MARCH 1962 / 50c

AIR FORCE

and SPACE DIGEST

The Magazine of Aerospace Power / Published by the Air Force Association

Fear of thermonuclear war, a myopic view of Soviet aims and purposes, a "devil theory" of America's history —these are the roots of the current spate of woolly-minded arguments against a strategy based on deterrence. . . .

See Page 31

How to guide a bull by the nose

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Flight Propulsion

First U.S. Turbojet Tested by G.E. Just 20 Years Ago

LYNN, MASS.—Twenty years ago here, under strictest secrecy, U.S. aviation witnessed an event that would send it headlong into the Jet Age. The time was March, 1942. The event: General Electric's initial testing of America's first turbojet engine.

The Nation's first jet engine, primitive by today's standards, was a centrifugal-flow powerplant that weighed 780 pounds and developed 1250 pounds thrust. To build it, the Government selected General Electric on the basis of its historic experience in the technology of compressors, turbines, and superchargers.

Six Months to Build

The G-E engine was based on the design of Great Britain's Whittle turbojet, drawings for which were received by the Company in October, 1941. Despite production and material hurdles that required numerous innovations, G.E. completed and test-fired its first engine in six months.

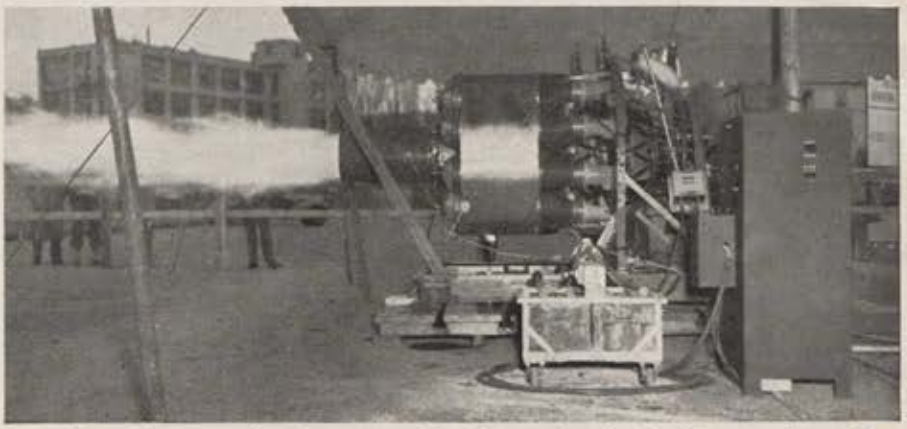
This was the I-A engine, forerunner of all American turbojets. In October of 1942 two I-A engines were installed aboard the Bell P-59A, built especially for the purpose, and America's first jet aircraft took to the air.

By 1946 General Electric had successfully demonstrated the advantages of the axial-flow compressor for turbojet propulsion. Its first engine using this principle, the J35, was quickly followed by the historic J47, workhorse turbojet that today claims more actual combat hours in military aircraft than any other jet engine. The world-wide achievements of the J47-powered North American F-86 and Boeing B-47 over the past decade are now a matter of history.

G.E. Unveils J79

In 1958 G.E. unveiled the nation's first Mach 2 turbojet, the now-renowned J79, featuring a high thrust-to-weight ratio. The 16,000-pound thrust J79 began its extensive role in U.S. aviation by powering the Lockheed F-104, the Grumman F11F-1F, and the Chance Vought Regulus II missile.

THE LATEST—J79's 16,000 pounds of thrust symbolize 20 years of propulsion progress. The J79, along with the smaller J85, are the latest of G.E.'s turbojets.



THE FIRST—flame streaks from a modified I-A engine in this historic photo of an early G-E test run. The first jet produced 1250 pounds thrust, weighed 780 lbs.

Today G.E.'s J79 turbojet, as production powerplant for the General Dynamics Corporation B-58, North American A3J, and McDonnell F4H, along with the F-104 Starfighter, has the distinction of having powered military aircraft to 24 international jet flight records.

After the debut of its J79 in 1958, G.E. was prepared for its entrance into the commercial jet aircraft industry. Its CJ-805-3 engine—civilian cousin of the J79—was chosen to power the Convair 880 transport, which went into service in May, 1960. As of January 1, 1962, it had accumulated more than 400,000 hours of flight time.

Small Engines Make Debut

In 1953 General Electric won a Navy competition to develop the 800 horsepower T58 turboshaft helicopter engine. The following year, under USAF contract, the company began development of the 2450-pound thrust J85 turbojet, versions of which have since grown to 3850 lbs thrust and over.

The T58 engine, currently rated at 1250 hp, powers the Sikorsky HSS-2, the Kaman HU2K, and the Boeing Vertol HRB-1. Its civil counterpart, the CT58, first U.S. gas turbine to be FAA-certificated for commercial helicopters, is now in airline use on the Boeing Vertol 107, the Sikorsky S-61L, and S-62.

Meanwhile General Electric achieved a major advance in the state of the art in developing the high-thrust J85 engine, which was the beginning of a versatile family of military and commercial turbojets. Offering the highest thrust-to-weight ratio of any engine in the Free World today, the J85 is currently in high volume production as the powerplant for the supersonic T-38 and N-156 jets, the McDonnell GAM-72 decoy missile, Radioplane's Q-4B target drone, and NASA's X-14A VTOL demonstrator.

A Look Ahead

At the 20 year milepost of the Jet Age, General Electric's Flight Propulsion Division has behind it a production record of more than 35,000 engines whose operational record is currently nearing the 35 million flight-hour mark. Looking ahead, G.E. sees these as some of the highlights of its participation in the Jet Age's third decade:

- Additional V/STOL applications for its 2850 hp T64 turboshaft/turboprop, already undergoing flight test on the deHavilland Caribou DHC-4 and selected for the Vought Tri-service Transport
- In 1963, the Nation's first flight test of a fan-in-wing aircraft, powered for VTOL by G.E.'s J85-driven X353 lift fan
- Growth of experience in Mach 3 propulsion, to be gained from the North American B-70's G.E.-built J93 engines, plus basic supersonic transport propulsion research
- Expansion of its role in the business jet aircraft market, where the G-E J85/CJ610 turbojet has already been chosen to power Swiss-American's SAAC-23, the Aero Commander Jet 1121, and the Piaggio-Douglas PD-808
- Continuing turbofan engine progress with such successful advanced powerplants as the CJ-805-23 (powering the Convair 990 and the Caravelle 10A), and the aft-fan version of the CJ610, the G-E CF700
- Projection of turbojet technology and experience into propulsion systems for the Aerospace Age, including ion, arc jet, and rocket engines, and air breathing boosters for space vehicles.

These and other developments at G.E.'s Cincinnati, Ohio, and Lynn, Mass., facilities are helping give the U.S. dramatic impetus as it enters the 21st year of the Jet Era.

NEWS

A report about progress in research and products from the Flight Propulsion Division of the General Electric Company

POISED AT FULL THROTTLE, this United States Navy McDonnell F4H "Phantom II" gets its launch signal from catapult officer during final phases of Carrier Suitability Trials aboard the FRANKLIN D. ROOSEVELT. During the 10-day trial period which ended last December 14, performance of the aircraft and engine was outstanding. Powered by two General Electric J79 turbojet engines, the F4H is destined to become the Navy's standard Mach 2 carrier-based fighter. It holds three world speed records (500-km closed course, 3-km low-altitude, and 15/25-km straight course), and the sustained-altitude record of 66,443 feet.

USAF Lauds T-38 for Flight Test Safety

NORTON AFB, CALIF. — Northrop Corporation's T-38 Talon was recently acclaimed by the United States Air Force for compiling the best safety record in flight test of any USAF supersonic jet.

In a tribute to pilots as well as the aircraft, an Air Force spokesman said that over 90 T-38's had flown more than 9000 flight test hours without a major accident. The report came from the office of Major General Perry B. Griffith, Deputy Inspector General for Safety.

The T-38 Talon, powered by twin General Electric J85-5 turbojets, is the world's first supersonic aircraft designed expressly for training purposes. Its use as a "supersonic classroom" for space age pilots began late last year.

Chosen for its high safety assurance and versatility, the T-38 features performance capabilities of jet fighters twice its size. With flight capabilities in excess of Mach 1.2, it has exceptional stability and handling qualities in both supersonic and low-speed flight regimes.

The T-38 fills the critical gap between subsonic trainers and supersonic first-line fighters. Aboard the tandem-seat Talon, pilots explore supersonic flight, take-off and landing techniques, multi-jet engine operation, aerobatics, formation flying, night flying, and cross-country navigation.

Each of the aircraft's J85-5 engines is fully capable of powering the aircraft by itself. This factor, combined with dual hydraulic and electrical systems, results in exceptional T-38 safety and reliability margins.

General Electric J85-5 turbojets deliver 3850 pounds thrust each, yet weigh only 555 pounds.

In addition to the T-38, General Electric J85's currently power the GAM-72 SAC decoy missile, the Q-4B target drone, and Northrop's N-156 limited-war fighter, a single-place counterpart of the T-38.

USAF's best flight test safety record for a supersonic jet belongs to the General Electric J85-powered T-38 Talon trainer.

American, Swissair Start Jet Service With Convair 990

CINCINNATI, OHIO—American Airlines and Swissair will be the first major airlines to inaugurate passenger service with Convair's new 990 jetliner.

American, which refers to the aircraft as the 990 Astrojet, is scheduled to start service between New York and Chicago in mid-March.

The new Swissair Coronado began passenger service between Zurich, Geneva, Lisbon, Dakar, Rio de Janeiro, and Buenos Aires in late February.

Newest of the nation's jet transports, the Convair 990 is powered by four General Electric CJ-805-23 aft turbofan engines, each rated at 16,100 pounds thrust. Federal Aviation Agency certification for the 990, first jet transport designed specifically around aft turbofan advantages in thrust and fuel economy, came last December 18.

The 990 has transcontinental capabilities, but both American and Swissair will use the aircraft for intermediate-range service. It can land and take off from most airports used by four-engine propeller-driven aircraft, and can cruise at near 600 miles per hour.

The new Convair jetliner was designed with the extra strength, rugged airframe and short takeoff and landing capabilities required for the frequent stops to which aircraft in medium-range operation are subjected.

During FAA testing the 990 made more than 110 takeoffs and landings, and cruised some 76,000 miles on simulated airline schedules throughout the United States. At the time of certification, the six test 990's then flying had accumulated almost 1000 flight hours.

In addition to American and Swissair, REAL/Varig and SAS are also scheduled to add the 990 to their routes.

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Chance Vought, the aerospace arm of Ling-Temco-Vought, has the prime contract for development of an operational prototype VTOL. Teamed with Vought are two other famous names in aviation — Ryan Aeronautical Company and Hiller Corporation. LTV's efforts in this important program are guided by Paul Thayer — a dynamic executive who has grown through the ranks from test pilot to Chance Vought president, and whose leadership is a vital component in LTV's management in depth.

This caliber of management, linked with proved technical competence in aerospace, electronics, communications and consumer products, enables LTV to make important contributions to the security, prestige and the well being of our nation.

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AIR FORCE

The Magazine of Aerospace Power
Published by the Air Force Association

VOLUME 45, NUMBER 3 • **MARCH 1962**

AIR FORCE Magazine and SPACE DIGEST are published monthly by the Air Force Association. Printed in U.S.A. Second class postage paid at Dayton, Ohio. EDITORIAL CORRESPONDENCE AND SUBSCRIPTIONS should be addressed to the Air Force Association, 1901 Pennsylvania Ave., N. W., Washington 6, D. C. Telephone, FEderal 8-6575. Publisher assumes no responsibility for unsolicited material. CHANGE OF ADDRESS: Send us old address and new address (with zone number, if any) to Air Force Association, 1901 Pennsylvania Ave., N. W., Washington 6, D. C. Allow six weeks for change of address. Send notice of UNDELIVERED COPIES on Form 3579 to AIR FORCE Magazine, 1901 Pennsylvania Ave., N. W., Washington 6, D. C. SUBSCRIPTION RATES: $5.00 per year, $6 per year foreign. Single copy 50 cents. Association membership includes one-year subscription: $6.00 per year (Cadet, Service and Association membership also available). ADVERTISING CORRESPONDENCE should be addressed to Sanford A. Wolf, Director of Marketing, AIR FORCE Magazine and SPACE DIGEST, 501 Madison Ave., New York 22. N.Y. (PLaza 2-0235). New England office: Morley L. Piper, Resident Manager, 428 Essex St., Hamilton, Mass. (HOward 8-4600). Midwest office: Paul J. Jones, Suite 1310, 105 S. LaSalle St., Chicago 3, Ill. (STate 2-1265). Los Angeles office: Harold L. Keeler, Sales Manager and William H. McQuinn, 625 S. New Hampshire Ave., Los Angeles 5, Calif. (DUnkirk 5-1436). San Francisco office: Mark M. Hurd, 201 Town & Country Village, Palo Alto, Calif. (DAvenport 6-2920). Detroit office: Kenneth J. Wells, 801 S. Adams Rd., The Adams Plaza, Birmingham, Mich. (MIdwest 7-1787). European representative: Brayton Nichols, 7 Blenheim St., London W. 1, England.

An Editorial

AIRPOWER VS. GUERRILLAS

By John F. Loosbrock
EDITOR, AIR FORCE/SPACE DIGEST

GUERRILLA, literally translated, means "little war." The word was coined by Spanish peasants who waged a little war against Napoleon with such success that he bitterly referred to their country as "the Spanish ulcer."

Guerrilla warfare poses to organized military forces the kind of problem juvenile gangs present for a metropolitan police force—hit-and-run tactics, cooperation (willing or forced) of the population, rules that apply to the policeman but not to the criminal, frustration, and loss of face. The technique is made to order for Communist use in the new and undeveloped nations that have not yet made the transition from colonial dependence to viable independence. Vietnam is probably the classic modern example.

Guerrilla warfare is but one phase of the shadowy area of conflict that lies just short of the kind of organized hostilities that we call "limited war." "Sub-limited war" is one name that has been given to this gray area, and it represents the most likely arena of conflict between the free world and the Sino-Soviet bloc in the near future.

The philosophical approach to sub-limited war is not unlike that to general and limited war. The first aim should be to deter, to see that war does not occur. But, should that prove impossible, it is essential that both means and will exist to fight and win. And, to complete the circle, existence of the will and means to win is what makes deterrence work in the first place.

Airpower's role in deterring general war is relatively well defined and recognized. Nor is there much quarrel about its decisiveness, or at least the need for it, in deterring limited war, although the battle about the use of nuclear weapons short of general war still rages. The unique contributions of airpower to deterrence of sub-limited war, however, are less well understood although they are equally impelling.

For the newly emerging nations, airpower provides a short cut to the benefits of a modern society, and quick achievement of these benefits is the best defense against the infiltrating subversion of communism, which feeds on weakness and is repelled by strength. In nations lacking highways and railroads, air offers quick and comparatively cheap communication and transportation, lack of which has been a prime contributor to instability and loss of control on the part of new governments.

In addition air permits widest use of scarce technicians, doctors, nurses, teachers. It provides ready aid in case of flood or earthquake. It makes the presence of the central government felt quickly and effectively. Thus, airpower can be exploited to achieve and maintain internal strength, stability, and control in the emerging nations, rendering their governments less vulnerable to Communist subversion and their people less likely to be attracted by either Communist threats or promises of the better life. Our foreign-aid programs, military and economic, must be reoriented to recognize these facts and to take advantage of them. The military services, including the Air Force, can be of great assistance to this effort in transmitting skills, advice, and know-how.

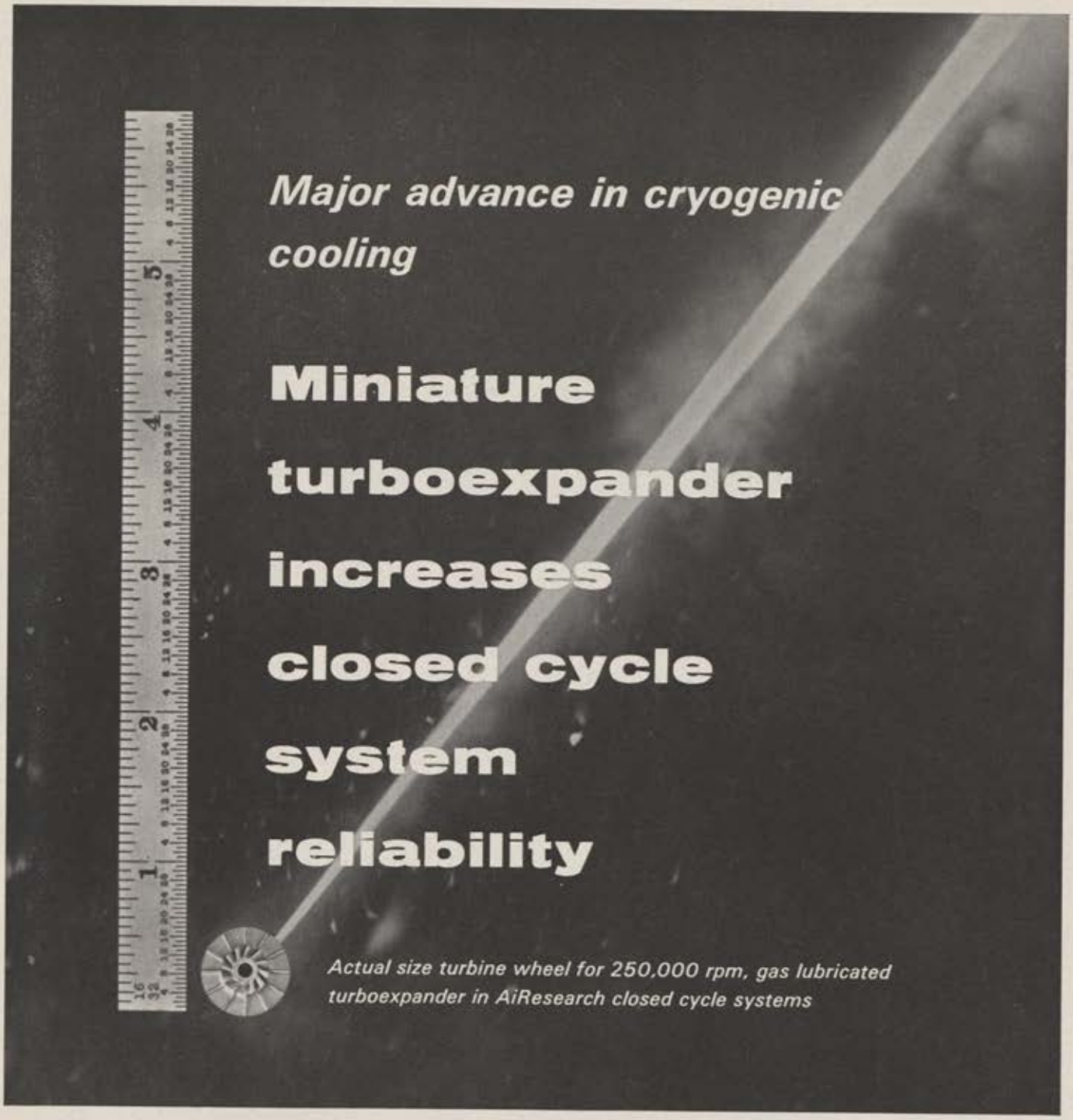
Where it is too late for deterrence to work, guerrilla wars must be fought and won. Here, too, the fact that airpower is the key to success is not fully understood. The popular image of guerrilla warfare is that of hand-to-hand combat on shadowy jungle trails, of modern-day Daniel Boones with blackened faces and camouflage-netted helmets. This is part of it, to be sure, but there is an important distinction to be made between guerrilla operations and counter-guerrilla operations. To a great extent, guerrillas fight the way they do because they have no better way. They improvise because they lack equipment. They hit and run because they lack the strength to stand and fight. They walk because they cannot ride.

Rather than imitating guerrillas we and our allies must take full advantage of what superiority we have—firepower, movement, logistics, communications, tactical control, reconnaissance. After all, in the long haul the American Indians weren't licked because we became more adept with the bow and arrow. They lost out to a combination of the transcontinental railroad, the telegraph, the repeating rifle, and the US cavalry.

This is not to say that modern arms and equipment should not be used in daring and unconventional tactics. The French in North Vietnam tried in the conventional way and Dien Bien Phu was the tragic result. But the British combined modern equipment with unorthodox tactics and beat the Malayan guerrillas in their own ball park. Currently, in Vietnam, airpower is being employed in novel and daring ways and is the fulcrum for whatever success is being achieved there.

It is no secret that the Kennedy Administration has put counterguerrilla warfare high on its list of current priorities. The Air Force, rich in recently won experience, has formed a Sub-limited Warfare Task Force, chaired by Brig. Gen. Adriel N. Williams, Deputy Director of Plans for Policy, DCS, Plans and Programs. Lessons learned in Vietnam and other troubled parts of the world are being hammered into policy, doctrine, and tactics. Individuals and units are being especially trained for this kind of duty.

While guerrilla, or sub-limited, war is popular at the moment, USAF leaders know that it is in addition to, not a substitute for, the basic mission of deterring and winning, if need be, larger conflicts. The ramparts we watch are long ones, and no post can be safely left unmanned. But airpower is a flexible instrument. Applied selectively and with imagination it can do many jobs.—END



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Utilizing its experience as a world leader in lightweight turbomachinery and cryogenic cooling, AiResearch is also developing an all-turbomachinery closed cycle system incorporating a turbocompressor as well as turboexpander.

