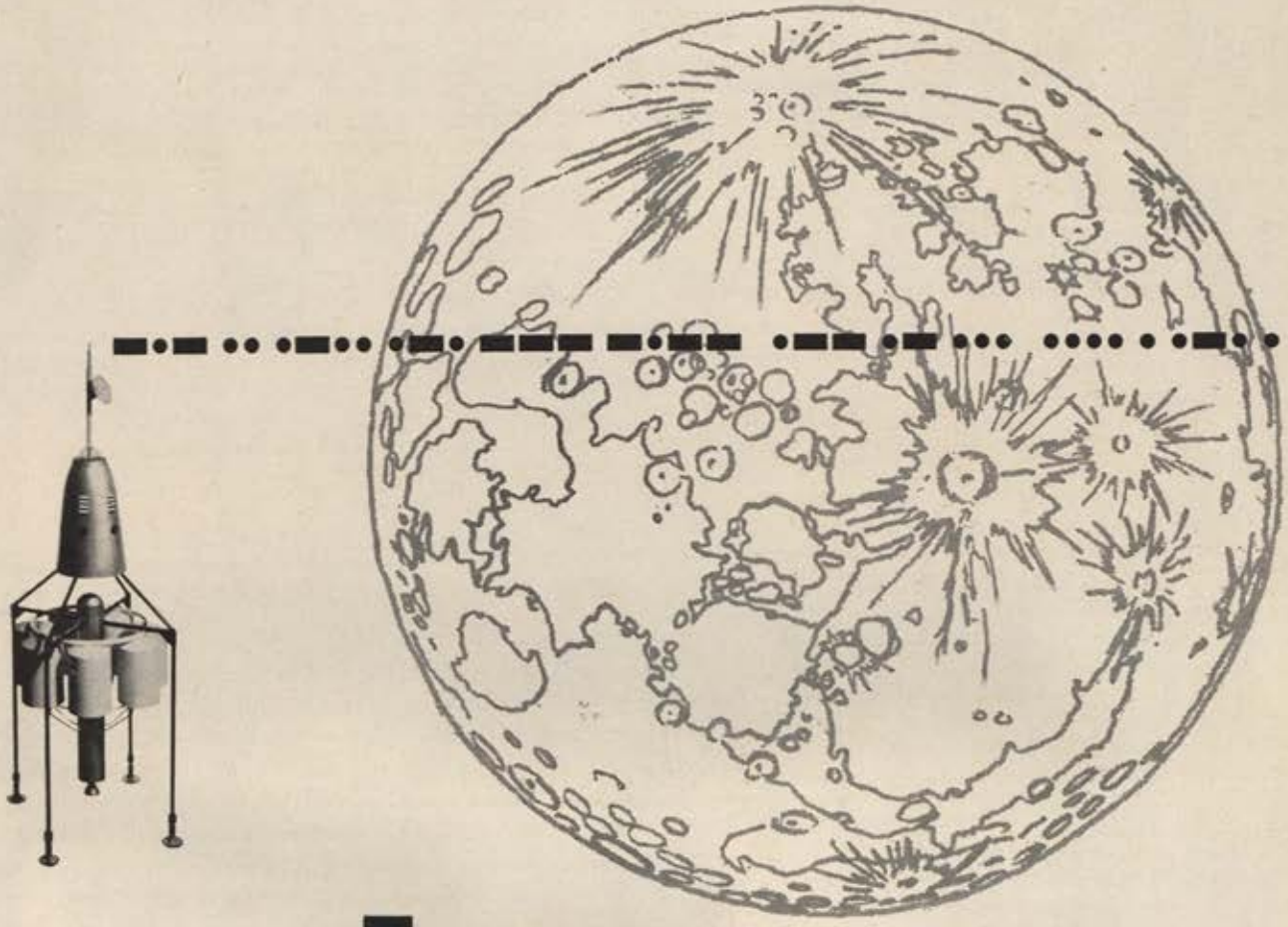
° ° °

In 1914 the German Supreme Command came close to capturing the whole of France in one bold military stroke. This was the famous "Schlieffen Plan" in action—brainchild of Graf Alfred von Schlieffen who died just before World War I broke out.

In *The Schlieffen Plan: The Critique of a Myth* (Praeger, $5.50) distinguished German historian Gerhard Ritter presents this controversial ill-fated plan in its original form, as he found it in American archives after forty years of search. In careful analysis, he evaluates its pros and cons, and its political implication in an attempt to settle for all time the heated debate of armchair strategists. Observations of H. von Moltke, who helped implement the plan, are given special treatment. This small book is bound to be of considerable interest to professional military people.

—MAJ. JAMES F. SUNDERMAN

From Normandy to Eniwetok, P.F.C. Joseph Willie Kilroy was there . . . and he'll be out there somewhere when man in space is commonplace! Today, the top astroscientific and missile engineering teams in the country are already at work on the fundamental problems of space exploration and the manned orbit vehicle. One of those top teams is at Martin—with 30,000 engineering man-years of experience in missile and space system pioneering.



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Objectives

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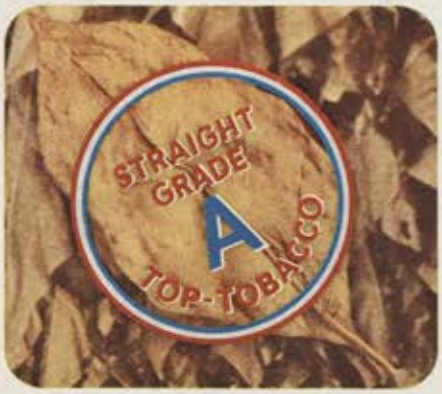

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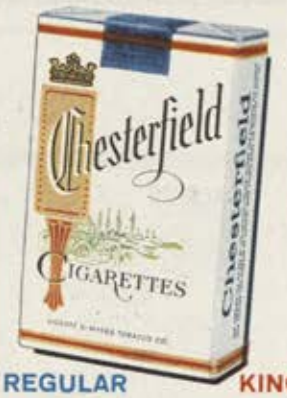

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