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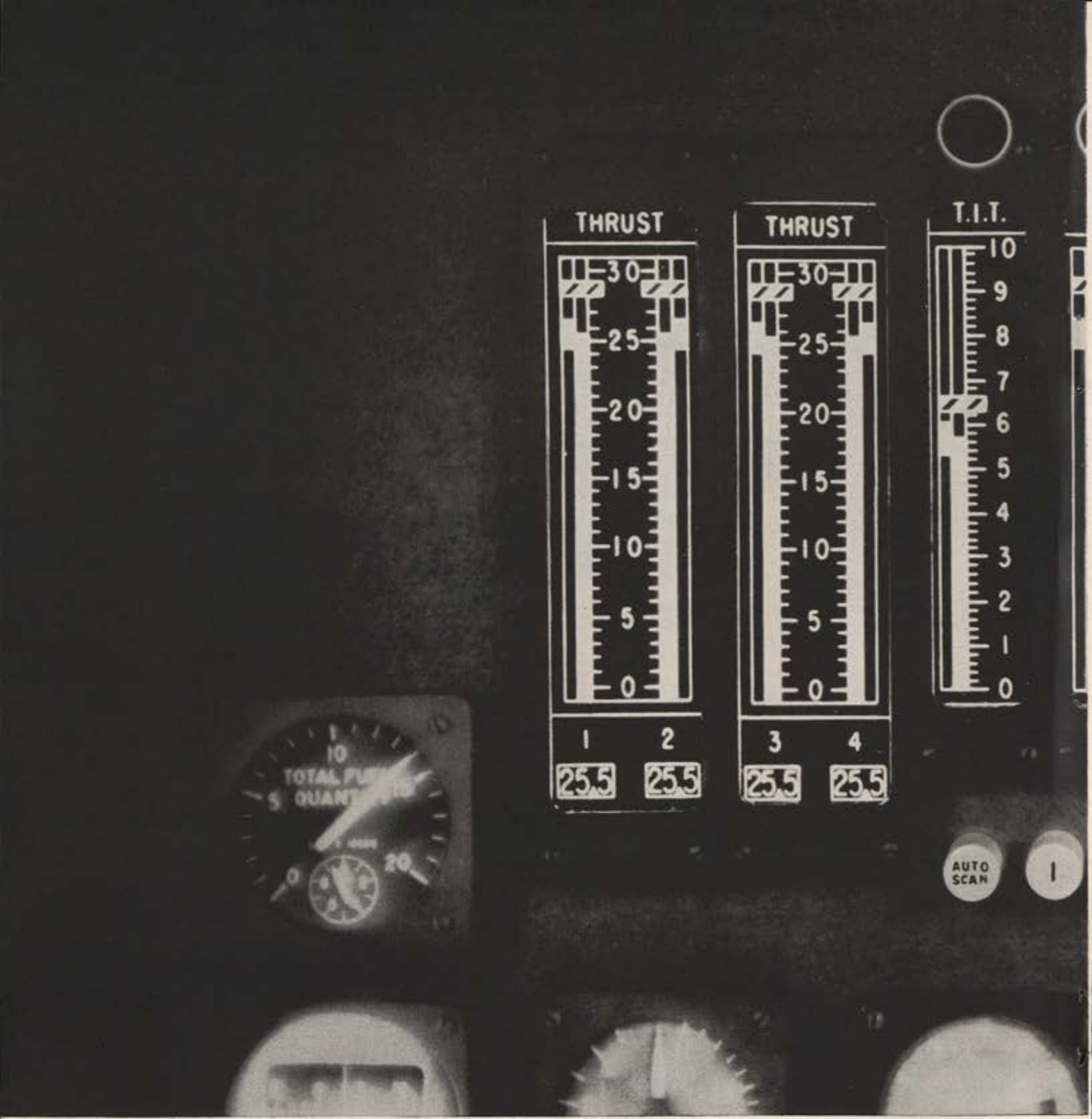

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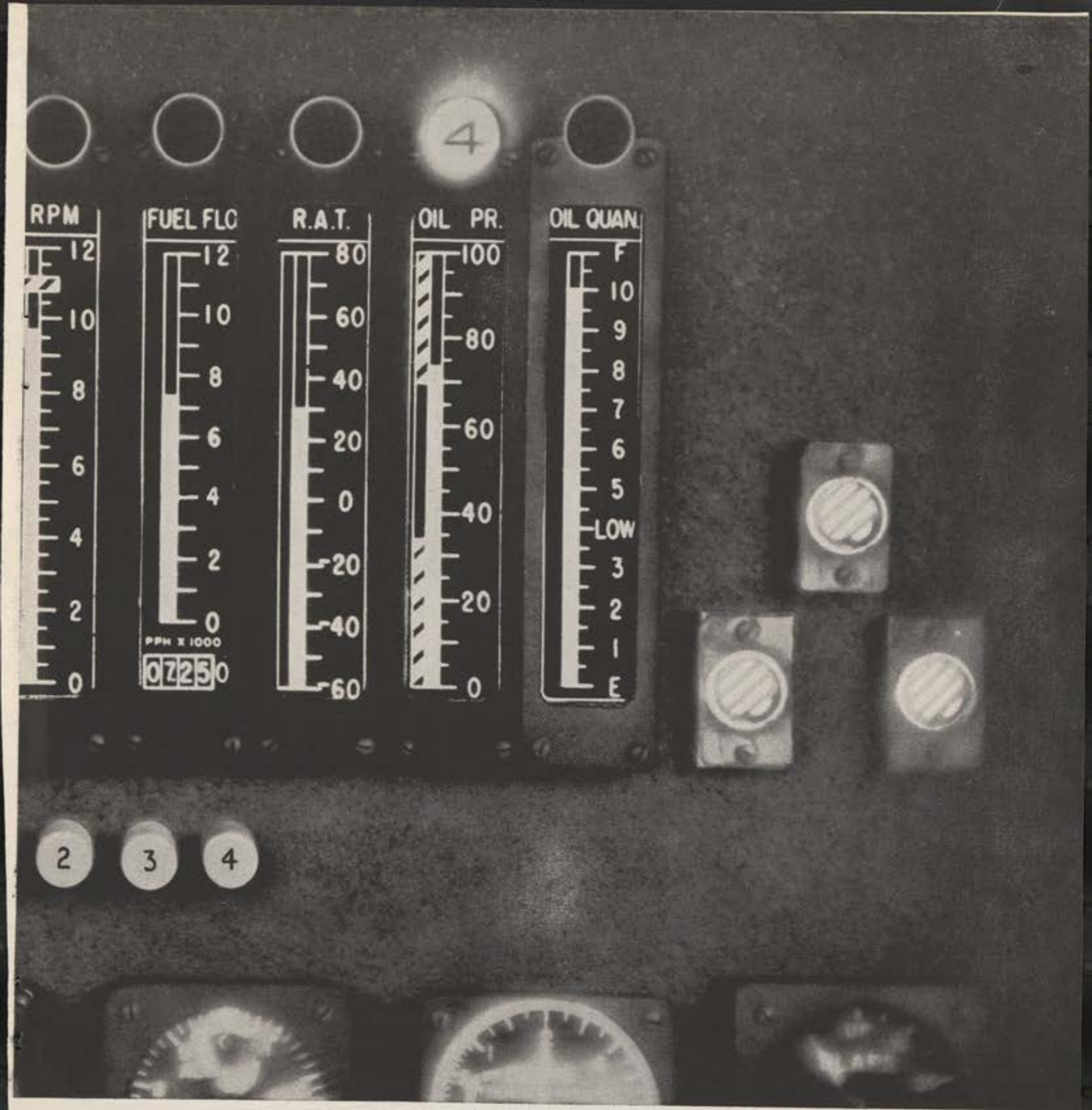

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Juggernaut

Gentlemen: Apropos Claude Witze's most interesting comment in the January issue of AIR FORCE/SPACE DIGEST ["Airpower in the News," page 16] may I call your attention to the editor's introduction to "Juggernaut," and particularly the following paragraph:

"Although it will be apparent to most readers, we wish to emphasize that this article is not concerned with the military budget per se; *i.e.*, whether we are spending too much, or not enough, on national security. There is no necessary connection between the size of the military budget and the degree of civilian control. It is to the central question of *control* to which this article is addressed."

As you can see, we tried to make it crystal clear that Mr. Cook was dealing with the problem of the control of the military establishment and not with its size or scale per se. Nor was it his assignment to assess the enemy's capabilities or intentions.

I call the point to your attention . . . because of your statement that "in the entire sixty-four pages of *The Nation* there is no evaluation of the threat or the capabilities of the potential enemy." You are quite right, of course. But the introduction, I think, makes it clear that this was not Mr. Cook's assignment.

CAREY MCWILLIAMS, Editor
The Nation
New York, N. Y.

● *The fact that Mr. Cook's assignment was to write about only one wheel on the Juggernaut does not mean the other wheels do not exist. Senior Editor Witze, who can recall Hitler's legions marching in Munich and Berlin nearly three decades ago, feels that we cannot ignore the enemy's capabilities or intentions. The fact that Mr. Cook did this on orders from his editor merely pinpoints responsibility for a journalistic error of omission.* —THE EDITORS

Useful Material

Gentlemen: Congratulations on an excellent report, "Red Intent and Strategy," which appeared in your January 1962 issue. We need upgraded material of this kind very much. I am passing my copy of the magazine on to a number of the top members of the Department staff.

CHARLES H. BOEHM, Superintendent
Department of Public Instruction
Harrisburg, Pa.

By Way of Comparison

Gentlemen: I have read your January issue of AIR FORCE/SPACE DIGEST and was impressed by this excellent issue. It was particularly revealing to compare Flint DuPre's piece on the Minuteman with a recent *Saturday Evening Post* article and *Time* magazine coverage on the same subject. I found "America's Strategic Ace in the Hole" better written and researched and more informative than the other two.

ROBERT PICKERT
Washington, D. C.

A Favor to an Old Friend

Gentlemen: In the past two years I have noted in your annual issue [September] containing the list of Air Force bases, that Maxwell AFB, Ala., named after Lt. William C. Maxwell, lists him as being from Natchez.

Maxwell was from Atmore, Ala., which is located about one hundred miles southwest of Montgomery, Ala.

He and I served together as instructors at the Aerial Gunnery School at Ellington Field, Tex. (the largest flying field in the world in World War I) through most of 1918. In February 1919 we were on the same orders to Kelly Field, Tex. There we occupied the same set of quarters until June 1919 when Maxwell was ordered to join the 3d Squadron (Pursuit), being reorganized at Mitchel Field, N. Y., for service in the Philippines.

Some fifteen months after Maxwell had left Kelly, I received orders to the Philippines and looked forward to seeing him and others of my friends. However, before I arrived there Maxwell had died in the crash of his plane near the Del Carmen Sugar Central, about twenty miles south of Clark Field (Camp Stotsenberg), P. I.

In your last issue containing the annual listing of Air Force bases, you had photos of some of the old "Stout Fellas." I thought you might like to have this photo of Maxwell for your files. It was given to me by him when we parted at Kelly. It is an excellent likeness.

Lt. William C. Maxwell

Maxwell was a quiet, gentlemanly fellow, slender and slightly over six feet tall, friendly but unassuming.

I hope you will not consider me out of line in taking this action. I do it as a sort of favor to an old friend, and to keep the record straight.

COL. RAPHAEL BAEZ, JR., USAF (Ret.)
Long Beach, Calif.

● *Thanks for the photo and information on Maxwell. It is a welcome addition to our file, and many of our readers will be interested in your contribution to little-known details of his career. Also, we are happy to correct the record on the place of his birth.* —THE EDITORS

Evolution and the Bible

Gentlemen: In the January issue of AIR FORCE/SPACE DIGEST there is an article entitled "Not Yet Space-Minded," by Arthur C. Clarke. This article obviously indicates that Mr. Clarke . . . lacks a belief in a Supreme Being. In essence this is the gist of Mr. Clarke's article. . . .

If Mr. Clarke and those like him had a profound belief and faith in what the Bible teaches, they would not be in the category of "neurotics" (in which he seems to classify a majority of the western world).

Perhaps evolution has been proven conclusively to Mr. Clarke, but it has not to me and I dare say those believing as I do are in the majority. . . .

(Continued on following page)

AIRMAIL — CONTINUED

Fortunately, Mr. Clarke has a right to his opinion in the free society in which we live. However, I am sure that there are a few who believe as I do. Mr. Clarke may trace his ancestors back to a fish that slithered out of some ocean if he wishes. I, for one, don't care for fish.

JOE C. HOPE
Palmdale, Calif.

● *As reader Hope points out, Mr. Clarke has a right to his opinions in our free society. Not to cavil, but an acceptance of the evolutionary hypothesis does not necessarily preclude the existence of a Supreme Being. A fish is God's creature, too. The phenomena of life and intelligence, whether confined strictly to our own planet or spread, as many scientists now think, throughout the cosmos, seem to strengthen the argument for a Godhead whose mysteries we have barely plumbed.*—THE EDITOR

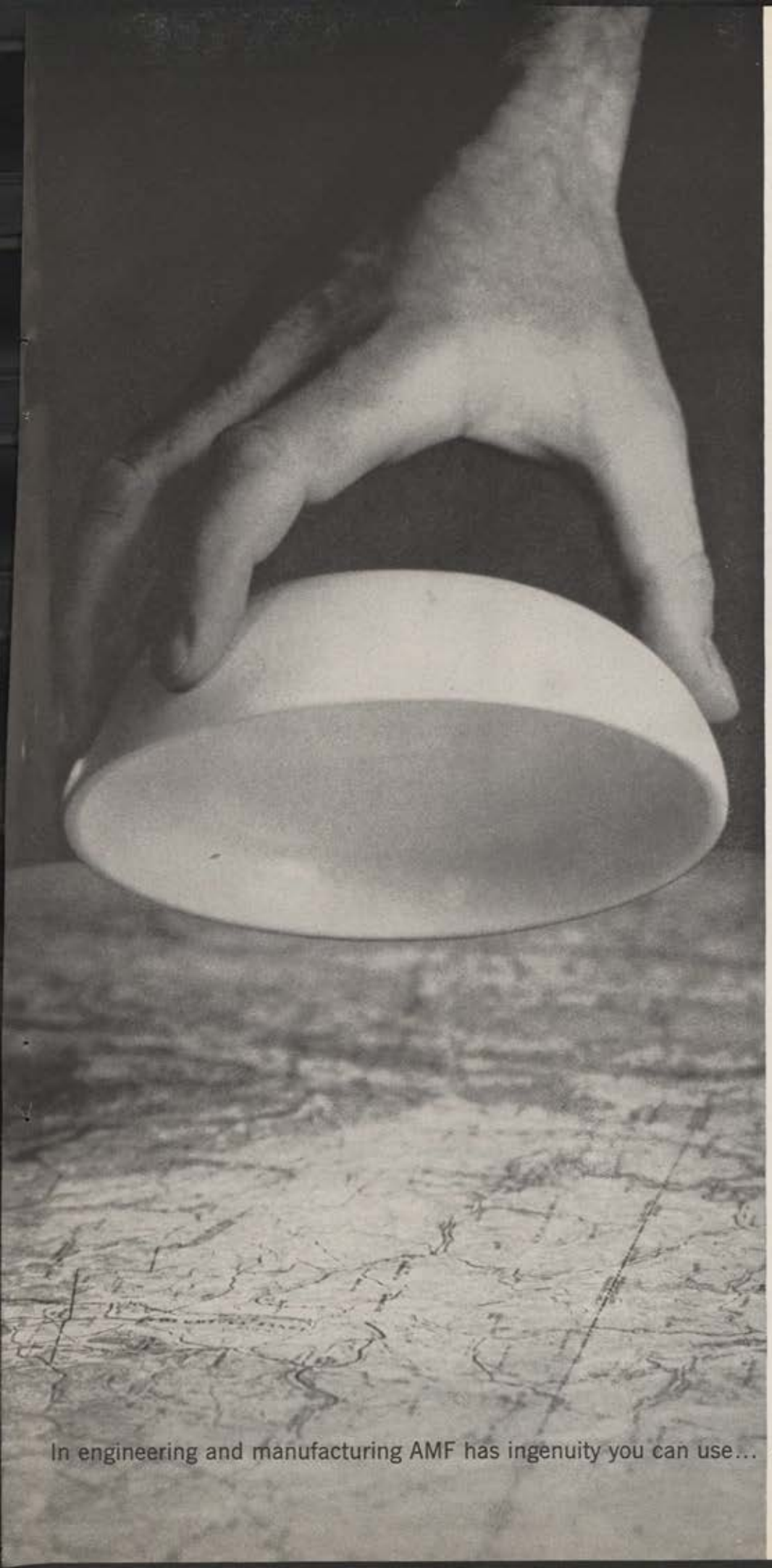
Gentlemen: Though most erudite, Arthur C. Clarke's opinions on man and religion are a bit old-fashioned. When he says, ". . . the theory of evolution arouses . . . little controversy," he is wrong. Evolution, as a general principle, is theorized by many scientists, but when you talk about specific theories of evolution the greatest opposition comes from scientists themselves. . . .

The earliest treatise on scientific theories of natural origin are found in Genesis. "Let there be light" expresses the first energy from which science today states prefaced the physical creation. The six days of creation correspond to scientific schedules even showing formation of dark bodies before the suns (an idea now supplanting the old nebular theories). Life began in the sea—say both Genesis and science. Even the gametophyle plant reproduction is outlined in Genesis 1:11.

Christians do not claim they are the only intelligence in the universe. Scripture acknowledges the "hosts of heaven." Nowhere does it claim the earth is the center of the universe. Such "old wives' tales" should not be accepted without investigation, especially by scientists like Arthur Clarke.

Remember, when man goes forth into the universe the elements necessary to succeed—order, sacrifice, loyalty, and even charity—will be brought not by predatory animal types but by men who believe in the Ten Commandments.

RUSSELL H. LEITCH
Wauwatosa, Wis.



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AIRPOWER in the news

By Claude Witze
SENIOR EDITOR, AIR FORCE MAGAZINE

The Education of R. S. McNamara

WASHINGTON, D.C.

For the most part, the newspaper headlines have politely avoided announcing that Defense Secretary Robert S. McNamara has lost a fight on Capitol Hill. For all of the cordiality displayed at his appearance before the Special Preparedness Subcommittee of the Senate, for all the handshakes and smiles and signs of mutual respect between him and Senator John Stennis, the fact remains that Mr. McNamara did not have his way.

The point appears to have been lost in the scuffle. The Defense Secretary refused to identify individual reviewers with particular military speeches they had handled in the Pentagon's Office of Security Review. The men still have not been identified, and they will not be identified. But the basic issue between Mr. McNamara and the Senate did not concern the availability of this information. The real issue was the basic legal ground on which the Secretary, which is to say the executive branch, can deny Congress access to this kind of material. There is only one basis, and that is the plea of executive privilege. Mr. McNamara, who has been a strong Defense Secretary and one of the few who have made decisions that stick, tried stubbornly to invoke a new, untried, and apparently illegal argument. It has been called the plea of executive responsibility, under which Mr. McNamara proposed to stand trial for the sins, if any, of his employees. There is no precedent for such a plea, and Congress has no intention of establishing one.

Mr. McNamara's clash with the Senate came up early in the cross-examination of Defense Department witnesses in the current study of charges that military spokesmen are being "muzzled." On the stand was Willis Lawrence, Assistant Director for Policy and Procedure in the Directorate of Security Review. Under questioning by Senator Strom Thurmond, chief protagonist of the inquiry, Mr. Lawrence refused to identify which reviewer had altered testimony prepared by the Army's Lt. Gen. Arthur G. Trudeau for the House Science and Astronautics Committee.

(The reviewer had stricken "Sino-Soviet bloc" from this sentence: "We must make sure that our military strength is geared to cope with the *Sino-Soviet bloc* threat today and in the future."

(In the same presentation the reviewer had deleted all of the following: "*With Soviet infiltration menacing this nation and extending through the far corners of the globe, freedom of spirit and self stands in great jeopardy. The threat of catastrophic war again haunts the lover of liberty and the protagonist of peace. The Reds deliberately, fanatically, unceasingly, strive to destroy the shreds of stability remaining as we enter the new frontiers of the '60s. A tower of peace founded on anarchy and chaos cannot stand.*")

Adm. Arleigh Burke, retired CNO, faces Senators Saltonstall and Stennis as an early witness before inquiry on alleged "muzzling" of military chiefs.

—Wide World Photos

Mr. Lawrence told the committee he was carrying out the instructions of Mr. McNamara in withholding the information. The next morning, in a letter to Senator Stennis, the Defense Secretary confirmed this and said he did not think his action would inhibit the investigation. In his own behalf he cited the cooperation already given to the committee, the fact that 1,500 speeches were made available for study of the censorship, along with the names of fourteen men on the Pentagon reviewing team. He said he did not understand why the committee wants to link individual reviewers with particular speeches. At a press conference the same day Mr. McNamara was asked whether he thought he could "make this stick without invoking executive privilege?" His answer was

(Continued on following page)

that he was "loath to invoke executive privilege" and that he considered his stand "a fundamental principle of management." He said he accepted personal responsibility for what had been done by the fourteen reviewers and that he is the one who should be queried and "charged with any errors."

Three days later Mr. McNamara appeared before the Senate group with Mr. Lawrence. He pleaded executive privilege, which Mr. Stennis had said was inevitable, and he did so with the authority of President Kennedy. In accepting the plea Mr. Stennis gave a scholarly review of the history of this executive prerogative, going back to the time of George Washington, and offered not the slightest criticism of its use in this case. This made it clear that the committee was prepared from the first to accept the plea. In this circumstance the surrender of 1,500 edited speeches from the Defense Department's privileged files is difficult to understand. Mr. McNamara's assertion that this constituted cooperation loses much of its impact in view of his intention not to go the limit with cooperation.

—Wide World Photos

Arthur Sylvester, Assistant Secretary of Defense, confers with his counsel before testifying to Senate committee.

—Wide World Photos

Defense Secretary McNamara, Senators Strom Thurmond and John Stennis appear before microphones to report on conference. Chairman Stennis has barred TV broadcast of the hearings and placed limit on coverage by news photographers.

It is both interesting and germane that the Secretary first let one of his vital executive powers go by default in the earliest stages of the current row. Another privileged document, an Army report on its investigation of the conduct of Maj. Gen. Edwin A. Walker, was released to Congress in another gesture of generosity. The action was unprecedented. It contributed to the present imbroglio and brought gasps of astonishment from Pentagon lawyers, in uniform and out, who for years had considered such documents strictly for in-house consumption. Summaries of findings heretofore had been transmitted to the legislative branch of the government on request. The original reports had been guarded with diligence and fervor.

Aside from Mr. McNamara's futile effort to substitute executive responsibility for executive privilege, probably the most important thing put in the record so far is the indication that the focus of the inquiry should be on the State Department, not Defense. At no point did Mr. McNamara or his people make it clear how he possibly could assume executive responsibility for what is done by people who work for Dean Rusk on the other side of the Potomac. At the same time they repeatedly referred the committee to the State Department when asked why a deletion had been made. It was reported that out of a hundred and sixty-seven speeches given special scrutiny by the committee staff, a hundred and twenty-eight had been purified over in Mr. Rusk's mysterious hangar.

This angle, in fact, is the one that Senator Thurmond clearly resolved upon to pursue his scourging after the inept General Walker strained the tie by disappearing into Texas and putting himself on exhibition as a candidate for governor of that state. In pursuing the "muzzling" charge with Defense Department witnesses Mr. Thurmond cited a long list of deletions from military speeches of such phrases as:

"eventual victory in all phases of the cold war."
"and victories determined."
"emerge victorious."
"by the poisonous fumes of world communism."
"and to achieve victory."

In an impressive number of cases the witnesses said that the changes were made by the State Department. Mr. Thurmond's persistence was provoked, he made it clear, by the indication that military officers were not being allowed to say out loud that their mission is to ensure victory in conflict. Nobody has denied that there is such a pattern, and up until the time that executive privilege was invoked—and it will hold for the State Department as well as Defense—no witness had explained why. Mr. Thurmond, who is the man credited with starting this inquiry, says he wants to know whether this is a matter of administration policy, so set down in directives or guidance documents, or a matter that can be traced to the capriciousness of individual reviewers.

The South Carolina Democrat clearly does not stand alone with his suspicions. When Arthur Sylvester, Assistant Secretary of Defense for Public Affairs, went on the stand he was armed with a ten-page statement with an introduction apparently designed to prove that he, too, frowns on communism.

"Today our country is again faced with a very real threat to its security," he began. "The grave challenge posed by the relentless Communist drive for world domination is reminiscent of the constant peril which

(Continued on page 21)

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"The present struggle covers every phase of human activity. The Communists use the entire spectrum of their national resources to further their ends."

James T. Kendall, chief counsel for the Stennis group, lost no time in an effort to dig out an explanation. Was this statement cleared by the Defense Department?, he asked. It was. There were minor changes, the witness appealed to himself and won the argument. Was it cleared by the State Department? It was. Mr. Kendall then wanted to know why there was so much material in the statement that was almost identical to the phrases cut out of many military speeches.

Charles W. Hinkle, ex-USAF officer and veteran censor, now heads the DoD Security Review office. So far, he has spent all his time preparing for investigation.

Newsweek photo by Noel Clark

The counsel pointed out that Adm. Arleigh Burke had not been permitted to say ". . . the only real way to increase the strength of our nation is to strengthen what is under attack, to strengthen the individual." In another talk he was asked to use "competing ideologies" instead of "communism." Again, he suffered a deletion when he wanted to refer to Communist leaders as "political conspirators." General Trudeau was not permitted to refer to the "Sino-Soviet bloc" or suggest that the Soviets want to dominate the world.

Mr. Kendall told Mr. Sylvester he saw signs of inconsistency in the comparative handling of the Burke, Trudeau, and Sylvester commentaries. The witness said the State Department cleared all of them and the inquiry should properly go to that department. The counsel pointed out that Mr. McNamara had said a year ago that "it's inappropriate for any member of the Defense Department to speak on the subject of foreign policy" and that last May he ordered all officials of the Department to "confine themselves to defense matters." At this point the witness said the McNamara ban was on foreign policy in the "substantive area" and that other references, such as his, were permitted if cleared by State. Mr. Kendall did not appear satisfied, but he did appear to accept, and share with Senator Thurmond, the suspicion that the State Department is responsible for a major part of the military editorial problem.

In view of Mr. McNamara's unsuccessful insistence that he alone should shoulder responsibility for what is done in the Pentagon, at least, it is interesting that there has been no serious assault on the simple concept of speech review itself. Early witnesses included Adm. Arleigh Burke; General Trudeau; Gen. Thomas D. White, former USAF Chief of Staff; Gen. David M. Shoup, Marine Commandant; Adm. George W. Anderson, Chief of Naval Operations; and Gen. Frederic H. Smith, USAF Vice Chief of Staff. If these men had a common denominator it was their full and almost uncritical acceptance of censorship in one form or another. Certainly there was no loud challenge to civilian control. On the other hand there were signs of an almost desperate effort to retain military dignity and respect at the hands of the people who control the vagaries of the blue pencil. Admiral Burke said he did not object when his first speech under the New Frontier was killed. He dropped it in the basket and wrote a new one. General Shoup said he was careful what he wrote about and never had any trouble, but he thought the procedure a waste of time. General Smith had no real criticism, but he warned at length of the threat to professional journals, which he considers essential to the proper study and evaluation of military concepts. Other witnesses said they accepted or valued speech review. Admiral Anderson stood almost alone with his argument that a military officer should make speeches on his own responsibility, ready to accept the consequences for failure on the platform as well as in battle.

It is difficult to see, after listening to these men, why Mr. McNamara and his top executives feel a compulsion to impose their will at a point so remote from their fundamental job of setting policy. A few years ago, during the Eisenhower Administration, there were some growls from the brass when a civilian Secretary, with experience in the management of a dry-goods establishment or auto agency, issued a directive telling admirals how to handle garbage-disposal problems aboard warships. It may be that this was a landmark of some kind in the continuous downgrading of men who graduated from Annapolis and West Point. The "muzzling" hearings, short-lived as they seem to be, have provided the first public airing of one of these complaints.

The setting for the hearings is the same caucus room of the Old Senate Office Building that provided a stage for Joe McCarthy's infamous harangue back in 1953 and 1954. It will stand to the eternal credit of Chairman Stennis that he demonstrated his qualities as a judge and a statesman in the first two weeks of the inquiry. At the same time he has not, at this writing, explained how his staff got out of hand with the flamboyant questionnaire on Communist indoctrination put to Marine and Air Force personnel. This was a show that could have had Cohn and Schine standing in the prompter's box. It may have dissipated whatever slim hope existed, considering the origins of the Stennis investigation in the first place, that the inquiry might help restore some degree of respect for military capabilities.

If the legislative branch is to exercise judicious control over executive activity and insist that the letter of the law be followed, as it did in Mr. McNamara's case, there is some self-discipline needed on Capitol Hill.—End

News,
Views
& Comments

AEROSPACE WORLD

By now the patient vigil of Mercury Astronaut, Marine Lt. Col. John Glenn, and waiting millions may be happily over. At this writing, preparations were under way to achieve finally the oft-postponed first American manned orbital flight. Meanwhile the country and the world rolled on through crisis. Berlin continued to simmer, the war in Vietnam increased in intensity, and the US stake in it was underscored by the appointment of a newly promoted four-star Army General, Paul D. Harkins, to direct American military assistance in that torn Asian land. Significantly, the President announced at his February 8 news conference that Soviet intransigence and free-world military considerations might require Western resumption of atmospheric nuclear testing.

—NASA photo

February 8 saw the successful launch from Cape Canaveral of Tiros IV, NASA weather satellite. NASA was pleased by first pictures from space.

The same day, the US and Britain released a joint statement: "It is the joint view of the United States and the United Kingdom governments that the existing state of nuclear development, in which the recent massive Soviet tests are an important factor, would justify the West in making such further series of nuclear tests as may be necessary for purely military reasons.

"The United States and United Kingdom governments have therefore decided that preparations should be made in various places, and as part of these the United Kingdom government are making available to the United States government the facilities at Christmas Island [Pacific site of earlier British nuclear testing].

"The two governments are, however, deeply concerned for the future of mankind if a halt cannot be called to the nuclear-arms race. The two governments are, therefore, determined to make a new effort to move away from this sterile contest. They believe that a supreme effort should be made at the eighteen-nation Disarmament Committee which will begin meetings on March 14 at Geneva, and that the heads of government of the United States, United Kingdom, and Union of Soviet Socialist Republics should assume a direct and personal interest in these negotiations. The President and the Prime Minister have, therefore, addressed a joint communication to Chairman Khrushchev proposing that this meeting be initiated at the foreign-minister level and that their foreign ministers should meet before the conference started and also be prepared to return as personal participants in the negotiations at appropriate stages as progress is made."

The next move—and it would have to represent visibly serious Soviet intentions in disarmament with viable controls—was up to the Russians. If no real progress is made at Geneva, it is highly probable that free-world atmospheric testing will be resumed within months.

—Wide World Photos

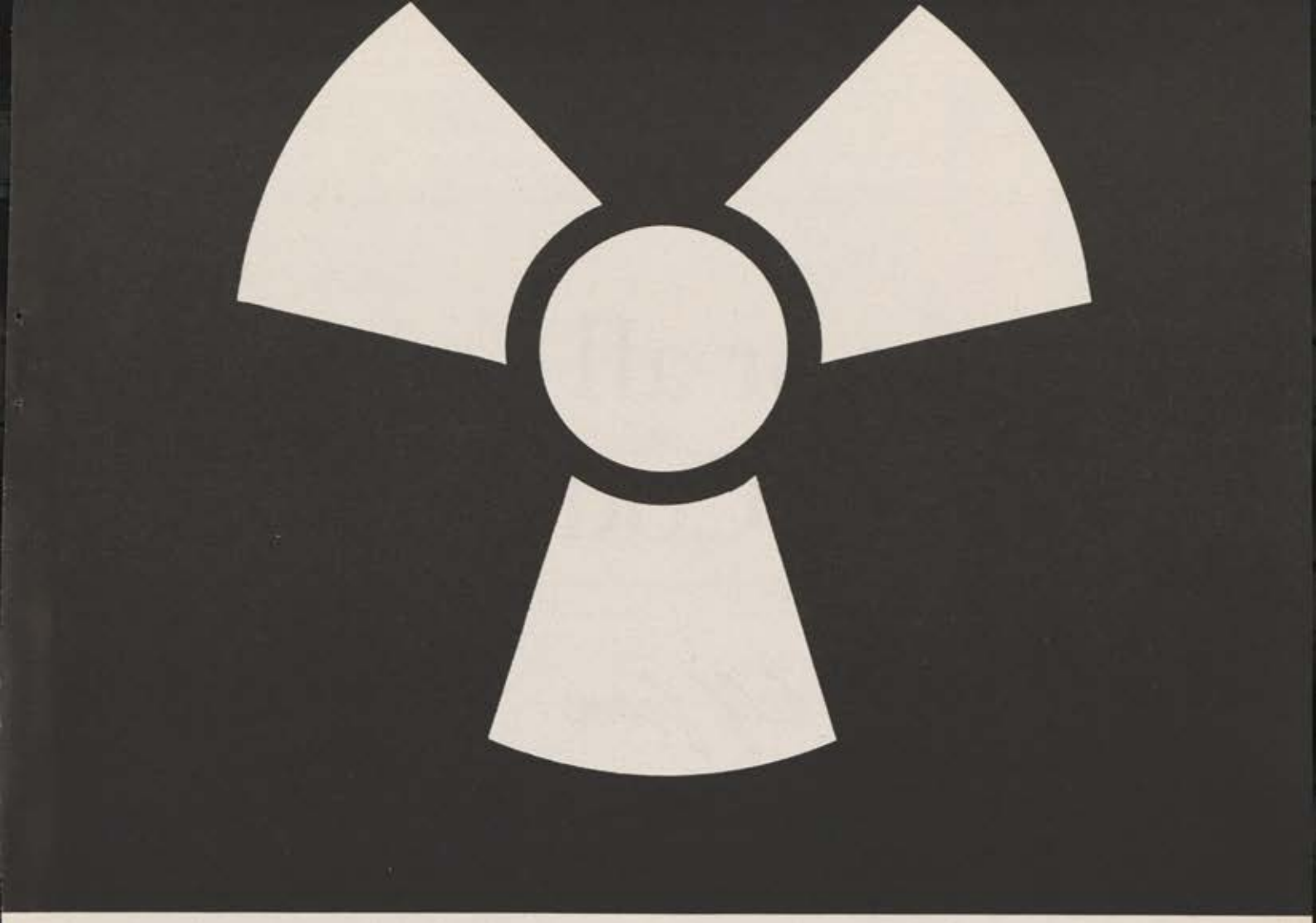
U-2 pilot, Francis Gary Powers, traded for imprisoned Red spy, Col. Rudolph Abel, returned to the US in February.

☆

A bizarre new chapter was added to the Francis Gary Powers U-2 story the week end of February 10 when it was disclosed that the US pilot downed over Russia on May 1, 1960, had been exchanged for convicted Soviet spy, Col. Rudolf I. Abel, who had been serving a thirty-year term in the Federal Penitentiary at Atlanta, Ga. Secret negotiations between the US and USSR had produced the exchange, which included the freeing of Frederic L. Pryor, an American student at the Free University in Berlin.

U-2 pilot Powers, who had been sentenced to a ten-year term in the Soviet Union after a widely publicized show trial in Moscow, arrived back in the US under security wraps, presumably to be questioned closely by intelligence authorities on the circumstances of his downing. The thirty-two-year-old pilot and Air Force vet-

(Continued on page 25)



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eran, whose capture enabled Soviet Premier Khrushchev to topple the 1960 summit conference in Paris, was reported to have been reunited with his family shortly after arrival in the US. They had never given up hope of his eventual release but expressed surprise at the Soviet action which took place less than two years after his apprehension.

The US announcement of the Powers-Abel-Pryor trade seemed as complete as security would allow. The Soviet announcement, not surprisingly, was made only in terms of pilot Powers, and billed as an effort to improve US-USSR relations. The fact of Colonel Abel's release was not mentioned by the Reds, and it was recalled by observers that Soviet avoidance of the Abel aspect of the exchange was in keeping with Moscow's perennial declaration that spying is strictly a capitalist activity.

☆

Military "muzzling" hearings (*see "Airpower in the News," page 15*) in the Senate, which monopolized the headlines in early February, were braked February 8 by a firm assertion by President Kennedy of executive privilege barring the questioning of individual Department of Defense Security Review personnel as to the rationales for the censoring of speeches by high-ranking military officers.

The controversy — principally between DoD and Sen. Strom Thurmond, Democrat of South Carolina — had been months in the making. It was traceable to a memorandum from Sen. J. William Fulbright, Democrat of Arkansas, to Defense Secretary Robert S. McNamara complaining of, among other things, military participation and sponsorship of various cold-war seminars. Senator Thurmond, reacting sharply to Senator Fulbright's memorandum, countercomplained that DoD's Office of Security Review was blue-penciling anti-Communist phrases in speeches by high-ranking officers. Hearings on the issue started in January; several high-ranking military people testified or sent statements, including former President Eisenhower, all with varying views on how much military people ought to say on cold-war issues. Things were building up to a climax by the time Pentagon news chief, Assistant Secretary for Public Affairs, Arthur Sylvester, appeared and read a statement which included some sharp anti-Communist statements that the Senate subcommittee counsel was quick to point out were nearly word for word the phrases shown to have been removed from speeches by military officers by DoD's Office of Security Review—as indicated by the massive compilation of speeches before and after censorship submitted by DoD to the hearings. Senator Thurmond demanded that individual DoD censors explain individual blue-pencilings. Secretary McNamara said no, he would take the responsibility for the work of his subordinates, and for a few days a constitutional issue seemed to be joined, since executive privilege had not been claimed at the outset by the Defense Secretary. Then the President directed assumption of executive privilege.

—Photo by Del Ankers

Flyer Jacqueline Cochran was awarded the General Electric Trophy on January 30 for setting eight speed, distance, and altitude records in Northrop's T-38 trainer last year. General Electric's J. S. Parker presented the award.

The entire affair was fraught with irony. Marine Commandant, Gen. David M. Shoup, had been one of the military witnesses, and had told the Senators that so far as the Marines were concerned they were not taught to hate, that Marine training primarily emphasized good soldiering, that the virtues of freedom and democracy were stressed as a matter of course. Having made this statement (which the Washington *Post & Times Herald* praised but also seemed unaccountably surprised at, coming from a military man) the Marine chief later denounced what he described as harassment of Marines. He said that some thirty Marines had been interrogated with abstruse Kremlinological questions at Marine quarters near Washington, purportedly to assess their knowledge of the Communist enemy, by two investigators apparently not specifically authorized by the Senate subcommittee running the "muzzling" hearings. General Shoup complained officially to Defense Secretary McNamara that such interrogations reflected on the Marine's patriotism and effectiveness. He was supported by Senators Mike Mansfield, Democratic Majority Leader, and Paul Douglas, Democrat of Illinois, both proud Marine veterans, among others.

Under the onslaught of the Marines, who were doubtless surprised to be involved as combat troops in a war of semantics and Mr. McNamara's invoking of executive privilege, the "muzzling" hearings recessed temporarily. But chaired ably as they were by Senator Stennis, the hearings were producing some interesting insights into the difficulties of fighting a war of words with the Communists in an era of conflict whose temperature varies month by month.

☆

MAJOR HARDWARE NEWS OF THE MONTH:

★ On January 24, the Army successfully fired a **Pershing selective-range ballistic missile.** The solid-fueled Army success was achieved at Cape Canaveral, Fla., during the week the world awaited the orbital flight of Lt. Col. John Glenn.

★ The next day, January 25, also from Cape Canaveral, the Air Force successfully fired a **solid-fueled Minuteman.**

★ And four days later, also from Cape Canaveral, number fifty and last of the liquid-fueled **Air Force Titan I** research-and-development series was fired successfully and spectacularly by the Air Force. There were reports that the flash of the Titan was seen as far north as the Carolinas.

★ January 24 at Cape Canaveral saw the unhappy failure, due to second-stage misfire, of the Navy's Composite I **Thor-Able-Star "quintuplet" satellite,** which had carried scientific payloads prepared by the three services. After blasting upward some fifty miles, the "quintuplet" vehicle fell back into the sea.

★ And January 26 was the sad day of the failure of the **Ranger III** attempt to hard-land a scientific payload on the moon's surface. Trouble with the burning time of the Atlas and guidance of the Agena second stage set the Ranger III off course, and it passed the moon by nearly 30,000 miles. There was some faint hope that the vehicle would be able to take some television photos of the lunar surface anyway, but signals re-

(Continued on following page)

Newly named FAA Deputy Administrator, Maj. Gen. Harold W. Grant, left, was succeeded by Maj. Gen. Kenneth P. Bergquist, above, as Cmdr. of AFCS.

ceived by the Jet Propulsion Laboratory, which is the project manager, were pronounced meaningless.

★ On February 8, the National Aeronautics and Space Administration successfully orbited **Tiros IV**, latest in its current series of weather satellites. The new weather-observer-in-space the same day began to send what were described as excellent pictures of the earth's surface and cloud cover. Perigee of the Tiros orbit was about 450 miles and apogee some 500 miles. NASA said it hopes to have an operating weather satellite in orbit at all times from now on.

☆

Since 1947 some 7,369 sightings of unidentified flying objects have been reported, and during that period the Air Force has investigated them, one by one, through its Office of Aerial Phenomena. In 1961 the Air Force checked on 488 such reports; by the end of 1961 only ten of the 488 remained unidentified.

In its February-released Project Blue Book report, summarizing UFO studies for the past decade and a half, the Air Force said there was no evidence that any of the thousands of objects investigated were spaceships operated by extraterrestrial beings, and that, to date, no UFO has given any indication of danger to our national security.

Although the Blue Book report did not specify exactly how many of the last fifteen years' sighting had been identified, it did say that the percentage remaining unexplained had dropped from 19.74% during 1947-52 to 1.94% in the past six years.

☆

Military pay is under comprehensive executive branch study for the first time since 1957. The President on January 22 announced the formation of the Defense Study Group on Military Compensation to "review and evaluate military pay, allowances, and related matters." The group, the White House announcement said, will consist of personnel from the Office of the Secretary of Defense, the Army, Navy, Air Force, Marine Corps, and Coast Guard, with representation from the Civil Service Commission and the Bureau of the Budget, and liaison with the US Public Health Service and the US Coast and Geodetic Survey—both uniformed services paid under the Career Compensation Act.

The announcement said that the group will study the entire spectrum of military pay, allowances, benefits including retirement, and "all other facets of the military pay system." The study is expected to be completed during October of this year. Any recommended legislation, the announcement added, will be prepared for submission to the Congress sometime early in 1963.

The announcement emphasized that the study will in no way affect the current DoD legislative proposal for an adjustment in the basic allowance for quarters already approved by the President and being prepared for submission to the current session of the Congress.

☆

An Air Force captain and a second lieutenant tied for first-place honors in the tenth annual Air Force-wide Short Story Contest. Each received $350. Capt. Herbert H. Johnson, AFLC, Kelly AFB, Tex., for his story "One Arm and Three Eyes," and 1st Lt. Lewis A. Gaff, TAC, Nellis AFB, Nev., for "No Michigan." Third prize of $150 went to Capt. Byron J. Liggett, ADC, for "Ready for Signature." Maj. Paul F. Ader, USAF Security Service, won fourth prize of $100 for "Milk Run," while fifth place, $50, went to Lt. Col. Verden McQueen, Hancock Field, N. Y., author of "Pigeons to Tin City."

AIR FORCE/SPACE DIGEST Managing Editor Richard Skinner served as one of the preliminary judges who selected what they considered the fifteen best entries from the forty-seven stories submitted by the major air commands. These fifteen then went to a different panel of judges for final consideration. These judges included Bennett Cerf, Nancy Hale, Frank Harvey, Richard C. Morenus, and Don A. Schanche.

Mr. Skinner also served as chairman of the panel of judges in this year's Worldwide Air Force Base Newspaper Contest, in which there were seventy-three entries in five classes, based on population. SAC and MATS each took two first places, with PACAF winning the other top honor.

Complete results are as follows:

Class I (fewer than 1,000 personnel): 1st, SAC's *Greenham Herald*, England; 2d, SAC's *Klaxon;* 3d, CONAC's *Flying Badger;* 1st honorable mention, USAFE's *American;* 2d honorable mention, CONAC's *Dixie Wing Intercom.*

Left, John R. Alison, AFA Board Member, has been named Corporate Vice President for Customer Relations, Northrop Corp. Right, USAF Gen. Charles P. Cabell, who has retired after several years' service as the Deputy Director of the Central Intelligence Agency.

Class II (1,000-5,000 personnel): 1st, MATS's *Skyliner,* Kindley AFB, Bermuda; 2d, SAC's *Altus Word;* 3d, ATC's *Sun Lines;* 1st honorable mention, USAFE's *Centurion;* and 2d honorable mention, ATC's *Courier.*

Class III (5,000-10,000 personnel): 1st, MATS's *Broadcaster,* Scott AFB, Ill.; 2d, ADC's *McChord Defender;* 3d, ADC's *Thule Times;* 1st honorable mention, SAC's *Aerospace Sentinel;* 2d honorable mention; SAC's *Skyhawk.*

Class IV (more than 10,000 personnel): 1st, SAC's *Air Pulse,* Offutt AFB,

(Continued on page 29)

Siegler puts eyes into orbit to televise space "live"

Siegler's almost incredibly miniaturized television cameras, slightly larger than a camper's flashlight, are now designed into critical areas of space vehicles—let man *see* what happens in space, *as* it happens.

Through Siegler "eyes," ground observers can *see* fuel operation from blast-off throughout stresses of shock, acceleration and under zero gravity conditions...*see* a final stage detach or a balloon inflate and follow its performance in space visually...*see and locate* malfunction, such as a first indication of structural failure. These high reliability systems will be used more and more in missile and space programs.

In the success *or* failure of a missile or space vehicle launching, Siegler space television adds the *indispensable visual dimension*—vital *continuous* information that cannot be gained through data analysis alone.

The vital area of space television is only one phase of Siegler versatility in many fields. To today's major aerospace programs, Siegler supplies meteorological electronics including completely automatic weather stations; launch check-out; electronic communications; major space vehicle structures and many other contributions.

January 15 Echo balloon shot seen in action through Siegler "on the spot" TV

Siegler developed and produced the entire TV video system for the Echo project—camera, transmitter, receiver, monitor, kinescope, tape recorder. Observers state the TV Echo pictures were the most striking ever relayed from space.

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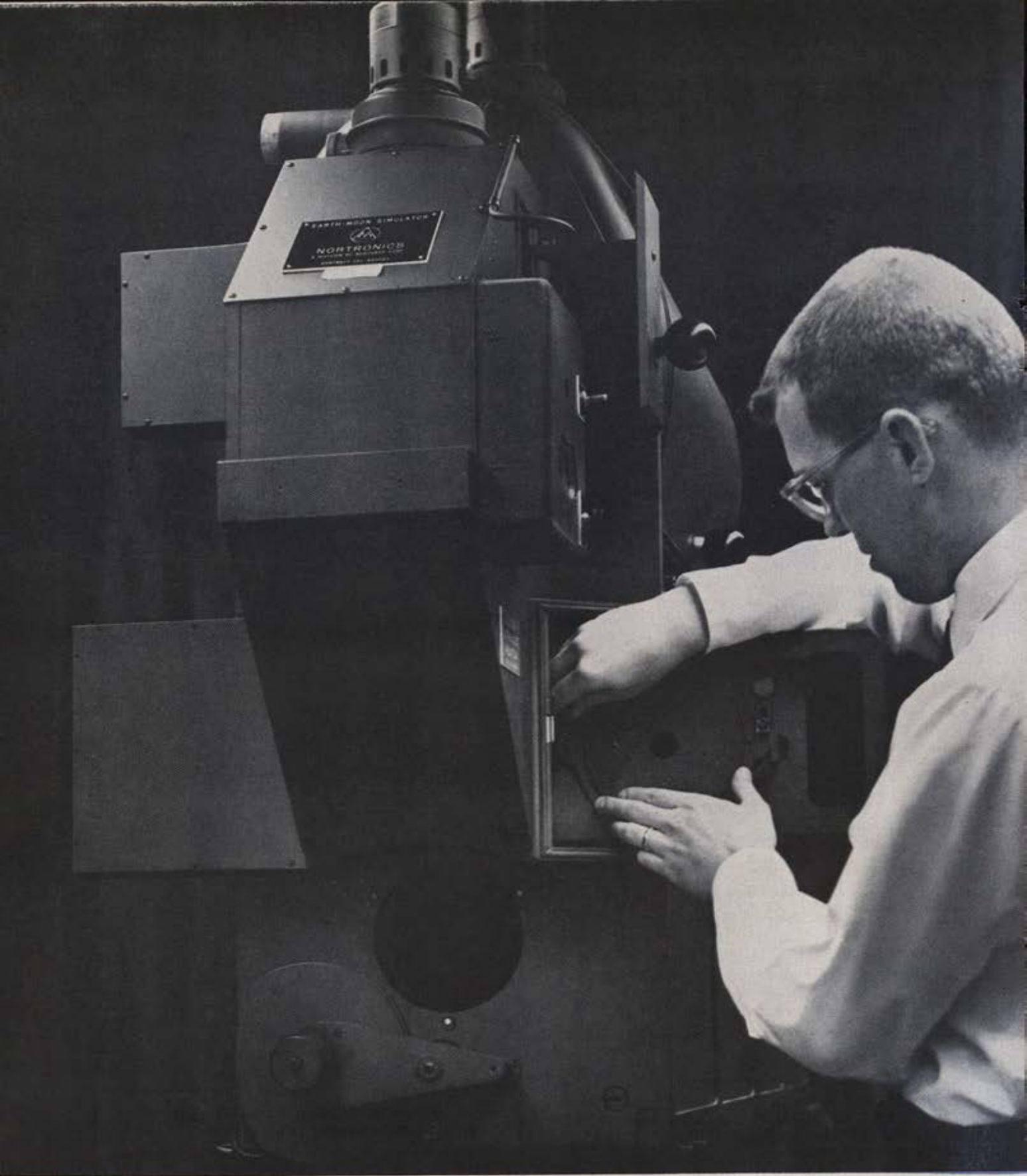

We put the earth and the moon in this box—and backed off a billion miles

This is an earth-moon simulator developed by Northrop. As its name implies, it shows us how the earth, or the earth-moon system, would look to an observer in space, from 80,000 miles all the way out to 1 billion miles. It was built to test the sensing devices which space vehicles use to track the earth, so they can guide themselves and point their communications antennas at the earth.

The earth-moon simulator is not only an important research tool, but also a major step toward quality control in space systems. It was designed and built by the Nortronics Division of Northrop. It will be used by Caltech's Jet Propulsion Laboratory, contractor to the National Aeronautics and Space Administration.

NORTHROP

Neb.; 2d, TAC's *Flyer;* 3d, MATS's *Global Ranger;* 1st honorable mention, Air University's *Dispatch;* and 2d honorable mention, USAFE's *Wiesbaden Post.*

Class V (command papers, serving more than one base): 1st, PACAF's *Kanto Plainsman,* Japan; 2d, AFSC's *AFSC Newsreview;* 3d, PACAF's *Hawaiian Falcon;* 1st honorable mention, ADC's *Guardian;* and 2d honorable mention, AFCS's *Intercom.*

☆

Two helicopter records: The Fédération Aéronautique Internationale, world aerospace record keeper, has recognized the October 18, 1961, altitude record set by an Air Force Kaman H-43B. The altitude figure was some 800 feet higher than the originally announced unofficial figure. Pilot was Lt. Col. Francis M. Carney, Air Training Command, Stead AFB, Nev. The October flight established a new US record for all helicopters of all classes. A week later, the colonel made a H-43B flight which laid claims, still pending, to three new records in time-of-climb category.

On February 6, a Navy Sikorsky HSS-2 became the first helicopter in history to exceed 200 mph in an officially sanctioned speed trial. Flying a nineteen-kilometer straight line course from Milford to New Haven, Conn., the twin-turbine chopper claimed a new world speed record of 210.6 mph, and a clean sweep of the world's five major helicopter speed records.

Navy flyer Lt. Robert W. Crafton was pilot, and Marine Capt. Louis K. Keck was copilot.

☆

Qualified personnel in the military on active or inactive status, civilian executives, and federal employees with a rating of GS-11 or higher are eligible for the correspondence course, "The Economics of National Security," being offered by the Industrial College of the Armed Forces, headquartered at Fort McNair, in Washington, D.C.

Interested persons should write:
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Armed Forces
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Washington 25, D.C.

☆

Quotable, from the February 22 address of Dr. Edward C. Welsh, Executive Secretary of the National Aeronautics and Space Council, prepared for a meeting of the First Women's Space Symposium at Los Angeles, Calif.:

"Is the space program essential to our national defense? The answer to this question is so definitely in the affirmative that I wonder why so few people use it as the basis for urging greater acceleration of our space activities. Many people speak of scientific advantages to be derived from space; even more refer to 'peaceful' uses of space. Since when has our national defense not been furthered by scientific breakthroughs and our military strength not been designed to keep the peace?

"I will go even further and state that we will not be able to keep the peace and at the same time be a free nation if we do not increase rapidly our space competence.

"Much more to the point, I would quote briefly from the President's recent report to the Congress of January 31, 1962. In his transmittal letter, which is the very first page in the report, he states: 'It is the policy of the United States that activities in space be devoted to peaceful purposes and during 1961 we made significant progress in that regard. Such progress included space projects to help keep the peace and space projects to increase man's well-being in peace.'

"In that same document there are recorded the Vice President's views on this very same policy. Not only for merited emphasis but also to show how fully coordinated and identical are the ideas of our top leaders. I also quote briefly what Vice President [Johnson] said on this same policy question: . . .

" 'The United States does not have a division between peaceful and nonpeaceful objectives for space, but rather has space missions to help keep the peace and space missions to improve our ability to live well in peace.' "

☆

A Navy commander who has contributed significantly to the success of the X-15 research program for the past three and a half years is now back on the job with the Navy.

In late January, Cmdr. Forrest Petersen completed his X-15 tour as one of the six research pilots assigned to the program and went to his new assignment at Miramar Naval Air Station, near San Diego, where he will command a squadron of all-weather F8U-2N fighters.

A naval veteran of seventeen years, Commander Petersen joined the Air Force-NASA-Navy X-15 program back in 1958 after selection from a pool of candidates at the Naval Test Pilot School, Patuxent River Naval Air Station.

During his X-15 tour at Edwards AFB, Calif., he performed chase and ground-control missions and flew the rocket-powered craft five times. On his last flight, January 10, he landed the craft safely at Mud Lake, Nev., after the X-15 engine failed to ignite after two attempts.

On September 28, 1961, during a flight planned to attain extreme aerodynamic heating, Commander Petersen reached a speed of 3,600 mph. and an altitude of 101,800 feet. Temperatures as high as 1,050 degrees Fahrenheit were recorded during the flight.

☆

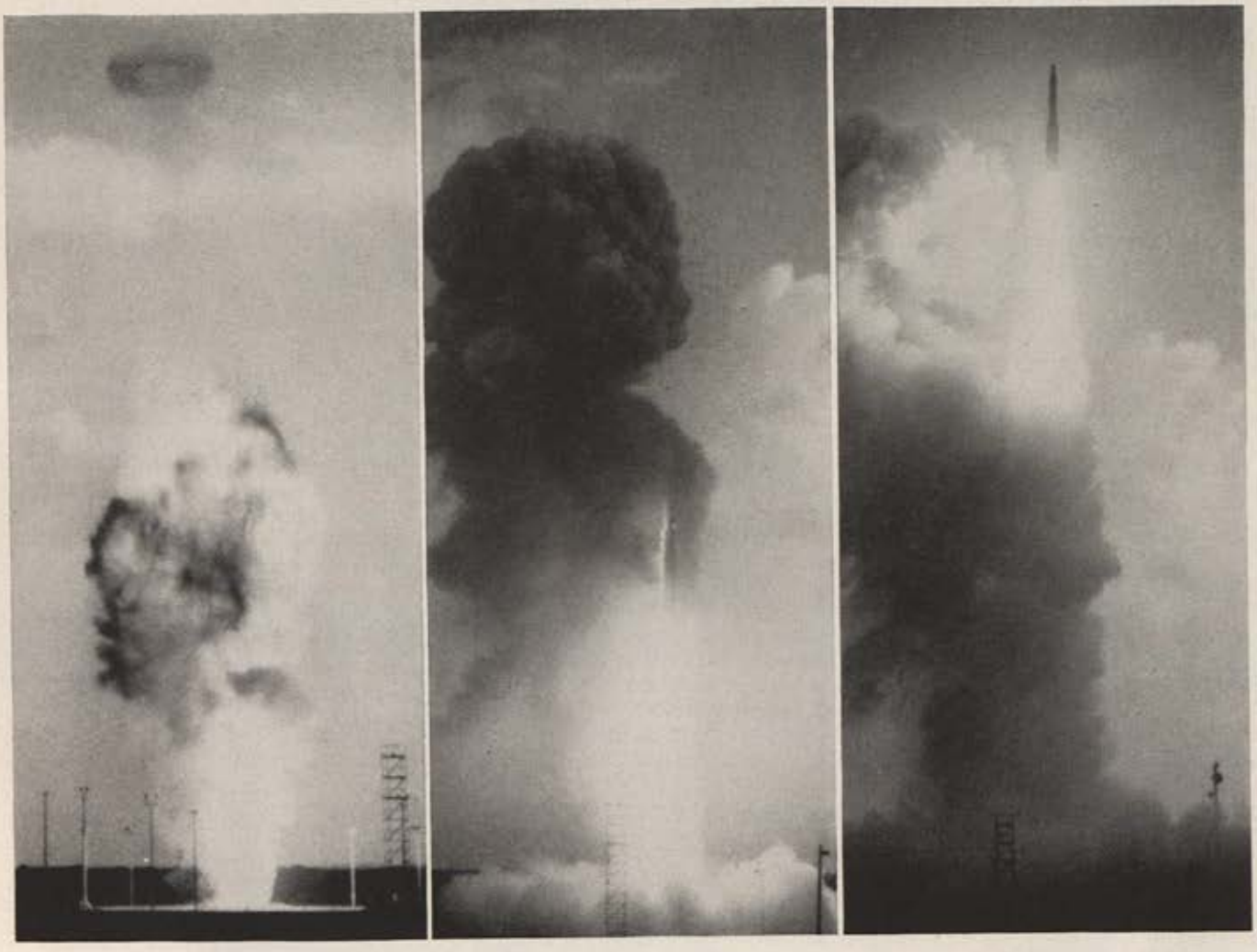
PROMOTIONS . . . . President Kennedy has appointed thirty-one colonels to the rank of brigadier general. They are: Charles G. **Chandler,** Jr., Lucius D. **Clay,** Jr., Winton R. **Close,** Joseph J. **Cody,** Jr., Duward L. **Crow,** William J. **Crumm,** Joseph R. **DeLuca,** Joseph L. **Dickman,** Richard H. **Ellis,** Harry L. **Evans,** Otto J. **Glasser,** Harry E. **Goldsworthy,** Donald W. **Graham,** Gordon M. **Graham,** William D. **Greenfield,** Louis B. **Grossmith,** Jr., Hubert S. **Judy,** John D. **Lavelle,** Lawrence F. **Loesch,** Robert W. **Manss,** John B. **McPherson,** Albert L. **Pearl,** Kenneth E. **Pletcher,** Jay T. **Robbins,** Norman C. **Spencer,** Jr., Lewis W. **Stocking,** Alonzo A. **Towner,** John W. **Vogt,** Jr., James H. **Weiner,** William W. **Wisman,** and Prentis D. **Wynne,** Jr.

Twenty-five brigadier generals have been promoted to the rank of major general. They are: Walter E. **Arnold,** Clyde **Box,** Emmett B. **Cassady,** Don **Coupland,** George B. **Dany,** Lee W. **Fulton,** George B. **Greene,** Jr., Harold E. **Humfeld,** Aubrey L. **Jennings,** William B. **Kieffer,** Richard P. **Klocko,** Curtis R. **Low,** James C. **McGehee,** Seth J. **McKee,** Melvin F. **McNickle,** Dwight O. **Monteith,** Joseph H. **Moore,** Jerry D. **Page,** James E. **Roberts,** Robert G. **Ruegg,** Paul W. **Scheidecker,** Charles H. **Terhune,** Jr., Frederick R. **Terrell,** Henry G. **Thorne,** Jr., and Selmon W. **Wells.**

President Kennedy has also nominated **Harold W. Grant** to be lieutenant general.

RETIRED . . . . Gen. Charles P. **Cabell,** Brig. Gen. James G. **Moore.**

—W.L.



SILO FIRING. Sequence photos show America's first solid-fuel intercontinental ballistic missile, Minuteman, blasting out of underground silo at Cape Canaveral, Florida. This U. S. Air Force missile, described as an "economical breakthrough" in terms of procurement and maintenance costs, is simple, compact, quick-firing. Minuteman missiles will be stored underground at sites hardened against nuclear attack. Boeing is weapon system integrator, responsible for Minuteman assembly, test, launch control and ground support. The Minuteman ICBM weapon system will be operational later this year, a year ahead of original schedule.

Capability has many faces at Boeing

DISTANCE CHAMP. A Boeing B-52H missile bomber set new world distance record, flying 12,519 miles from Okinawa to Spain, non-stop, without refueling. This Strategic Air Command flight demonstrated the global reach of the missile launching Boeing B-52s.

CLEAN ROOM. In super-clean room, Boeing technician inspects magnified circuit card detail. More than 4000 Boeing people are in electronics engineering and manufacturing activities.

WATER, WATER. New U. S. Army tug-fireboat uses two Boeing gas turbine engines to drive two pumps, each handling 2000 gallons of water a minute. Turbines weigh 335 pounds each, deliver 270 hp. Tough, tested Boeing turbines also power U. S. Navy minesweeping launches, generators, and personnel boats.

BOEING

The Neo-Pacifists . . .

AIR FORCE
MARCH 1962

DETERRENCE UNDER FIRE

Here is a consideration of antideterrence both as a policy and a philosophy. It is recognized that among those who favor a policy of nuclear deterrence, there are differences regarding force structure and targeting. However, this article does not discuss the finite and counterforce positions but rather directs its attention toward the broad spectrum of naked antideterrence.

By Herman S. Wolk

ALTHOUGH deterrence has been the heart of US defense strategy for almost sixteen years (from the establishment of the Strategic Air Command on March 21, 1946), it has hardly met with unanimous approval. The period from October 1957 to the end of 1961 was one in which the critics of nuclear deterrence became vociferous in their attacks on established US defense policy.

While there were definite reasons why the antideterrent dialogue reached a crescendo during the 1957-1961 period, those who argued against strong nuclear retaliatory forces could not be grouped together but came from diverse callings and gave expression to their views for different reasons.

The four years from the launching of Sputnik I on October 4, 1957, to the Soviet breaking of the nuclear-test moratorium on August 30, 1961, were clearly years of gain in military and space technology for the Soviet Union. The Soviets parlayed striking space successes achieved primarily through heavy rocketry and precise guidance into definite military, political, and psychological advances. This was particularly evident in many of the so-called unaligned nations where preeminent Russian space technology was equated with superiority of the Communist system.

On the other hand, the impact was equally significant in its import on Soviet-American and East-West relationships. It should be mentioned that the Soviet lead in space was, of course, at least partly due to lagging American efforts across the entire spectrum of rocketry and space technology since World War II. In significant measure, US lethargy could be traced to a misunderstanding of the nature of the cold war and Communist aims as well as to unfounded feelings of superiority and complacency. This is not the place, however, to launch a detailed inquiry into that massive and remarkable case of US political and psychological failure during the years 1946-1961 which directly affected the military balance.

The question remains: At a time when the USSR was clearly reaching—with some success—for international power of decision through strategic military supremacy, how can the antideterrent campaign in the West be explained? What were its roots? In the first place, one source of feeling against the US strategic nuclear delivery force originated in the Soviets' drive for a commanding lead in military technology itself. After it had been recognized that our enemy possessed the same obliterative power that we alone once commanded, the American and Western call for negotiation and conciliation became at once more pronounced. This was at least in part a quite natural reaction to the rather abrupt rupturing of clear US strategic delivery superiority. It will be recalled that less than two months prior to the orbiting of Sputnik I, the Soviets announced that they possessed an operational ICBM capability. Whether this was in fact true or not, psychologically and militarily the impact was great enough. During the period 1957-1961, the Russians definitely attempted to pull abreast of the US in strategic power.

Thus, voices in the US and especially in Western Europe called for ending the cold war, for immediate negotiations, and for interdiction of the arms race, *i.e.*,

(Continued on following page)

the nuclear missile race. At the same time, the argument was advanced that somehow the cold war was all our fault. Terribly mistaken people and politicians had led us upon a collision course with the USSR which could only lead to nuclear decimation of a large part of the earth's surface. At the fulcrum of the pro-cold war and arms-race forces stood the so-called scientific-military alliance which had committed us to perpetual hostility against the Soviet Union. We had turned our back, so the reasoning went, on more important objectives in the economic and nonmilitary fields. In fact, highly respected voices within the US protested that our national policy was heavily weighted toward the military. This meant that we were losing the favor (it was assumed we once possessed) of the uncommitted nations and "world public opinion."

In effect, articulate people—some of them highly respected intellectuals—brought the foregoing points together, all of them seemingly valid, to argue against deterrence and what was called "the New Militarism." Perhaps the clearest, most recent, and most detailed exposition of this thesis is to be found in D. F. Fleming's massive two-volume work, *The Cold War and Its Origins: 1917-1960* (Doubleday, 1961). To Professor Fleming, the cold war was initiated by the West (specifically, Winston Churchill and Harry Truman). Further, he feels, we have already lost the cold war through our unstinting belligerence and enmity for the Soviet Union. It is Professor Fleming's thesis that the Soviets have every right to their satellite empire in Eastern and Central Europe since the Russians have been ravished through the European corridor in two world wars and since the appeasement at Munich precipitated World War II and caused Russia to lose so heavily in human and material resources.

According to this thinking, Eastern Europe is simply "Russia's zone of occupation" (*Fleming, p 1038*). Thus, the "cold war arose because the leaders of American pubic opinion could not accept the chief consequences of World War II" (*Fleming, p 1055*). In general, Fleming argues that the events since 1945 have been nurtured by a stubborn and wrong-headed American

A HISTORICAL LOOK AT THE ARMS RACE

By Arthur Schlesinger, Jr.

From a speech before the California Federation of Young Democrats at San Diego. Mr. Schlesinger is Special Assistant to President Kennedy.

Whenever I hear talk . . . of "the power élite," I know that I am in the presence of a mirror image of the John Birch Society. The notion that a conspiracy of bankers and generals controls our destiny is as nutty as the notion that it is controlled by Walter Reuther and the officials of the ADA.

There are some who feel that all the world's troubles would be over if we only resigned from the arms race with the Soviet Union. Their view, as I understand it, is that our economic system requires us to invent an antagonism with the USSR in order to maintain profits in our own economy; and that if we would only stop all this nonsense about maintaining our nuclear strength, the Communist world would relax its hostilities and peace would descend on long-suffering mankind.

Let us first consider the economic arguments. From 1945 to 1946, the total government purchases of goods and services in the United States declined, with the end of World War II, from $82.9 billion to $30.8 billion. This was a drop of over $50 billion at a time when the total gross national product was only a little over $200 billion. The decline in government spending then was, in short, about twenty-five percent of the gross national product—and our economy rose to take up the slack.

An equivalent decline today would be over $130 billion—which is almost three times the size of our defense budget and half again as large as our total federal budget. The American economy would thus in no circumstances have to meet a decline in public spending comparable to that which it survived in 1945-46.

And if all present defense spending should cease tomorrow, the American economy, which survived a decline in public spending amounting to one-quarter of the gross national product in 1946, could certainly survive a drop in public spending amounting to one-eleventh of our gross national product today. The argument that our economy requires the cold war is, in short, a phony.

Let us look now at the second half of this case—that if we would only abandon the arms race, then all problems of world tension would vanish. The premise is, of course, that the cold war is an American initiative and that Soviet policy is purely defensive. But very little in the history of the years since the end of World War II substantiates this premise.

In 1945 we began the demobilization of the greatest military force known to history. In 1946 we offered to share our atomic monopoly with the United Nations. In 1947 we invited the Soviet Union to join with us in the Marshall Plan. And through these years the Soviet Union made clear its ineradicable view—a view rooted in its theory of history—that any society based on a system of mixed ownership is inherently evil and inherently a threat to the peace.

In the years since, the Soviet Union has gone even further. It has made abundantly clear that even societies based on systems of Communist ownership are unacceptable, like Yugoslavia and Albania, unless they bow to Soviet views on questions of foreign policy.

The only lasting hope for a relaxation of tensions lies in the establishment of a system of general and complete disarmament. One great issue confronting us today is how we may best negotiate an effective disarmament agreement. Those who object to our defense budget evidently assume that, if we were to permit the Soviet Union to achieve a decisive margin of military advantage, the Soviet Union would reward us by suddenly accepting a program of effective world disarmament.

As a historian, I find it hard to understand how—in view of a sequence of international actions from the Stalin-Hitler pact of 1939 to the resumption of nuclear testing in 1961—anyone can suppose that the Soviet Union is animated by anything but an aggressive conception of its own interests. There is only one way in which we can persuade the Soviet Union that it must submit to a program of international arms inspection and control—that is by persuading the Soviet leaders that we can stay in the arms race as long as they can.—END

idea that Soviet policy is guided by the militant desire to conquer and extend its borders and power through subversion and force of arms. According to Fleming: "It is my belief that most of our belligerence has been unnecessary and dangerous, and that a great deal of it has been based upon false premises and information" (*Preface, xiii*).

By 1952, according to this view, "Truman . . . had become only the belligerent leader of an anti-Soviet, anti-Communist crusade" (*Fleming, p 1051*). And why? "It is difficult to find evidence of any desire on the part of the Soviets to plunge into conflict with the West" (*Fleming, p 1060*). A binding thread in the argumentative fabric of those who saw the US primarily responsible for the cold war was the idea that if only we would stop unnecessarily opposing communism, liberal economic and educational trends would tend to ameliorate its militancy. Thus:

> As the standards of education and of living rise, wants are constantly expanded. These forces have already compelled a wave of liberalizing reform in Russia and some of the satellites, and eventually the same processes will operate in China. (*Fleming, p 1064*)

The theory that totalitarian militancy wanes as the standard of living rises is not new but has recently found strong support. When one views the history of the twentieth century in general and that of the last three decades in particular, however, the thesis becomes naked theory; for the lesson of this century irrevocably proves its bankruptcy. Japan possessed (and still has) the highest standard of living, the greatest and most productive industry, the most skilled people, and the greatest number of consumer goods of any nation of Asia. Yet Japan chose the road of aggression in the 1930s and the 1940s, a road that ended with her dreams of a Greater East Asia Co-prosperity Sphere shattered and her major cities in ruin. A productive and skilled Nazi Germany chose the same course and found that Hitler's mad genius brought death, destruction, and misery. Indeed, are there those who would argue that as Russia has increased her production, economic well-being, and standard of living at the same time she has become less aggressive? The record of the past sixteen years speaks for itself.

In general, the attack on deterrence was rooted in a myopic view of the history of Soviet Russia—a view that today would always refer to the forces of aggressive communism as the "enemy" (*always in quotation marks; for example, see Fleming, p 1093*). Because the US was responsible for the cold war, because communism was becoming more liberal while it became militarily more powerful and adventuresome, and because the world now lived in the shadow of nuclear decimation, the American deterrent policy was misguided at best and blatant folly at its worst. So ran the argument.

However fallacious deterrence became to the unilateralists and the nucleus of the antideterrent movement in the light of these arguments, there was yet one more compelling reason for their "anti" fixation. The crowning evil, the insidious scapegoat, became the domestic forces that had committed the nation—and were continuing to guide its policy—to a suicide course against world communism, *i.e.*, "the military-industrial octopus" (The Nation, *October 28, 1961, p 278*). The scientific-military alliance was not only nurturing a "New Militarism" but was "frustrating disarmament" (*Fleming, p 1111*). One observer saw at work in this country the same forces that had spawned Hitler: "At conflict, in essence, are traditional American democratic principles and the kind of Prussianized military-industrial concept that produced Hitler" (The Nation, *October 28, 1961, p 278*).

To the historian, America was once again becoming witness to a devil theory. It is a continuing and fascinating American political paradox that both the Right and Left of the US political spectrum hold tenaciously to their own devil theory; to the Right evil incarnate has become the State Department and those traitorous Americans who "lost" China and so many other entities to communism. To the Left, the military-scientific combination, the Atomic Energy Commission, the Strategic Air Command, and, of course, the Pentagon, are responsible for so much of our present predicament. Indeed, to the devil-believing Left, the attitude of the "New Militarism" was simply and brutally "Hurrah for more billions for the weapons of mass murder—and to hell with people!" (The Nation, *October 28, 1961, p 281*).

At the very heart of the attack on the military and the nuclear deterrent policy was the undiluted fiction that the military was actually and unalterably forming, guiding, and even dictating US national policy:

> This complex has come, in fact, to determine all our policy; to orient the entire nation, not toward peace, but toward war. If we are ever to avoid that war, the overwhelming and insidious power of the military-industrial complex must be smashed. (The Nation, *October 28, 1961, p 335*)

It should be noted that in the world of the devil theorists, the world of fixation and fantasy, the idea that the military is somehow controlling national policy is a constant and recurrent theme. Thus:

> There is little doubt that the armed services exert more control over Congress than that body exerts over the Defense Department. Indeed, the military group is clearly in a position to assume *actual political command* over the US striking forces if there are serious signs of "weakness" in US foreign relations. (*Harrison Brown and James Real,* Community of Fear, *Center for the Study of Democratic Institutions, 1960, p 34. Italics are mine.*)

And yet, to my knowledge, not one specific example has ever been advanced proving that the military are in fact controlling US national policy. It is indeed difficult to avoid the conclusion that many respected Americans are venting their disillusion and frustration with the cold war and nuclear weapons problems on the man in uniform.

The opinion that US policy has been overly

(Continued on following page)

weighted toward the military reached its apex prior to, and coincident with, the assumption of power by the Kennedy Administration, since it was felt in antideterrent quarters that the new President might conceivably reverse the course of events. In the New York *Times* of January 22, 1961, Jack Raymond observed that:

> . . . various suggestions have been made . . . to change the military image of America, which represents such a complete break with its own past. It has been said that forceful civilians must be put over military leaders; that the country's spokesmen, including the President, must avoid claims of strength and repeatedly affirm the desire for peace, and that more conciliatory positions should be taken in world affairs.

Additional voices joined the chorus for more negotiation, conciliation, and fewer military moves with the argument that after all we certainly didn't need more or better weapons since we already possessed enough "overkill" to wipe out the Communist bloc many times over. We had already reached the ultimate horror of the technological plateau. This reasoning again exhibited a regrettable myopia as far as military and international political knowledge were concerned. At least two points should be mentioned here. First, since US national policy is never to attack first, it is not how much we have in being today, but rather what we will have left after accepting the first blow. Second, we neglect at our peril a rapidly advancing technology that might at any time result in a revolutionary breakthrough. For example, should either side suddenly announce operational development of an antimissile device, the military, political, and psychological impact would indeed be far-reaching. The body of sincere, idealistic people promulgating these views was swelled by pacifists and nuclear renunciationists who saw an opportunity to make themselves heard regardless of the national and international consequences.

Toward the end of President Eisenhower's tenure and at the beginning of President Kennedy's, a noticeable emphasis became apparent on the logic of limited-war doctrine. Since each side now commanded nuclear strike forces capable of smashing the other, the only real power that counted—it was reasoned—was that of limited or conventional forces. In effect, it was argued, the two nuclear deterrent forces canceled each other out:

> . . . now that our ability to offset inadequacies in other kinds of forces by superiority in strategic, thermonuclear forces has disappeared, the comparative strength of the Soviets and ourselves in these other kinds of forces has become the *only real measure* of military capacity to accomplish national objectives. A great deal of analysis and sizable resources are needed to bring these aspects of our defense posture into line with thermonuclear realities. Unfortunately, we are in danger of riding off in the wrong direction. Most of the critics of our defense policy, and particularly those who concentrate on the missile gap and basic deterrence, have failed to identify our most pressing needs and vulnerabilities—chasing, instead, the will-of-the-wisp of "thermonuclear superiority." (*Lt. Col. A. A. Jordan, Jr., "Basic Deterrence and the New Balance of Power,"* Journal of International Affairs, *vol. XIV, no. 1, 1960, p 60. Italics are mine.*)

The time had arrived, therefore, to stress our limited-war capability and deemphasize strategic power. Indeed, the call was heard for a strategy of limited war to replace what had been known as *the* deterrent. Henry Kissinger had argued against this validity of *the* deterrent: "*. . . the* deterrent . . . implied that all other forms of power were a dispensable luxury and essentially irrelevant to the problem of security" (The Necessity for Choice, *Harper & Brothers, 1961, p 56*). Thus, because at one time in the not-too-distant past it had undoubtedly been true that our limited forces were neglected, it was now proposed that they be accentuated—so some argued—at the expense of the US strategic capability. For a time at least, almost entirely lost in the argument was the fact that our nuclear strike forces had prevented us from losing our national identity in one swift surprise blow. In addition, it was observed that without superior strategic power the rationale and foundation for our conventional capability would be completely and irrevocably undermined. Without strategic supremacy and, of course, political acumen, our limited-war position would in fact be built on sand.

An argument often expressed by intellectuals was that of pointing to nationalism and revolution in Asia and Africa while declaring that *the* deterrent had not prevented either nationalistic ferment or Communist inroads in these weak nations. Norman Cousins has thus declared:

> There is yet another fallacy to the deterrent theory. It assumes a static world. It assumes that . . . upheavals in the making for more than a century will somehow remain quiescent. It does not take into account that the nuclear deterrent will not prevent social and political unrest and the consequent disturbance to the peace. (*Norman Cousins, "The Fallacy of the Deterrent,"* The Saturday Review, *April 16, 1960*)

At the bottom of this strange logic could be found a basic misunderstanding of deterrence. The deterrent concept did not count among its objectives that of successfully challenging Communist subversion. Neither did it attempt to frustrate renascent nationalism in the underdeveloped areas of the world. Strategic deterrence was not a panacea. To think of it as a cure for all our international or domestic troubles—political, economic, and social—amounted to blatant misrepresentation by people who undoubtedly knew better. Curiously, many of these same persons were calling for greater emphasis on economic and ideological programs, evidently well aware of our shortcomings in the emergent countries.

Convergent and conversant with the above groups were a congeries of people who believed an arms agreement or even "general and complete" disarmament down to the "machine-gun level" had somehow been obstructed by the scientific-military alliance, the Atomic Energy Commission, and the Strategic Air Command. Some persisted in the fiction that US na-

tional policy was being dictated by the military and the AEC. One editor felt that negotiations had been prevented by the AEC, SAC, and a group of scientists led by Edward Teller:

> They believe, and have worked hard to prove, that an airtight system of inspection to police an arms-control agreement would be impossible. . . . And I believe that Kennedy himself will overrule the bureaucrats of the Radford-LeMay-Strauss school who have previously prevented serious negotiations. (*John Fischer, "Editor's Easy Chair,"* Harper's, *February 1961*)

It was further believed that in general a lessening of cold-war tensions and fruitful negotiations were stymied by the military and certain powerful individuals and groups with a vested interest in continuance of American-Russian enmity. It is quite clear that these charges were in many cases put forth by true believers; significantly, it has also become evident that in other instances a definite antimilitary bias existed, sometimes coupled with pacifistic or renunciationist strains. *The* deterrent represented to these people the final embodiment of all that the antimilitary persuasion abhorred.

And finally, the point was advanced that our strategic power—being in large measure that of a "soft" or vulnerable force—was primarily a first-strike posture which had the effect of urging the Soviets on to a surprise nuclear attack. Russian hostility, it was said, sprang logically from an intrinsic fear of a preemptive move by the US. The difficulty with this line of attack was essentially that it ignored the much larger foundation of Russian hate, *i.e.*, strong US forces barring the way to the Soviet road to empire.

Naturally, it is recognized that there are sincere people who are against larger and more powerful military forces simply because they fear—like all of us—thermonuclear holocaust. It can be cogently argued, however, that people who do not understand the requirement for a *superior* strategic capability (let us hope that the term "adequate" has now been relegated where it belongs—in history's graveyard) and who unwittingly pursue a national policy of what amounts to timidity and weakness, are helping to bring about exactly what they fear most—a Communist military adventure beginning with, or ending in, central war.

The antideterrent movement reached a peak during 1960 following the U-2 incident. President Eisenhower was nearing the end of his term and hope was expressed for a "fresh start" in dealing with the Sino-Soviet monolith. At the same time, the Russians had scored startling space successes, and the rising tide of neutralism had clearly reached its zenith. These events taken together gave sharp impetus to the campaign against military outlays in general and the policy as well as the cost of nuclear deterrence in particular. However, if 1960 marked the high tide of antideterrent thought, 1961 saw the turning of the tide as the movement was abruptly undercut. Ironically enough, it was the Soviet Union that pulled the rug from under antideterrent sentiment. In a move in many respects not unlike the Russian pact signed with Nazi Germany in 1939, the Soviets broke the nuclear moratorium by resumption of atmospheric testing.

As the Russian Communists stood naked to the world—their deceit and insincerity in calling for a nuclear agreement and general and complete disarmament bared—the Belgrade Conference of "unaligned" nations convened. Thus, when these countries—many of whom had trumpeted their strict neutrality, impartiality, and international moral code—exhibited a clear and blatant double standard in softly and almost inaudibly appealing to the USSR to cease its testing in the atmosphere, the US, from President Kennedy on down, and its allies were clearly appalled. From the simultaneity of these two important events evolved a marked reappraisal of US national policy involving political, military, and economic (foreign aid to Yugoslavia and Poland, for example) tenets.

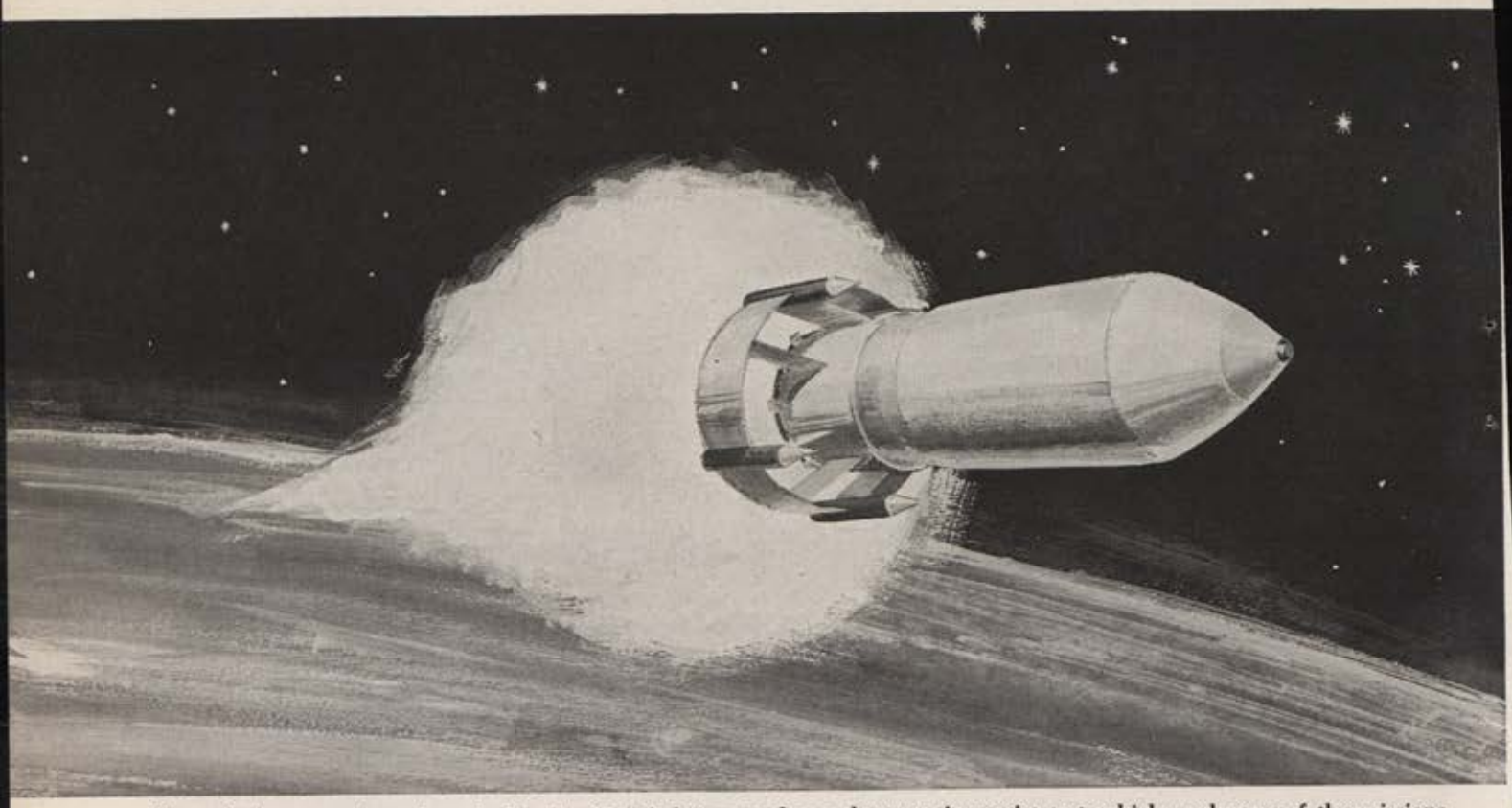
We have focused our attention upon the deterrent under fire. This, of course, was a significant, and fortunately, minority opinion. Its roots were diverse and its reasons multifaceted although the objective was similar. It can be stated without fear of contradiction that the overwhelming majority of the American people, along with US national leadership, have been one in their desire for a strong strategic strike force. For they have recognized that as long as international communism continues to subvert freedom throughout the world, we dare not afford the luxury of anything less than military supremacy.

We require not only retaliatory power but effective limited forces as well. But military strength alone is not enough to preserve democracy. Our leaders and our people must recognize the Communist threat for what it truly is—a deadly cancer eating away at the vitals of humanity. The Sino-Soviet leadership exists, and attempts to extend itself, upon the premise that the state and a self-perpetuating élite are in fact almighty. We emphatically deny this and believe that individual dignity and belief in a divine being become the ultimate rationale for life on this earth.

We trust that free, democratic society will recognize, understand, and effectively meet the threat, thus proving its resiliency and staying power. But we must once and for all understand that we are not talking about a temporary or transitory effort. The task requires sustained work and indefinite commitment.

The choice remains ours.—END

The author, Mr. Wolk, has been a historian at Hq. SAC, Offutt AFB, Neb., for the last three years. A native of Springfield, Mass, he served in Army I&E programs from 1953-55, and from 1956-58 was a high-school history teacher in Sturbridge, Mass. Mr. Wolk holds B.A. and M.A. degrees from American International College, Springfield, Mass., and has done work toward his Ph.D. at the University of Washington. His book on strategic weapon systems, doctrine, and national policy is to be published this year. Mr. Wolk's last offering for this magazine was "The Case Against Our Armed Forces," in the December '61 issue.



The artist's conception above depicts the Vostok being used as a hypersonic ramjet test vehicle, only one of the missions it could perform. Its nose has been lifted to a small angle of attack, and hydrogen fuel is being burned in the ring wing.

SOVIET engineering today is generally tagged as "brute force." From tanks to Sputniks, Western experts point out that the Russians continually have settled for increased weight, standardization of design, and less than maximum performance to gain simplicity, ruggedness, and reliability.

Good evidence is available that the Soviets have applied this philosophy in its severest form to the most challenging engineering problem of our time—the construction of vehicles to fly men into space and back through the atmosphere at speeds from 18,000 to 25,000 miles per hour.

The information at hand certainly points to the conclusion that the Soviets have constructed one standard vehicle which can perform all of the manned spaceflight tasks, of both the "civil" and "military" variety, envisioned for the next decade. This multipurpose spacecraft is the Vostok, which was shown in Moscow on Red Air Force Day last July. A large mockup of the vehicle was slung under a MIL-6 helicopter and flown low over the crowd that gathered for the air show at Tushino Airfield.

The impact of the Vostok's initial public appearance was blunted considerably because the Russians chose to parade it along with a new stable of supersonic bombers and fighters. Western newspaper and magazine coverage of the Tushino exhibition concentrated on such new Soviet Mach 2 aircraft as the Beauty bomber and the Blinder interceptor (*see* AIR FORCE, *September 1961, page 52*).

Most observers passed the Vostok off as a large version of the Mercury capsule. But this analysis falls far short of the vehicle's potential.

A close look reveals that it is technically possible for the Vostok, as exhibited by the Russians in July, to perform all of the major space tasks possible in the near future. They are:

- **Ballistic Reentry**—The most elementary form of reentry common to the Mercury capsule and many missile warheads.
- **Lifting Reentry**—The Vostok could also function as a maneuverable, hypersonic glider with a range of several thousand miles in the atmosphere and the ability to return to any given airfield on earth. Wings in the conventional sense are not needed on hypersonic gliders. Symmetrical bodies (*see illustration page 42*), such as the one used on the Vostok, will produce lift efficiently if held at an angle of attack as a vehicle travels many times the speed of sound. The Vostok's lift/drag ratio of around 1.0 places its lifting ability in a class between the Dyna-Soar (L/D of 1.5 to 2.0) and the Gemini and Apollo vehicles (L/D of less than 0.5).
- **Rendezvous**—Maneuverability in space is the first requirement for rendezvous. If two vehicles are to make contact in orbit, at least one of them must be able to maneuver by changing orbital plane and altitude. To make rendezvous effective over a broad range of conditions it is probable that the rocket engine used for maneuvering will have to be supplied with a propellant load equal to at least ten percent of the total vehicle weight. Such a fuel load plus the guidance units and grappling system needed to draw the vehicles together could easily be carried inside the Vostok. Its internal volume is around 2,500 cubic feet, large for a spacecraft, including most of those still in the thinking stage in the US. By comparison the Mercury capsule is not even 1/20 as large, with a volume

Some second thoughts and a few educated guesses about the Soviet spacecraft Vostok, which carried Cosmonauts Gagarin and Titov safely into space and back, lead to some startling possibilities . . .

What Are the Lessons of VOSTOK?

By J. S. Butz, Jr.
TECHNICAL EDITOR, AIR FORCE/SPACE DIGEST

of about 100 cubic feet. The fuselage of a B-52H bomber is around 13,000 cubic feet.

• **Moon Mission**—The Vostok's large volume proves valuable for another reason when one considers the lunar missions now planned in the US Apollo program. One vehicle, proposed by General Electric (*see page 38*), contains three of the four Apollo modules. It could fit inside of the Vostok.

The available weight data also indicates that the Vostok configuration shown in Moscow could be loaded up and used for moon flights. A weight of about 10,500 pounds was reported for both the Gagarin and Titov flights, and this is verifiable by ground tracking. Therefore, the Vostok on these missions was very lightly loaded, at less than five pounds per cubic foot of volume.

US practice is to build more "dense" vehicles such as the Mercury, Gemini, and Apollo, which are loaded to twenty pounds per cubic foot or more. This is efficient for any reentry vehicle using an absorption-type heat protection system such as an ablating outer surface. Apparently, ablating material will have to be used on the hottest spots on moon return vehicles which will reenter the atmosphere at 25,000 mph.

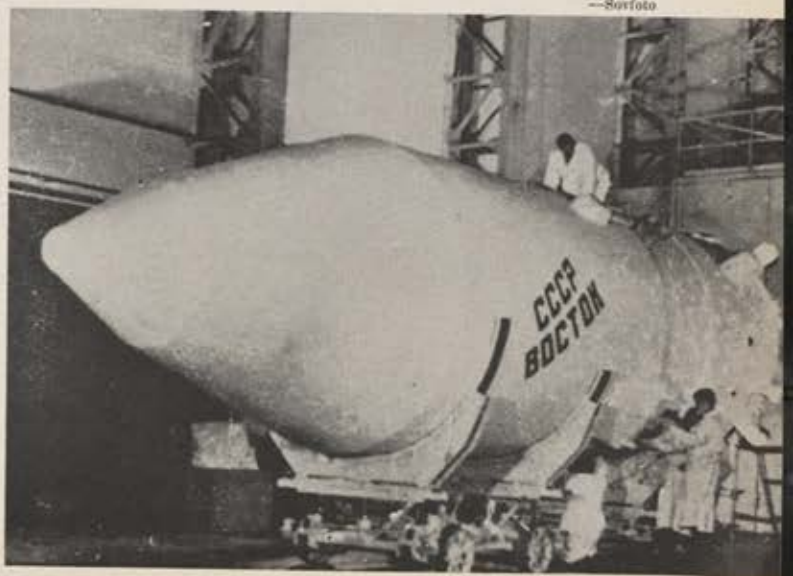
If the Vostok's loading were increased to the US standard of about twenty pounds per cubic foot its gross weight would go up to the vicinity of 50,000 pounds or ample for a moon mission, when the proper booster is available. Undoubtedly the structural materials would have to be changed. But the shape would be the same. Every Vostok would be adding to the experience of operating standard future vehicles.

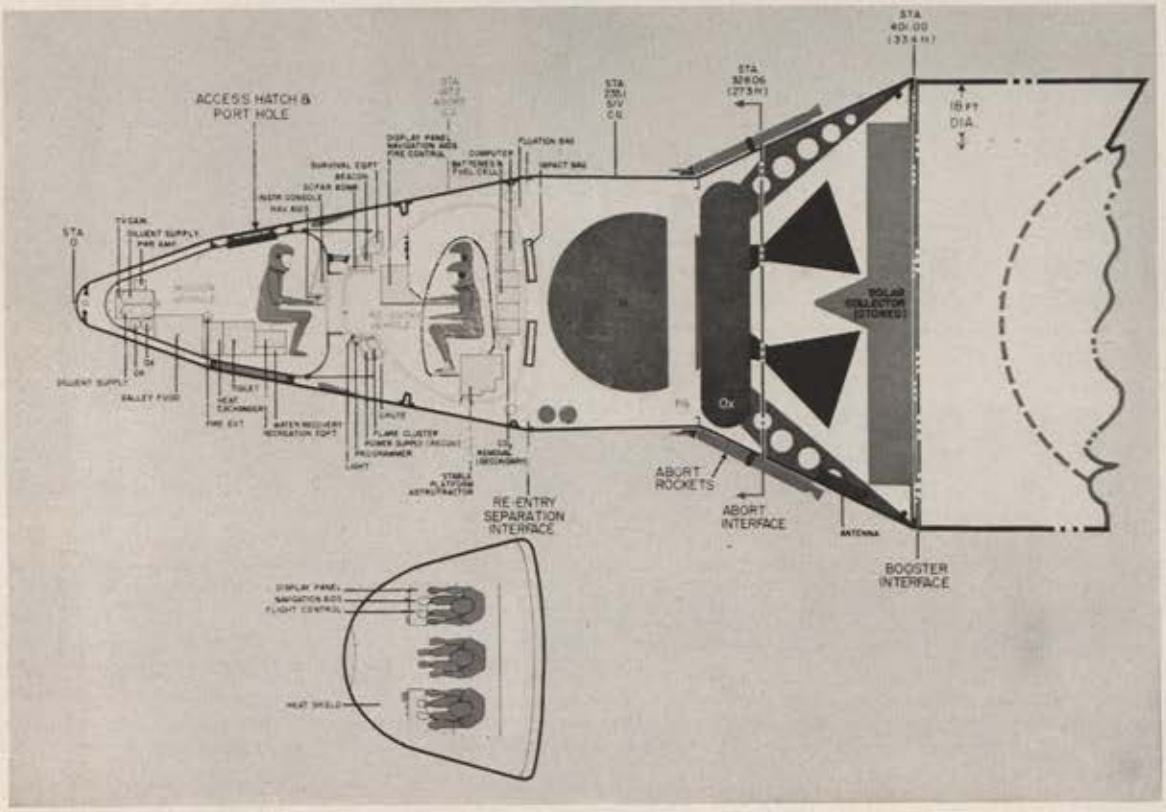
At this point in the development of space tech-

(Continued on following page)

Mockup of the Vostok (*above*) was exhibited on Red Air Force Day last July, complete with a picture of Yuri Gagarin. The spacecraft's great size was emphasized by the 120-foot-long fuselage of the MIL-6 helicopter which carried it over Tushino Airfield. The large round opening to the right of Gagarin's photo is believed to be the hatch through which the pilot's ejection seat would pass in an emergency. The photograph below was taken from a Soviet documentary movie on spaceflight. It shows a team of technicians assembling the Vostok. Russian sources indicate that the pilot's compartment is located in the forward end of the cylindrical section of the vehicle. According to Russian weight data, the Vostok was nearly empty and very lightly loaded on the Gagarin and Titov orbital flights last year.

—Sovfoto





Lunar spacecraft design at left was proposed by General Electric. Smaller than the Vostok, it uses the NASA modular concept carrying a life-support system for three men and a hydrogen-fueled rocket for maneuvering in space.

nology there seems to be no substitute for high operational experience time if truly reliable vehicles are to be constructed. Consequently, the National Aeronautics and Space Administration has based its three manned reentry vehicles on one basic design approach. The Gemini and the Apollo essentially use Mercury aerodynamics, and Mercury flight experience can easily be applied to improve their design. If US booster power had been adequate to place an Apollo reentry vehicle in orbit this year, there is a good chance that Mercury and Gemini would not have been built, leaving Apollo as our only civil spacecraft.

• **Hypersonic Air-Breathing Engine Tests**—The ring wing on the aft end of the Vostok could serve as a hypersonic ramjet, if hydrogen or some other highly reactive fuel were burned. The significance of these engines cannot be overemphasized for they would eliminate the great weight of the oxidizer that has to be carried in rocket-powered boosters. If hypersonic air-breathers will operate efficiently over a wide Mach number range, they could fundamentally alter the economics of spaceflight. On paper, they are more efficient than even the nuclear rocket in putting heavy payloads into orbit at low cost.

The above analysis of Vostok capabilities is based on fundamental data found in the open literature, published primarily by NASA and the Air Force. A double check was made by asking several experts in hypersonic aerodynamics and the design of spacecraft to comment on the conclusions.

Three main points developed during these discussions. First, few had seen much material on the Vostok or had thought about it to any extent. Apparently only one had ever been asked to comment on this vehicle by anyone, either inside or outside the government.

Second, all agreed that the Vostok, as it was shown, could reenter in ballistic fashion; it could develop lift and maneuver in the atmosphere; it could be loaded up heavily for advanced missions such as a moon flight; and the Russians might even use it as a test bed for hypersonic air-breathing powerplants.

Third, while these men agreed that it was possible to put the Vostok to such varied uses, all of them immediately expressed a doubt that the Soviets would actually use it for anything but a ballistic reentry. Only one basic reason for this doubt was cited. The Vostok just isn't an optimum configuration for these more advanced missions. It is possible to build a more efficient lifting vehicle than the Vostok. And if someone wanted to test a hypersonic air-breathing engine he would change the shape altogether. The ring wing at the aft end of the Vostok is not the optimum inlet for a hypersonic engine.

After expressing their first pass opinions, most of these specialists took a longer look at the Vostok. There developed a sizable list of reasons why the Soviets might build such a standard vehicle. It also resulted in many detailed design ideas as to how the various growth versions of the Vostok might be expeditiously constructed.

For instance, no one believed that the Vostok as it now stands could land on a runway. Using its L/D of 1.0, it could maneuver in over the target airfield, but it would have to be recovered by parachute. Probably the first parachutes would have to be extended at low-supersonic speeds, before the vehicle began to enter the transonic region. Probably the Russians

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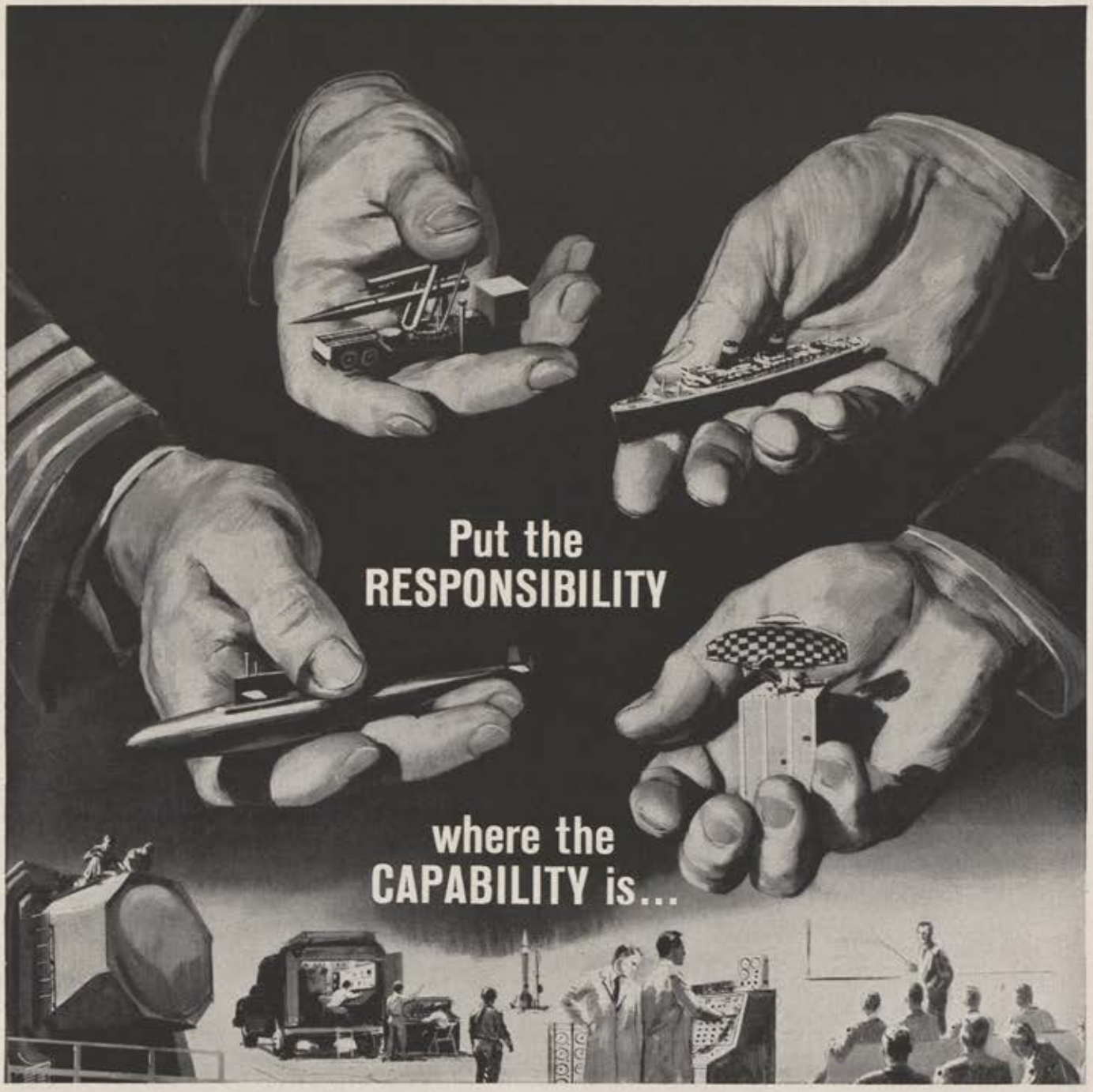

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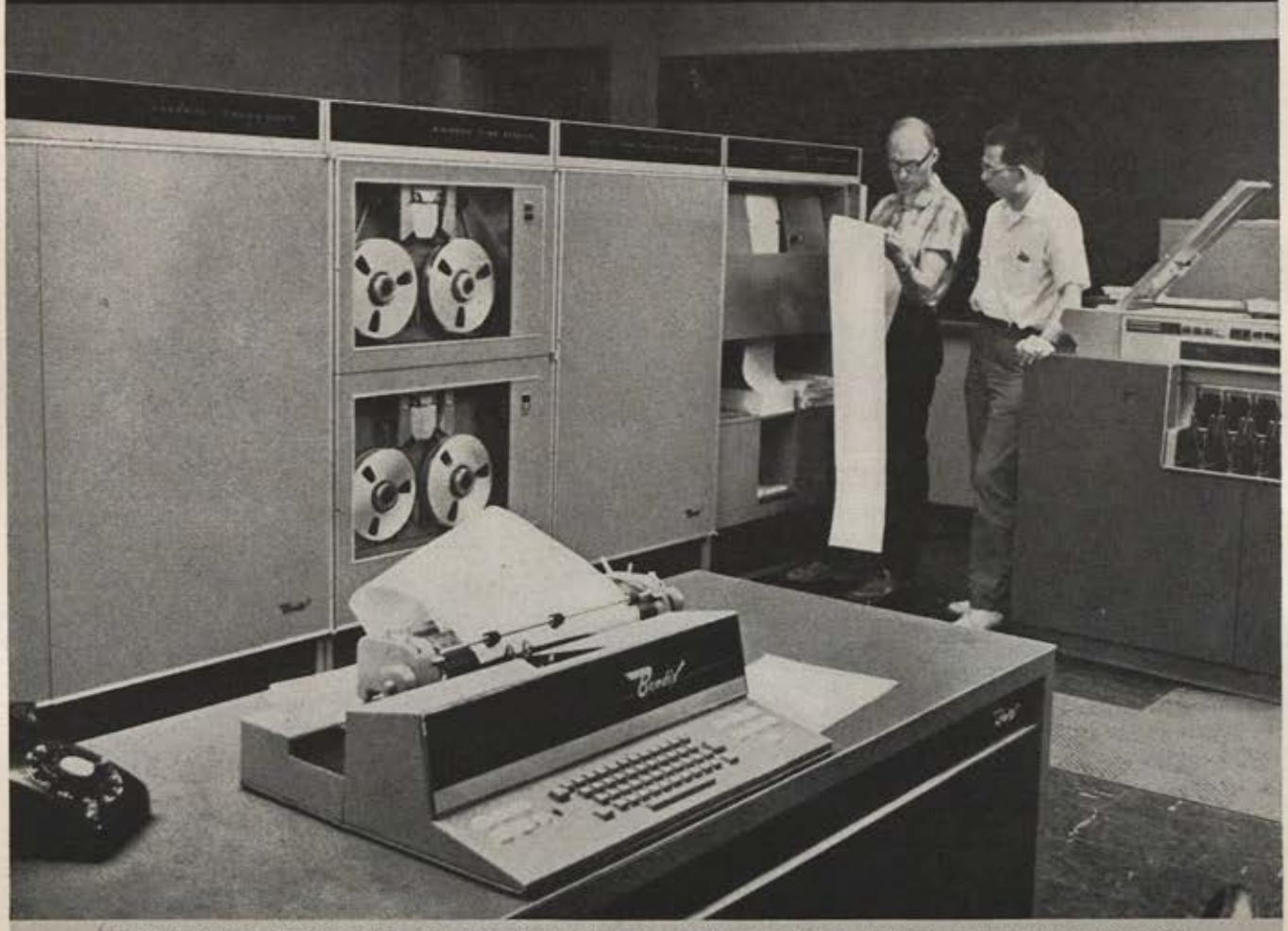

NOW IN OPERATION—Carnegie Institute of Technology, Pittsburgh, Pennsylvania

would not want to live with this situation forever so they would add small wings at some stage. With these wings added, the necessary lift and control could be provided for a runway landing. Attaching these wings and spreading their load out through the cylindrical Vostok would require structural changes. Problems such as adding these wings are of intense interest to spacecraft specialists.

In general, however, the final comments ran as follows: A multipurpose Vostok would be in keeping with the development philosophy the Russians have shown to date, and the Soviets usually do not split their resources between two major developments efforts in any field.

The opinion about hypersonic air-breathing engines was unanimous, however, even among those with the greatest background in this field.

It is believed that the testing of such powerplants is pretty far down the Soviet development schedule, if any is planned at all. There is much work that they would want to accomplish with the Vostok first.

Many of the realities of hypersonic design are difficult to keep in mind, especially for those brought up on subsonic airplanes. For instance, the boundary layer of low-speed air enveloping a flying vehicle is not thin at very high speeds. It is actually thicker than the vehicle itself as orbital speed is neared at high altitude. The motion and stability of this deep boundary layer is extremely critical, so far as vehicle lift, heating, and stability are concerned.

The idea that efficient high-speed vehicles can be built without wings apparently took a long time to sink in, even in the technical community. About seven years ago, when many of the missile and space projects now operational were in their gestation period, three of the country's leading high-speed aerodynamicists wrote a basic and classic paper on hypersonic vehicles. They compared the range efficiency of hypersonic ballistic vehicles (conventional missile nose cones), glide vehicles (Gemini, Apollo, Dyna-Soar, and Vostok), skip vehicles (hypersonic lifting vehicles which dive in and out of the atmosphere) with the range efficiency of supersonic airplanes. Title of the report is "A Comparative Analysis of Long-Range Hypervelocity Vehicles." Its authors are Alfred J. Eggers, Jr., H. Julian Allen, and Stanford E. Neice, and the paper was issued by NACA as Technical Note 4046.

One of the major points in the report was a reminder that wings are not needed to develop sizable lift above Mach 5 or so. The authors point out the then-well-known fact that an infinitely thin flat plate is theoretically the ideal lifting device at low-supersonic speeds but that, ". . . it has relatively little advantage over the cone at hypersonic speeds. Evidently, the body of revolution is relatively efficient for developing lift at hypersonic speeds."

To illustrate this the report carried the drawing of a hypersonic glide vehicle shown on page 42. From this it is obvious that missile warheads can be made to maneuver and change direction in the atmosphere and that maneuverable reentry vehicles can be shaped like warheads.

This discussion of conical lifting bodies does not rule out the use of wings on efficient hypersonic vehicles, especially those which carry men. Successful recovery of these craft means that they must fly in all four speed ranges—subsonic, transonic, and supersonic as well as hypersonic. Some sort of conventional wings seem to be necessary to give the lifting power for a runway landing. Eggers, Allen, and Neice made the following statement on this subject. "It appears most unlikely that acceptable low-speed aerodynamic characteristics can be obtained without using more conventional planar surfaces, at least to the extent of a wing." As yet, no one appears to have found a way to get around this problem.

The main difficulty with putting wings on hypersonic gliders is heating. To reduce heating and prevent the wings from literally melting away at high speed, the L/D has to be compromised by rounding the leading edges and sweeping them back to very high angles—seventy degrees and more. Even when this is done completely new high-temperature materials must be used to maintain structural integrity. Quite naturally the new high-temperature structure is heavier than that on low-speed aluminum aircraft. Therefore, structural weight is especially critical for reentry vehicles.

If one compares the manned spacecraft known to be in development, there is only one using planar lifting surfaces—the Dyna-Soar, which is intended to achieve a high level of aerodynamic efficiency compared with the others. It will glide for long ranges in the atmosphere, and its high-temperature periods on each reentry will last half an hour or longer. Its gradual descent through the atmosphere will keep its heating rates low despite its terrific speed. Consequently it can use a relatively light radiation-cooled structure. The outer skin heats to 2,000 degrees F or more, and most of its heat is radiated into the atmosphere. If the Dyna-Soar's skin had to be cooled to a lower temperature by some internal device, its total weight would go up and its usefulness down. If the glider were coated with an ablative material, its structural weight would again be increased by a significant percentage and its entire skin would have to be replaced after every flight.

By comparison the Mercury capsule reenters the atmosphere rapidly, and its total heat intake is relatively low. However, the quick reentry causes a high rate of heating, much higher than the rate at which a high-temperature skin such as the Dyna-Soar's could radiate heat back to the atmosphere. So some means must be provided to augment surface radiation and help dissipate the flood of heat energy. On the Mercury this is an ablating shield on the front surface, which is by far the hottest area. Large quantities of heat energy are absorbed by allowing the skin to ablate and burn away. The cooler aft portions of the Mercury are cooled by radiation.

There is no definite information on the Vostok structure. Many believe it probably has a combination of ablation and radiation cooling.

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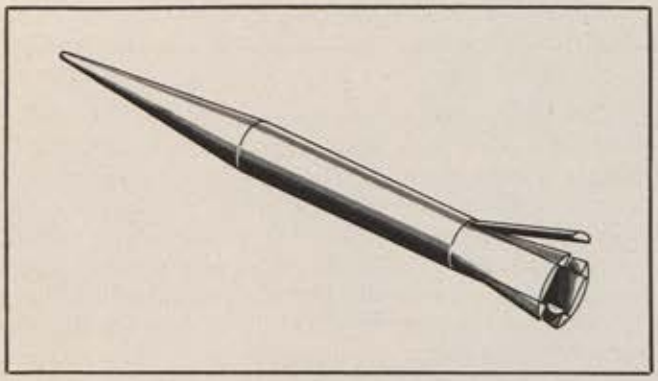

This drawing of a cone-cylinder, wingless, glide vehicle (*above*) was included in an NACA report written in 1954 to show that bodies without conventional wings could develop lift efficiently while traveling at hypersonic speeds.

In general sophistication, structural complexity, and maneuvering ability in the atmosphere, the Vostok apparently lies somewhere between the Dyna-Soar and the Mercury and Gemini spacecraft. Moon return vehicles, which reenter the atmosphere at much greater speeds, will have more difficult heating problems. The Apollo will have major structural differences from the Gemini and presumably any Vostok moon vehicle will be constructed differently from today's model. The use of wings and radiation-cooled structures undoubtedly will not be possible, at least on the first generation of moon vehicles.

The Vostok in many ways can be called a state-of-the-art spacecraft. Its fuselage is technically termed a cone-cylinder shape. This is a fundamental shape in hypersonic aerodynamics, and it was one of the first to be widely investigated in high-speed wind tunnels. The wind-tunnel tests long ago proved the validity of the basic theory and provided the engineer with the tools he needs to sit down and design actual vehicles. US agencies, over the past ten years, have gathered a mass of good wind-tunnel data on a variety of cone-cylinder bodies at hypersonic speeds.

On the basis of unclassified data of this type, available primarily in reports of the old National Advisory Committee for Aeronautics, it looks as though the Vostok, with its rather short cylindrical afterbody, would have an L/D of about 1.0 at hypersonic speeds. Precise estimation is difficult because of the ring wing on the aft end. Some aerodynamicists believe the ring wing could improve the L/D slightly; others disagree. It is certain that the added surface area of the wing will increase the skin friction drag significantly. Just how much this will hurt the L/D is problematical.

Perhaps the greatest uncertainty is the effect of the ring wing on stability. In any sort of transient-flow conditions it can give severe problems. For instance, at transonic speeds when the air stream passing over a body is a rapidly changing mixture of subsonic and supersonic flow, a ring wing almost always has trouble. There is a great tendency for supersonic flow to start unevenly in the bays between the struts that support the ring wing (the Vostok has eight such struts). If the flow in some bays is supersonic and subsonic in others it will greatly unbalance the forces acting on the vehicle. This sudden unbalancing of airloads can cause heavy vibrations and make it essentially impossible to stabilize and control the vehicle.

THE LESSONS OF VOSTOK——CONTINUED

These troubles and some others apparently have caused many high-speed aerodynamicists in the US to have a low regard for the ring wing. This feeling is not universal, however. A group in the Aerophysics Laboratory at the Massachusetts Institute of Technology has worked with the ring wing for several years. They believe it has good potential for several types of vehicles, and their research is continuing. The MIT group is not alone in their evaluation of the ring wing, and some scientists at the RAND Corp. and elsewhere are in general agreement.

Most of the US ring-wing research is classified, and only the most basic material is available. One of the few open reports was written by Leon H. Schindel of MIT for the USAF. In it he does a basic review of ring-wing theory and problems along with some wind-tunnel data. As regards Vostok-type vehicles, Mr. Schindel's only applicable information is that the ring wing should be on the back end. The Russians apparently agree.

The specialists interviewed in connection with this article all agreed that the Russians could use the right wing as a stabilizing device at hypersonic speeds. A flare, or tail surfaces of some type would be needed for stability at low angles of attack. It was estimated that the ring wing would give trouble, but there was little doubt the problems could be solved. However, it was generally predicted that something would be done so that the Vostok's occupants would not have to ride the ring wing at transonic speeds during the unpowered descent. The Russian description of a Vostok flight indicates that this idea is a good one.

Another obvious question about the ring wing is high temperature. It will be behind the strong shock wave off the Vostok's nose, and this will reduce aerodynamic heating. But the wing shown is quite thin, and its leading edge is not blunt or well-rounded, which means that it will probably operate at a fairly high skin temperature. The specialists believe this problem can be handled, but one of these thin ring wings probably couldn't be used more than once.

The possibility of using the Vostok as a test bed for hypersonic engines undoubtedly touches a tender nerve with many in the US. Most people familiar with the engine development business disagreed strenuously in 1958 when NASA essentially stopped work on air-breathers and concentrated on rockets. In keeping with this federal decision, other agencies of the government have not been allowed to seriously fund hypersonic air-breathing engine development.

There is some encouragement, however, because the small-scale work that continues does not seem to have revealed any overwhelming difficulties with these engines. One of the main questions a few years ago apparently has been answered in the affirmative. Until recently no one was absolutely sure that it would be possible to burn fuel, even hydrogen, in a supersonic airstream. If it proved impossible to do this, the top speed for practical air-breathing engines probably would be under Mach 5. Slowing the engine air down to subsonic speeds to burn fuel, as done in to-

(Continued on page 45)

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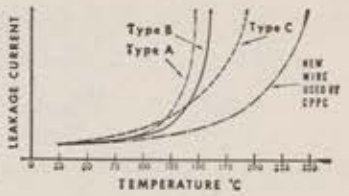

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day's turbojets and ramjets, would create an impossible drag on a vehicle flying at hypersonic speeds. Apparently this won't be necessary. Today it is difficult to get an engine man, familiar with this subject, to express any concern over burning in a supersonic airstream.

A number of engine experts see no end to the potential of air-breathers and predict they will be able to operate right on up to escape speeds of 25,000 mph or so. Others think more research is definitely in order before such theories can be acted upon. There is great uncertainty as to when absolutely convincing information will be available because the current US research effort on high-speed air-breathing engines is much lower than it was five or six years ago.

Use of the Vostok as an air-breather test vehicle would be relatively simple mechanically. Some highly reactive fuel, such as hydrogen, probably would be sprayed out of small holes on the fuselage back near its base, just ahead of the ring wing. The combustion would spread into the low pressure area behind the fuselage.

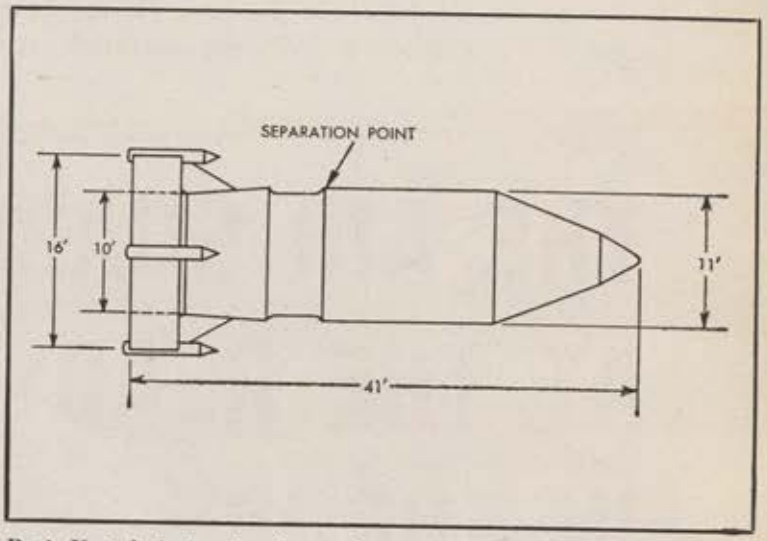
Simple burning arrangements of this general type have been demonstrated many times in wind tunnels. In one of the first tests, a group at the NACA's Lewis Laboratory squirted aluminum borohydride, a highly reactive fuel, out of holes in the top of supersonic wind-tunnel test sections, and it burned well. It was not certain that the flow in the combustion area was supersonic, but the fire did not go out and it showed no tendency to be unstable.

Since then this Lewis group has performed several experiments that have added strength to the theory that external-burning engines are feasible. Technically, an engine installation of the type described for the Vostok probably would be called an external-burning ramjet with a cowl.

The Lewis experiments included burning fuel on the bottom surface of a six percent thick supersonic wing in a small wind tunnel. Fuel was also burned on the after portions of a body of revolution. This body was thinner than that of the Vostok. The burning covered the entire aft half of the body—top, bottom, and sides.

The vital questions regarding such propulsion are: How much thrust can be produced for a given expenditure of fuel and how much can this thrust improve the aircraft's L/D? If the fuel consumption does not prove too great, then it is probable that the after end of a vehicle using external burning will have to be carefully shaped to get a maximum thrust and improvement in L/D. These are complex questions, and the Russians seem to be the only ones in a position to answer them on a full-scale vehicle—where it counts.

The Russians have published many thousands of words about the Vostok, and they have made many general claims for it. In usual fashion, however, they have managed to obscure exactly what they are doing. One official description of the Vostok says that it has two main parts—"the pilot's capsule with facilities for the pilot, the life-sustaining installations, . . . the landing system," plus the "instrument section with the ship's retro-engines and the instruments that operate during orbital flight." Clear Soviet photographs have also shown the Vostok in an assembly hangar, broken down into these two main sections. The break is about three-quarters of the way back on the fuselage as shown in the drawing above. Russian descriptions of the flight indicate that the instrument section (the aft portion with the ring wing) is jettisoned before the "landing system is switched on."



Basic Vostok design details are shown above. The separation point between the forward pilot's compartment and the aft "instrument section" was shown in Soviet movies. Ring-wing location is believed suited for exploratory tests of hypersonic air-breathing engines by some US specialists.

It is believed by several US specialists that the Vostok is probably held in a zero lift or ballistic configuration during the most severe heating period in reentry. Possibly the entire ring wing can be blocked off to form a very large flare of the type common on ballistic missile nose cones. The lifting portion of the reentry would then be initiated by deflecting the flaps in the ring wing assymetrically. Once the pilot had maneuvered in as close to his desired landing spot as possible and at the same time decelerated to low supersonic speeds, he would jettison the after section and actuate the parachute "landing system." Some Russian reports have made it sound as though the heat shield also drops away from the landing pilot's compartment. This would lighten the load for the parachute. It probably would be a necessary design procedure if Vostok were loaded up with equipment in US fashion.

This article has attempted to present some preliminary answers to the questions: "If the Vostok shown by the Russians is their manned space vehicle, what use could they make of it, and why is it designed as it is?" Obviously, the final answer will not be available for some time. But this preliminary analysis clearly indicates that the space challenge to the US may be more serious than anyone previously estimated in terms of time. The Soviets have a "brute-force" vehicle, and they may have *one plan* that they intend to stick with and "brute force" to completion.—END

The nation's top Air National Guard officer recently made a flying inspection trip to the Reserve Forces units newly deployed in Europe. Things look pretty good. Here is General Wilson's personal report . . .

THE AIR GUARD AT THE READY IN EUROPE

By Maj. Gen. Winston P. Wilson, USAF
DEPUTY CHIEF, NATIONAL GUARD BUREAU

AIR National Guard units on active duty in Europe, are giving a good account of themselves. They are combat-ready, fully integrated into Air Force and NATO operations, highly regarded by Air Force commanders. They are gaining valuable experience that will help make the Guard even more effective in the years ahead.

These are my conclusions after visiting each of our units in the European theater.

I appreciate this opportunity to report to readers of AIR FORCE on that visit, particularly because it picks up where Maj. Jim Elliott's article describing the Air Guard deployment left off, and carry on the chronology of this historic event (*see "The Recall Story: To Maintain the Peace," in January '62* AIR FORCE).

We had every reason to expect that Air Guardsmen called to active duty were combat-qualified and well motivated, but when news stories indicated that some elements of the Reserve Forces were not up to these standards I decided to go over to Europe to see for myself how our Air Guard "Stair Step" forces were faring.

I took with me Col. Fred Hook, chief of the Air Operations and Training Division in the National Guard Bureau. We left shortly after Christmas and went directly to USAFE headquarters in Wiesbaden, Germany.

There we met with USAFE Commander in Chief, Gen. Truman H. Landon; his Deputy, Lt. Gen. Harvey T. Alness; and members of their staff. Later, General Alness filled us in on the measures taken by USAFE to prepare for the arrival of Air Guard units and what had been done to integrate their activities with other USAFE forces.

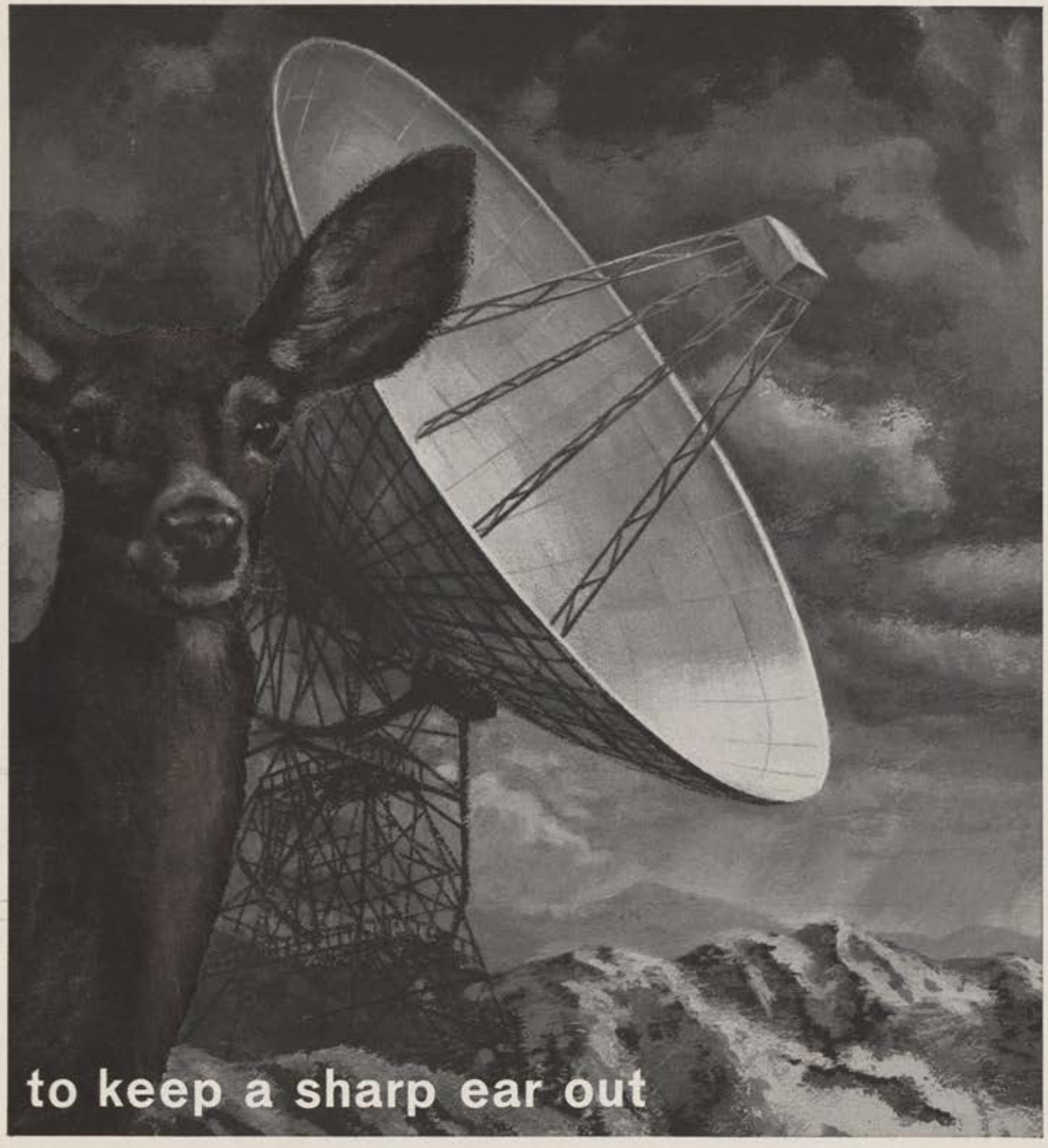
One of their major planning problems is getting necessary coordinations among the various governments involved in USAFE operations. In the Pentagon we talk a lot about the coordination and red tape required to get an action paper through the Air Staff and the Office of the Secretary of Defense, but at least we are all working under the same ground rules. In Europe, the western powers are working toward the same goal, and many ground rules have been established in NATO, but it still takes time, and not a little finesse, to negotiate agreements among sovereign nations, each with its own set of policies and internal conditions that may bear upon the problem.

It was obvious, from General Alness' comments, that a tremendous amount of effort and support had been rendered throughout USAFE to smooth the way for our units and get them up to combat-ready status as soon as possible.

General Landon assigned us a C-47 and crew, and we flew from Wiesbaden to Ramstein, to meet with Maj. Gen. Russ Spicer who commands the Seventeenth Air Force. The Seventeenth is USAFE's combat force in central Europe, and all the Air Guard squadrons, except the one at Moron, Spain, come under General Spicer's command. It was very gratifying to hear from him that he was well pleased with the performance of the Air Guard units. The one problem that worried him was that some of the pilots who had been assigned to Guard squadrons after mobilization weren't operationally ready in Air Guard aircraft. The Seventeenth is a "Gung Ho" outfit, as it must be on the edge of Communist territory, and General Spicer will not take time to transition any pilots in his Air Force. This situation was easily corrected by swapping unqualified pilots for combat-ready pilots in Air Guard units back home, and all cockpits in our Air Guard squadrons are now occupied by ready pilots.

General Spicer and his staff gave us a detailed briefing on the mission of the Seventeenth. He made it clear that if anything should break loose in Europe every element of the Seventeenth would know just what to do and to whom.

(Continued on page 49)



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Air Guard units have their assignments along with all other Air Force squadrons under General Spicer's command. I came away from that briefing with renewed respect for the fine attention this combat-experienced airman devotes to every detail of his responsibilities, and his remarks provided an excellent perspective in which to evaluate the status of our Guard units in Europe.

Two Air Guard squadrons are based at General Spicer's headquarters at Ramstein. They are the 151st of Knoxville, Tenn., and the 197th from Phoenix, Ariz., both equipped with F-104s. They are elements of the 86th Air Division, commanded by Brig. Gen. Frank W. Gillespie. The division is a part of General Spicer's force. It was reassuring to hear from both of these capable commanders that the boys from Knoxville and Phoenix knew their business.

One factor was giving the F-104 pilots trouble—weather. When we visited the alert hangar the pilots were impatiently waiting for the weather to improve up to the prescribed operating minimums. "Anytime we get an alternate," one said, "we go."

Next morning, luckily the weather was above minimums, and we departed for Dreux Air Base, near Paris, headquarters of the 7117th Tactical Reconnaissance Wing and 106th Squadron, late of Birmingham, Ala.

The four-numbered wing designations look strange to Air Guardsmen at first, but it's easy to read them. Under the Air Force's IBM code system, the figure "7" is used as a prefix to designate a provisional unit. Because all but one of the Air Guard wing headquarters in Europe are split off from the remainder of the wing headquarters back home, the Air Force assigned the "7" prefix to their regular designation. Thus, the 117th Wing element in Europe becomes the 7117th, to differentiate from the 117th Wing element remaining in Birmingham to administer their other squadrons in the States. The one exception is the 102d Wing from Massachusetts, which deployed to Europe intact and hence doesn't require the "provisional" prefix.

Dreux is a fine big installation which had been inactive for some time until the Guardsmen arrived. Some of its buildings are used as a school for dependents of Americans stationed in the Paris area, civilians as well as military. When the Birmingham wing and tac recon squadrons moved into Dreux, their commander, Lt. Col. James E. Hardwick, also assumed command of the base and became, in effect, the school principal as well.

Birmingham's RF-84Fs were later transferred to Chaumont, a couple hundred miles away. We visited next Chaumont and found the 7117th members there are rather envious of their colleagues at Dreux, possibly because of the many American school teachers there. To describe their sentiments, they have composed a little folk song entitled "Don't Send Me Back to Birmingham—Just Send Me Back to Dreux."

Chaumont also houses the 7108th Wing and 141st Tactical Fighter Squadron from McGuire AFB, N. J. The 141st, which shared the Air Force Association's outstanding unit trophy a couple of years back, is a topnotch outfit, normally part of Brig. Gen. Don Strait's command. With General Strait running his two remaining squadrons back home, Col. Joe Zink heads the 7108th. We found its combat-operations center in full swing and everything rolling along in fine style.

From Chaumont we moved on to Toul-Rosiere to meet with the Missouri Air Guard's 7131st Tac Fighter Wing, commanded by Col. Walter J. Wiehe, and the 110th Squadron of St. Louis. Their F-84s share the base with USAFE B-66s and F-101s. USAFE's 7544th Support Wing is also located there, which helps to make life a little easier for operating units on the base since the 7544th receives and allots all equipment for Seventeenth Air Force installations. The 7131st has been one of the tenant units, but Colonel Wiehe is slated to take command of the base on March 15.

Next day was one of the busiest in our itinerary, with three stops, all fairly close together. The first was at Etain, occupied by the 7121st Tac Fighter Wing of Ohio and the 166th Squadron from Lockbourne. Col. Albert B. Line, of Mansfield, Ohio, who had been Deputy Wing Commander back home, runs the show at Etain. Facilities were adequate, morale was high, and the biggest problem was weather, which of course was true at all bases in France and Germany.

We moved on to Chambley, occupied by Indiana Air Guardsmen under Col. Irwin Bucher, of Fort Wayne. The main element of his 7122d Wing is the 163d Tac Fighter Squadron of Fort Wayne, which shared AFA's outstanding unit trophy in 1960 and won it outright in 1961. Accordingly, we were pleased but not surprised to find that this unit enjoyed the highest operationally ready aircraft among Seventeenth Air Force units, and a zero AOCP rate. Colonel Bucher and Maj. Eugene Royer, 163d Commander, explained that they had stocked their flyaway kits with everything they thought they'd need, totaling some 8,000 items. Nothing succeeds like success; General Spicer's headquarters has now recommended the 7122d flyaway kit list as standard for all F-84F tac fighter wings.

From Chambley it is just a short hop to Phalsbourg and the 102d Tactical Fighter Wing, led by Brig. Gen. Charles Sweeney of Boston. General Sweeney's is the only Air Guard wing operating intact in Europe. It includes squadrons from Boston and Westfield, Mass., and Syracuse, N. Y., all of which fly the F-86H.

General Sweeney seems to have the best setup of all the Air Guard units. Not only is Phalsbourg probably the best-equipped dispersed operating base in France, but General Sweeney has his entire wing staff and support units to handle the wing's missions as well as to run the hospital, commissary, clothing sales store, base exchange, billeting office, etc. General Sweeney's smooth efficient operation at Phalsbourg demonstrated that Air Guard wing manning is adequate when a wing is deployed intact, but that the split-wing structure established for other Air Guard units in Europe requires varying degrees of improvisation.

From Phalsbourg we flew across France and Spain to Moron, not far from Gibraltar, to visit the 157th Tac Fighter Squadron, an F-104 outfit from McEntire ANG Base, S. C. Lt. Col. Bob Corbett, the Squadron Commander, showed us through his section of this big SAC reflex base. This squadron was the first of the F-104 units to enter on alert status after reaching Europe. It is no reflection on that achievement to note that the 157th did have two big advantages over the squadrons at Ramstein—first, the weather which, while wet at this time of year, is well above minimums as a rule; and second, a fine set of facilities especially designed for air defense.

Colonel Corbett's squadron won the hearts of the Spanish population almost immediately. Unusually heavy rainfall caused floods that forced many people to evacuate their homes in Seville. Squadron members wrote home to South Carolina for spare clothing and food. Columbia newspapers and television stations joined in, merchants contributed, and thousands of pounds of food and clothing were collected. SAC bombers and tankers, operating be-

(Continued on following page)

tween Hunter AFB, Savannah, Ga., and Moron, ferried the welcome cargo to Spain.

The 157th is part of the 65th Air Division with headquarters at Torrejon, near Madrid. From Moron we visited Col. Andrew Evans, who commands the 65th. He told us he was very pleased with the professionalism exhibited by personnel of the 157th.

We were forced to stay overnight at Torrejon, awaiting weather clearance back to Ramstein. To while away the time, Fred Hook and I visited some points of interest in Madrid and are able to report that recreational facilities there are entirely adequate, and considerably less expensive than in Paris.

At Ramstein we were briefed on the 4th Allied Tactical Air Force by Brig. Gen. Reg Clizbe, its Director of Operations. The 4th ATAF includes French, German, and Canadian air elements, plus USAFE's Seventeenth Air Force. Thus, Air Guard squadrons in Europe are also part of the 4th ATAF.

From Ramstein our itinerary called for us to visit units of the Air Guard's 152d Tactical Control Group at a number of points in Germany. Since they were more accessible by car than by plane, we turned in USAFE's C-47 at Ramstein and picked up Capt. Bill Gill of USAFE, an electronics officer who was to double as our guide and driver.

En route to the 152d headquarters at Mannheim, where we were to meet Col. Willard Magalhaes, 152d Commander, we stopped at Sembach, home of the 108th AC&W Flight from Syracuse, N. Y. The 108th, commanded by Lt. Col. Alexie N. Stout, shares the base with USAFE's 38th Tactical Missile Wing. Colonel Stout told us that when his unit arrived every man was greeted by a member of the 38th Wing who served as his host to show him around the base. When they reached their barracks they found that even their beds had been made up by their thoughtful hosts.

We drove on to Mannheim to Colonel Magalhaes' headquarters, also the location of the 106th Tac Control Squadron of Roslyn, N. Y., under Lt. Col. Mervin E. Sheu. The installation there is operated by the Army. Colonel Magalhaes briefed us on the deployment and mission of his group, whose units provide radar control and coverage for USAFE's tactical missile squadrons as well as manned aircraft. While we were there, personnel were still busy sorting out and reshipping the group's equipment which had been routed to Mannheim because of some uncertainty over exact operating sites when units left the States.

From Mannheim we visited the 123d AC&W Squadron from Blue Ash, Ohio, near Cincinnati, now based at Landshut, also an Army installation. Maj. Chester C. Hawley, who commands the 123d, said he had no unresolved problems and his men were on the job with most of his unit's equipment on hand.

In the National Guard Bureau, we had received inquiries from members of Congress about conditions the 123d found at Landshut. The wives of some 123d members had written that their husbands were experiencing certain hardships and had very little work to do. We asked Major Hawley about this matter.

He said he, too, had heard about the letters and had immediately called his men together. It was true, he said, that when the unit reached Landshut, the barracks they were to occupy had not recently been used and some improvements were necessary. But the Army commander was most cooperative in providing men and supplies to help the Guardsmen make their surroundings more comfortable.

A sergeant in the squadron explained it in these words: "In our first days in a strange country, it's only human to look for a little sympathy from home. Then too, we did leave our wives to face a few problems with the kids and family finances. It wouldn't sit too well with them if we told them we were having a ball. But the boys were surprised and a little embarrassed when their wives made a big thing out of their letters. We're really in pretty good shape."

The 101st AC&W Flight from Worcester, Mass., ran into another type of problem when they moved into Giebelstadt, operated by the German Air Force. The area they were to occupy had been a youth hostel. "We were shown through the area by the German commander," said Lt. Col. Ernest O. Lindblom, the 101st's Commander. "When we came to the latrine, I asked if he had been expecting a bunch of midgets. The plumbing fixtures seemed about one foot off the floor. It took us a few days to straighten that out."

Another unit sharing facilities with the German Air Force is the 112th AC&W Flight from State College, Pa., now based at Beuchel. These men, under Lt. Col. Kenneth L. Royer, are working under austere conditions but they are overcoming their difficulties with normal Air Guard ingenuity and had nothing but good words for the cooperation extended by their German hosts.

Probably the most attractive base we visited was Rothwestern, where the 103d AC&W Squadron of Orange, Conn., is based. Lt. Col. William J. Pollitt and his men are living in a college campus atmosphere at a former German aviation cadet training school now run by the Army. Needless to say, accommodations are excellent, and the Connecticut Guardsmen consider themselves fortunate to be stationed there.

A small detachment of the 103d led by Capt. Nick Sowpel is based at Mausdorf, undergoing on-the-job training with a detachment of the Air Force's 601st Tactical Control Squadron, preparing to take over its modern functions. This equipment is newer than anything in the Air Guard inventory and is a challenging assignment both in its operation and the purpose for which it is used.

The last stop on our itinerary was Celle, also a German Air Force base. When the 102d AC&W Squadron of Rhode Island arrived there, they found that the German commander and his staff had moved out of the headquarters building to make it available to Maj. Irvin G. Ray and his men until adequate housing could be arranged. This attitude has been typical of the German Air Force, which has gone out of its way to help make the Guardsmen comfortable within their limited resources. There was some delay in setting up operations at Celle until the British and German governments could work out an operating agreement with USAFE, but this was completed early in January, and the 102d is now in full swing.

We returned to USAFE headquarters at Wiesbaden to report to General Landon and General Alness on our findings, and to express appreciation for the wholehearted support we found at every installation. I told General Alness in return that I could assure him all Air Guard units were eager to get on with the mission, morale was high, and a general "can-do" attitude prevailed.

There are some problems, and undoubtedly the Guardsmen will be uncovering and solving new ones throughout their duty in Europe. But, as one man put it: "This deployment isn't too different from going to field training each summer. After you've been through a few summer camp tours, you learn to take what you find and make the best out of it. I figure this year's duty over here is equivalent to about twenty-six years of summer-camp experience. We're making out OK!"—End

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SPACE DIGEST

VOLUME 5, NUMBER 3 • *MARCH 1962*

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An eminent scientist comments on the fundamental schism between science as the search for truth, wherever it leads, and politics as the "art of the possible." Until society and education are dominated by the spirit of science—not, he emphasizes, "by science"—the schism will continue.

The Dilemma in Communications— Scientists and Nonscientists

By D. JEROME FISHER

MY FORTY-ODD years in science have convinced me that there is no conflict between science and religion, or science and culture, but there is a real conflict between scientists and many nonscientists. Or maybe instead of calling this a conflict, it could be better referred to as a schism—a nearly complete failure to understand one another in any fundamental way, the way men think and act.

The best definition of science to my mind is that it is the rational search for truth. Ah, yes, you say—but aren't we all searching for the truth? So I will further qualify it by saying we scientists do not expect to find the truth through revelation, except as serendipity may be of help to us. And if we have this aid, we do not stop here; we do not accept such revelation as being of any value to us, unless we and all other qualified scientists can confirm its validity through experiment or oft-repeated experience. If it fails this test, it is not truth—at least not the complete truth.

All scientists make guesses and write papers containing material that will later be shown to be erroneous; in short, are completely fallible and (I wish I could add) reasonably human. This is the way science grows—painfully, slowly, taking wrong paths but reaching what we regard as the truth, more or less readily confirmed by all subsequent technically competent experience.

One hope for society is that most scientists are smarter than I am. Now I don't mean this in a practical personal way, because in this sense no one can beat me—my life proves it. During my first year in the University of Chicago I took a course in geology under an inspiring teacher (who was a graduate student) and then knew what I wanted to be. As an undergraduate and (after the war) a post-graduate [there], and in all my later years, I have come to feel that at no other place could I have had such a near-ideal, happy, truly free, and in a minor way productive life. But to get back to the question of smart scientists rather than smart individuals. How at times I have bungled my scientific work! Some papers have required more than a year of my time in experimental and observational study. And yet, had I known the answers to begin with, I would presumably have known how to get them, and the work could have been accomplished in a month or two. In short, what I am trying to emphasize is that even

now at my age and with my experience I can make no beeline to learn what is the truth. It is like climbing a cinder cone; two steps up while slipping back one.

Now let us assume I am a representative average run-of-mine scientist of an almost past generation, and please remember I am not talking about geniuses or near-geniuses. If this be true, it is certainly the case that scientists are human. They have no supernatural powers. When they finally stumble on a truth, they have done it in a roundabout, time-consuming, more or less bumbling fashion, and generally at the expense of long hours of concentrated thinking and action. But what they attain, eventually and collectively, may be taken as the truth. No real scientist doubts that he has made mistakes or hesitates to admit them in the light of later experience. A scientist eats, drinks, and sleeps the truth; nothing else really matters. Most research scientists come to feel they are working in the path of God; that the Almighty fashioned a universe which would ever fascinate the keenest minds; and that He wanted mankind to sweat his way to the truth, thereby fulfilling his destiny.

But what about nonscientists? Well, let us except all scholars, scientists or not; let us say they are seekers after the truth, which ideally they certainly are. What about lawyers, politicians, statesmen—the folks who in the main represent us in a representative society? In the presence of most of these people the scientist—if he acts as a scientist rather than as some other kind of human being—is regarded as naïve, impractical, and probably a nuisance. Our government at all levels—and I mean at *all* levels—is run by people (with too few exceptions) that play the game: You scratch my back, and I'll scratch yours. This is often called the art of compromise. It is a world utterly foreign to that of the pure scientist. The politician commonly attains his ends by working deals. The scientist attains his ends by repeated trial and error until the truth is found; mistakes are freely recognized. The scientist cannot compromise; the politician cannot avoid it and he dare not admit his mistakes (unless they are utterly glaring).

If you doubt these statements, I urge you to peruse a bit of the Senate proceedings in the *Congressional Record*. Here you will find considerable pap of a sort which would never get by the editor of a scientific journal. And in fact in any ordinary rational body, a speaker trying to inject some of this material would be laughed out of court. Let us hope that a people that condones such practice is in an intellectual sense at a low ebb of its existence. . . . And now, if the spirit still moves you, try reading the papers and discussions given at some scientific assembly. Since in both cases we are concerned with what individuals say, the intellectual level will of course vary considerably, but I assure you there will be no difficulty in assessing the relative qualities. Often you will feel that the politician is using words to mask his real "thinking." In contrast the scientist tries to employ words so that his meaning cannot be mistaken. No scientist can understand a typical politician unless he gets out of his scientific frame of reference.

All this may sound as though I am picking on our congressmen, or our state legislators, or our local aldermen. I wish to specifically disavow such an interpretation. If I am picking on anyone, it is you, and *you*, and YOU. A successful legislator is not going to try to lead people to do or to expect things that he knows they cannot be led to do or expect. As long as too many people want little selfish things from our congressmen, these they will get. Only when a significant number demands national integrity in our Congress will this be achieved. But instead of suggesting that anyone or any group be blamed for this state of affairs, let us ask why does it or how can it exist? Apparently our congressmen must act the way they do in order to get reelected; without this, their lives become purposeless. Until the voters have sufficient education and integrity to realize this (assuming we remain a democracy) there is small probability that any but the occasional congressman can think and talk in the spirit of a true scientist.

In short there is no chance of any important change for the better over any short period of time in this schism of the way men think. Outside of war there is no greater source of danger to our freedom than this antiquated philosophy of the practical or politically possible. It tends to drive us toward the lowest common denominator. The best hope for the future to my mind is that education may be increasingly dominated by the spirit of science—notice I did not say "by science."—END

Now retired after 49 years at the Univ. of Chicago where he was professor of mineralogy, Dr. Fisher now heads the International Mineralogical Assn. The above is condensed from a longer address to students at the University, is reprinted here with permission of the author and of the University of Chicago Magazine, *where it appeared originally in the January 1962 issue.*

In the absence of any foreseeable breakthrough in diplomacy, it would appear that the best condition that we can hope for is a continuing crisis. In the competition of ideas which will accompany the crisis, the victory may be won by the successful evolution, here, of a society combining . . .

SCIENCE AND FREEDOM

By GLENN T. SEABORG

THE enormous impact of the past two decades on the scientific community reflects significant integration of science into society. I do not detect any qualitative change in the spirit of scientific inquiry, fortunately. But it would appear that there is an important alteration in the attitude of scientists about the relationship of their work to the larger social environment. Many of us can recall a fairly general feeling of pride among scientists in the isolation of their work from the practical affairs of men. Indeed, it was not difficult to find resentment at any implication that a piece of research should have more than the remotest connection with application. Now, with the reduction of the time gap between basic and applied research, and with the growing general appreciation of the value of knowledge, scientists seem more willing to relate themselves and their work to social objectives.

The material conditions have been modified, too. More and more, scientists find that they are supported adequately, if not opulently, and for sustained programs. Funds are available for "elegant" equipment that saves time and gives greater power to investigators. Money can be obtained for assistants to do detailed work, giving researchers more time for creative effort. The improvements are not uniform, of course. Space to work is still in short supply, especially in our graduate schools; yet, new governmental policies promise some alleviation. And the personal rewards are still relatively less for those who train our scien-

tists and generate much of our knowledge, than for many others in our society who play much less significant roles.

The consolidation of science into society is striking in the field of governmental policy and international relations. The government has become increasingly dependent upon scientists for advice. This is true not only in the sphere of the administration of government science, but in a much more comprehensive way. Any evaluation of the future of the economy must embrace scientific and technological knowledge. Decisions in military matters are intimately involved with science and technology. And any commitment of portions of our national resources for science and technology themselves must be decided with the help of men of wide knowledge in these fields.

The entry of scientists into important national advisory capacities is an inevitable concomitant of the events of the last twenty years. I believe it is a healthy and essential development, and I have advocated it for many years. It does not seem to me that the influence of scientists in this respect is greater than it should be; indeed, in the national interest, I believe it must increase.

The question of the place of science in government touches upon some of the critical questions about the future evolution of a scientific society in a democratic context. Our aim must be to use science to strengthen democracy, not weaken it; to expand the potential fulfillment of the individual, not decrease it. We must avoid any erosion of the broad base of informed participation by the electorate. In the past two decades, our democracy has ingested science, but has not yet digested it—a measure of the infancy of our scientific society. This is not surprising, since our previous experience had not prepared us for anything like the explosion of those twenty years. We must expect the next twenty years to be even more dynamic. Therefore, it is urgent that we accelerate the process of assimilation.

A central problem in assimilation, it seems to me, is the extent to which men, including the otherwise well educated, fail to identify freedom of scientific inquiry with our political and other freedoms. In the somewhat less complicated world of the eighteenth century, a great thinker like Thomas Jefferson could be all at once a political theorist and practitioner, a philosopher and a scientist. His mind could embrace and integrate a very large part of human knowledge. He had,

therefore, a clear appreciation of the broadly humanistic values which are the common heritage of all men who pursue the truth.

But, as knowledge grew and fragmented, the specialties went their separate ways. Science has seemed to walk more apart than other fields, perhaps because the details of scientific truth touch infrequently a community of intellectual experience. Science became a stranger even to many intellectuals.

This estrangement has resulted in the paradox with which we are familiar: as science became more important to society, it apparently became less important in the curricula of liberal education. This fact was noticed in the last century by Thomas Huxley, who pleaded with contemporaries holding a narrow view of humanism to include a more generous helping of science in liberal education. A cultured, or liberally educated person, Huxley maintained, is one capable of making a criticism of life—of evaluating the environment and making enlightened judgments.

Thirty years ago George Sarton wrote in the same vein in his volume, *The History of Science and the New Humanism*. He stated the issue, which remains central for our nascent democratic-scientific society, as follows: "The main issue does not simply concern humanism but the whole of education from the cradle to the grave. And the real question is: Will education include science, or will it exclude it? The intellectual élite is at present divided into two hostile groups—which we might call for short the literary and scientific—who do not speak the same language nor think in the same way. If nothing is done, the gap separating them must necessarily increase, together with the steady and irresistible progress of science. Shall we deliberately widen the gap as the old humanists would have it, or shall we take special pains to reduce it as much as we can?"

In our own time, C. P. Snow has eloquently drawn attention to the same problem, in his discourses on the "two cultures."

The remedies have been widely discussed: a larger content of science in the lower schools and in the universities and colleges; a wide range of efforts to give the public some appreciation of science; a greater effort by scientists to explain their work in popular terms.

All of these measures are needed. It is necessary to bring about a larger understanding of scientific principles. But in striving toward this goal, it may be even more important to promote a greater consciousness of the common heritage of all who pursue the truth. The philosopher, the social scientist, the artist, the writer, the natural scientist—all are intellectual brothers under the skin. Whether their technique involves the distillation of human experience or the ordering of measurable phenomena into statements of principles, their motivations, the quality of their experiences, and their satisfactions are rooted in a broadly defined humanism.

I am sure intellectuals generally know this to be true. Yet it would appear that it is often far back in the consciousness. I wonder if this fact is not responsible for much of the inability of Snow's two cultures to communicate? I wonder if there is not a common language, deriving from a community of basic ideals and purposes, whatever the details of different bodies of knowledge, that is the foundation for communication? I wonder if the barriers are not superficial, even as language is a superficial obstacle between men who share common bonds?

The achievement of a conscious, working realization of the common heritage of truth-seekers—among scientists as well as other intellectuals—can be significant in the successful evolution of our new kind of society. It should make it clearer that the free and uninhibited pursuit of truth in science is a natural part of the right of free inquiry that is inherent in democracy. It should do much to abolish fruitless discussions over whether we should continue doing science and whether scientists should not withhold scientific truths that may be used destructively. It should give wider acceptance of the inevitable growth of knowledge and of its continual change. It should force us to a greater awareness of the need to prepare for and to cope with the hazards that are a paradoxical by-product of the expansion of knowledge.

It has seemed natural to lay some emphasis on science in this discussion of the society that has developed in the last twenty years. I do not wish to give the impression, however, that I believe this new kind of society is the property of science. We cannot, of course, proceed intelligently without integrating into our thinking and our acting the full range of human wisdom. If you have noticed carefully, I have asked primarily for men generally, and intellectuals in particular, to return science to the fold of humanism. It is unthinkable that a democratic-scientific society could evolve constructively without a wide endowment among its people of art, music, history, literature, and social dynamics.

We can hardly discuss the future of the scien-

tific society without relating it to the world struggle and the terrible dilemma confronting man as the result of the development of nuclear weapons.

I am reminded of the reaction of many scientists, including some of us who worked on nuclear weapons, to this dilemma—when it became a reality in 1945. Scientists sometimes have been called too optimistic and naïve by social scientists. As a group, they are not lacking in idealism. Perhaps it was natural that many of us, recognizing from close at hand the significance of nuclear weapons, set out to advise the world that nuclear war was out of the question. To us, the data were unequivocal, the conclusions indisputable, and the course of action clear. We felt the world would quickly see this—and, seeing it, do something about it.

The half-life of disillusionment varied from individual to individual. Few have changed their minds about nuclear war. But, many have become more sophisticated, if less idealistic. Much of what has been described as naïveté has rubbed off. But we should remember that idealism, happily, has not been limited to scientists. In the period following World War I, experienced statesmen, imperceptibly influenced by scientists, solemnly signed unrealistic treaties outlawing war. Perhaps sophisticated statesmen, aided by sophisticated scientists in an age of science, may be able to combine realism and idealism.

In the absence of any foreseeable breakthrough in diplomacy, it would appear that the best condition of the world we can hope for is a continuing crisis. In the competition of ideas which will accompany the crisis, the victory may be won by the successful evolution, here, of a society combining science and freedom.

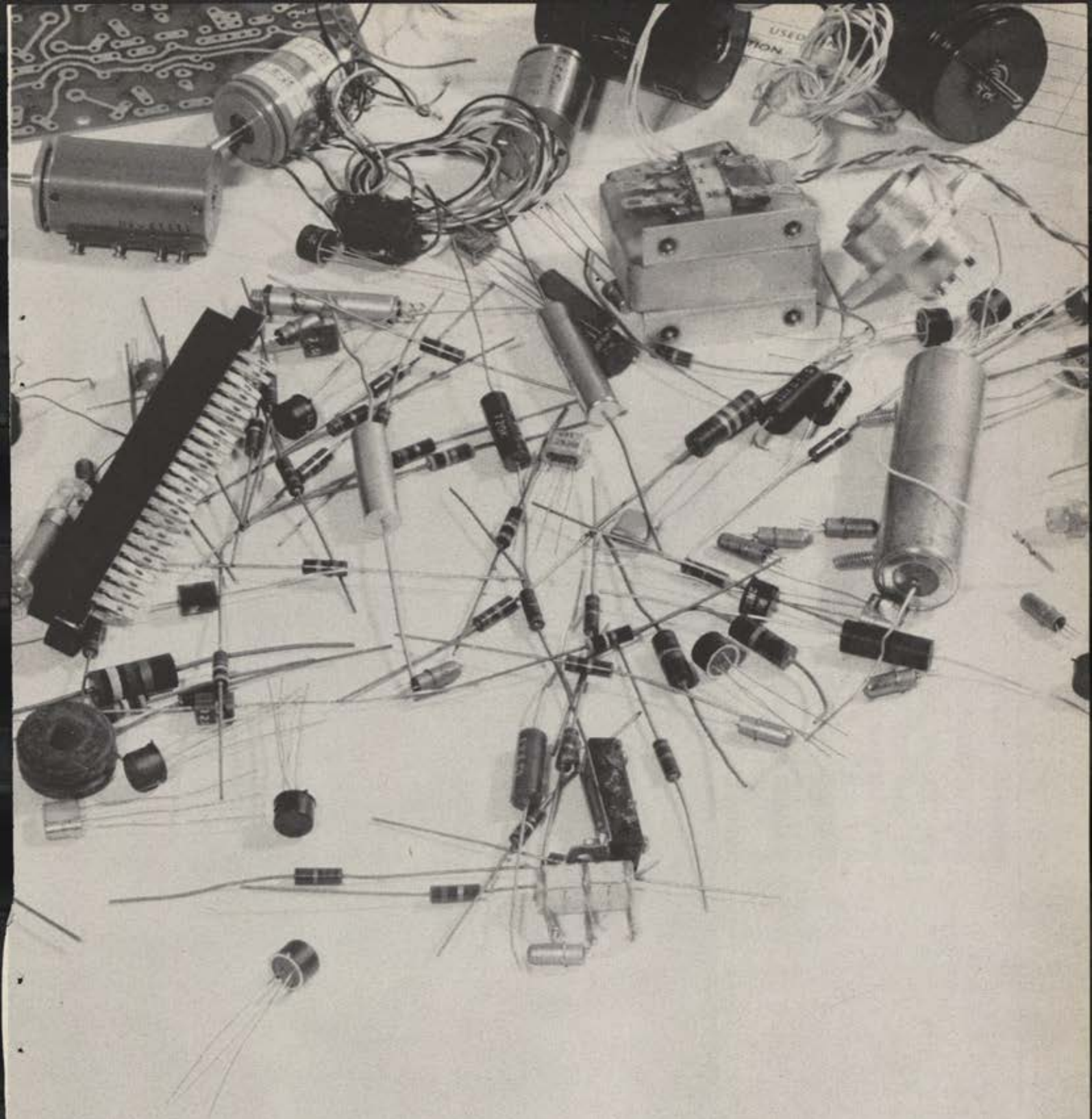
Scientists and engineers can continue, as they have in the past, to make a major contribution in this contest, not only by achievements in the laboratory but also by their participation in exchange programs and international meetings, and other contacts with Iron Curtain nations through the medium of basic research when and if the occasions arise. All of these activities are essential to help keep the channels of communication and understanding open.

I believe each of us, scientist and nonscientist alike, must be aware of the importance of his own effort to the preservation of a libertarian society in the continuing crisis. Each of us needs a sense of responsibility and urgency—for the total of our efforts will be decisive, however remote from combat our work may seem. We must not do too little. We cannot delay. We must have both determination and good intentions—*we must act*. As I have advocated in the past, we must expand and raise the level of education all along the line. We must, especially, search out and cultivate the gifted and creative—for it is these that usually make the great breakthroughs in knowledge and understanding. We must mine every vein of our human resources and exploit our talents in the fullest measure.

The democratic-scientific society has taken root in the past two decades, combining the values of freedom and individual worth with the promise of growing material well-being. Can we preserve it—not only for ourselves, but as a choice for other peoples?

I believe we can and will, partly because of the moral strength of freedom and partly because of the material power of our new society. We cannot be blind to the fact that freedom needs strength and determination as well as a good heart. Generosity has its place in relations between men, but it is, unfortunately, a quality not uniformly respected by all nations in relations between themselves. This is why, for example, we must be prepared to negotiate from a position of unquestioned strength as well as undoubted good faith; and negotiate we must. To turn our back on this most hopeful and sensible solution of the differences between East and West would be as foolish as it could perhaps be fatal. But we must recognize that until all nations can proceed from the same definition of right and truth, international agreements which involve our vital interests must incorporate provision for adequate controls against violations as well as provision recognizing the other's rights. We must be firm when our own security is at stake, as well as fair when another's is. I cannot help but recall, in this vein, that eloquent passage from President Kennedy's Inaugural Address: ". . . civility is not a sign of weakness, and sincerity is always subject to proof. Let us never negotiate out of fear. But let us never fear to negotiate."—END

Dr. Glenn T. Seaborg is the Chairman of the Atomic Energy Commission. A 1957 Nobel Prize winner in chemistry, he is on leave from his post as professor of chemistry at the University of California. He was Chancellor of the University prior to his appointment to the AEC. The above is condensed from his address to the December 1961 annual meeting of the American Association for the Advancement of Science at Denver.



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ITSELF!

By A. E. VAN VOGT

Itself, king of the Phillipine Deep—that awesome canyon where the sea goes down six miles—woke from his recharge period, and looked around suspiciously.

His Alter Ego said, "Well, how is it with Itself today?"

The Alter Ego was a booster, a goader, a stimulant to action, and, in his limited way, a companion.

Itself did not answer. During the sleep period, he had drifted over a ravine, the walls of which dropped steeply another thousand feet. Suspiciously, Itself glared along the canyon rim.

...Not a visual observation. No light ever penetrated from above into the eternal night here at the deepest bottom of the ocean. Itself perceived the black world, which surrounded him, with high frequency sounds which he broadcast continuously in all directions. Like a bat in a pitch dark cave, he analyzed the structure of the things in his watery universe by interpreting the returning echoes. And the accompanying emotion of suspicion was a device which impelled Itself to record changing pressures, tem-

peratures and current flows. Unknown to him, what he observed became part of the immense total of data by which computers far away estimated the inter-relationship of ocean and atmosphere, and thus predicted water and air conditions everywhere with uncanny exactness.

His was almost perfect perception. Clearly and unmistakably Itself made out the intruder in the far distance of that twisting ravine. A ship! Anchored to rock at the very edge of the canyon.

The Alter Ego goaded, "You're not going to let somebody invade your territory, are you?"

Instantly, Itself was furious. He activated the jet mechanism in the underslung belly of his almost solid metal body. In a flash, a nuclear reactor heated the plates of the expansion chamber. The sea water which flowed through the chamber burst into hissing clouds of steam, and he jetted forward like a missile.

Arrived at the ship, Itself attacked the nearest of four anchor lines with the nuclear-powered heat beam in his head. When he had severed it, he turned to the second cable, and burned through it. Then he headed for the third cable.

But the startled beings aboard the alien ship had spotted the twenty-foot monster in the black waters below.

"Analyze its echo pattern!" came the command. That was done, with total skill.

"Feed the pattern back through the infinite altering system till the recorders register a response."

The significant response was: Itself forgot what he was doing. He was drifting blankly away, when his Alter Ego goaded, "Wake up! You're not going to let them get away with that, are you?"

The defeat had galvanized Itself to a more intense level of rage. He became multiples more sensitive. Now, he simply tuned out the alien echo copies.

The new greater anger triggered a second weapon.

Itself's echo system of perception, normally monitored to be safe for all living things in the sea... suddenly strengthened. It became a supersonic beam. Purposefully, Itself started towards the ship.

Watching his approach, the enemy decided to take no chances. "Pull the remaining anchors in!"

Itself headed straight for the nearest part of the vessel. Instantly, those ultrasonic waves started a rhythmic vibration in the hard wall, weakening it.

The metal groaned under a weight of water that at these depths was thousands of tons a square inch. The outer wall buckled with a metallic screaming.

The inner wall trembled, but held.

At that point, the appalled defenders got a counter-vibration started, nullified the rhythm of Itself's projections, and were safe.

But it was a sorely wounded ship that now drifted helplessly in a slow current. The aliens had so far used no energy that might be detected from the surface. But they had come to earth to establish a base for invasion. Their instructions were to accumulate enough data about underwater currents, to enable them to leave the Deep, and eventually to be able to drift near land, launch atom bombs, and drift away again. For this purpose they were mightily armed, and they refused to die in these black waters without a fight.

"What can we do with that demon?"

"Blast it!" someone urged.

"That's dangerous!" the commander hesitated.

"We can't be in greater danger than we already are."

"True," said the captain, "but frankly I don't know why he's armed at all, and I can't believe he has anything more." His command when it came held a restriction: "Set up a response system. If he does attack with anything new, it will automatically fire back. We'll take that much of a chance."

The second setback had driven Itself completely berserk. He aimed his nuclear pellet gun, and fired twice. The next split second a blast from the invader pierced his brain.

The Alter Ego yelled, "You're not going to let them get away with that, are you?"

But the king of the Phillipine Deep was dead, and could not be goaded.

In due course there came a report to weather headquarters:

"Computer Center shows no recent data from Itself. It therefore seems as if another of the war-time antisubmarine water-weather robots has worn out. You may recall that these electronic monsters were programmed to suspicion, anger, and the idea that they owned part of the ocean. After the war we could never get these creatures to surface; they were too suspicious of us."

The ocean of water, like the ocean of air far above, flowed and rolled and moved, a ceaseless, dynamic, driving motion, many, many times more powerful, however, than any comparable air current. Yet, in essence, the quadrillions of water movements solely and only balanced each other out.

Through the Phillipine Deep there began presently to flow an enormous balancing river. It carried the invader vessel in a long, slanting, upward direction. But it was many weeks before the drifting ship actually broke surface, and another day or so before it was seen.

A naval patrol boarded it, found aliens dead more than a month from concussion, and—after examining the damage—correctly analyzed what had happened. And so—

A new king "woke" to the first "day" of his reign, and heard *his* Alter Ego say, "Well, Itself, what's the program?"

Itself glared with a royal suspicion.

Would you like your own pocket model of "Itself"? See column at right.

The Douglas Skybolt gives an aggressor reason to pause. It is being developed as a missile with nuclear capability that can be launched from a mobile hiding place in the sky a thousand miles from its target.

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Speaking of SPACE

WILLIAM LEAVITT
Associate Editor, AIR FORCE/SPACE DIGEST

Cocoa Beach Blues

"Hope and prayers of the free world are with Colonel Glenn."

So read the sign on the marquee of the Holiday Inn Motel on North Atlantic Avenue, Cocoa Beach, Fla., when we arrived January 21 to cover the first American manned orbital flight. It was still there when we left ten days and several unscheduled laundry cycles later with the rest of the disappointed press corps who had descended on the Cape Canaveral area by the hundreds to view and report Der Tag.

By the time this is printed, the game Colonel may have made his long-heralded flight, and we wish him well. For he will have achieved the Mercury mission with dignity and daring against a background of technical and public relations difficulties that have dogged the National Aeronautics and Space Administration's first major venture into manned spaceflight.

The technical difficulties—trouble with the Atlas booster vehicle, trouble with the life-support system—all the things reported on and speculated about during the January vigil, should be credible enough to even the most nontechnical follower of the space age. Everyone agrees that as close to predictably perfect reliability as humanly possible is vital to a "go" signal for any manned spaceflight. That is the least we can do for men who risk their lives for salaries that compare less than favorably with the stipends of deodorant commercial writers.

But the public relations difficulties are of a different and less justifiable order, and it is in this area that Colonel Glenn and his colleagues—and the American people—have a right to ask more and better.

By law NASA, as the statutory agency for peaceful, scientific space research, development, and exploration, is required to provide maximum public information about its programs.

This requirement was cited, in fact, by Lt. Col. John A. Powers, USAF, who has served for the past two and a half years with NASA as the spokesman for the Mercury Astronauts, at the January 26 prelaunch briefing he conducted for the press in the auditorium of Cocoa Beach's Starlite Motel where NASA had its news headquarters for the mission.

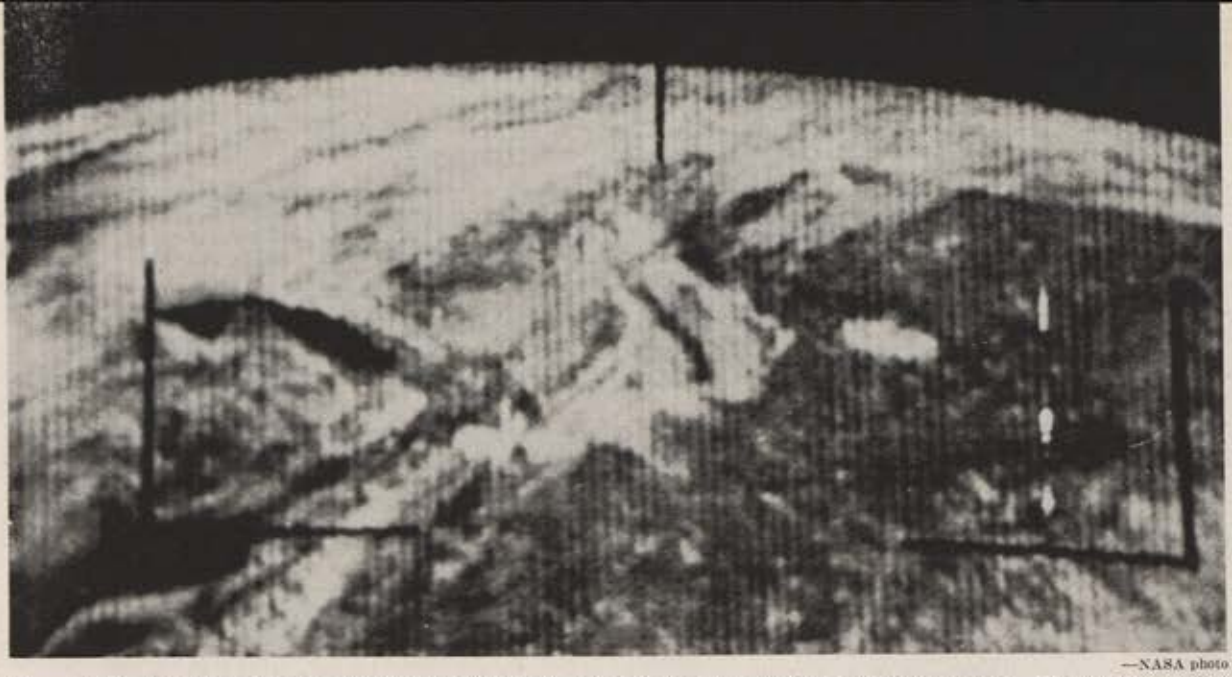
But between the concept and the creation, as

—NASA photo

Suited up, Mercury Astronaut, Lt. Col. John Glenn, prepares for simulation of his orbital mission. January saw a lengthy, fruitless vigil, then a postponement due to technical difficulties.

the poet T. S. Eliot once remarked, there falls a shadow. And between Project Mercury and the waiting American people that week at Cape Canaveral, there fell a shadow which obscured the free flow of information on what was happening re the flight of Colonel Glenn.

The prelaunch briefing lingers in the memory. Having been sent to cover the event and having been promised full information consonant with the safety of the mission and the efficiency and privacy of the principals, newsmen were instead lectured on their own responsibilities, admonished not to sleep in the sun during important activities, warned archly against rumor-mongering, and given a number of either inaccurate or improvised answers to perfectly legitimate questions. They were advised also (and we for one found it rather hard



—NASA photo

One of the first photographs relayed by National Aeronautics and Space Administration's Tiros IV weather satellite, successfully launched into near-circular orbit February 8 from Cape Canaveral. Photo was taken by Tiros as the satellite passed over northern portion of the US. Visible are Lake Michigan, partially free of ice, at bottom left, and an ice-free section of Lake Superior. The exact geographical outlines are difficult to discern because of lake ice and cloud cover, such as that visible near and along horizon. Camera angle to the west.

to believe) that Colonel Glenn had said something about doing his job and hoping the newsmen were doing theirs. The atmosphere at the briefing pervaded the entire ten days.

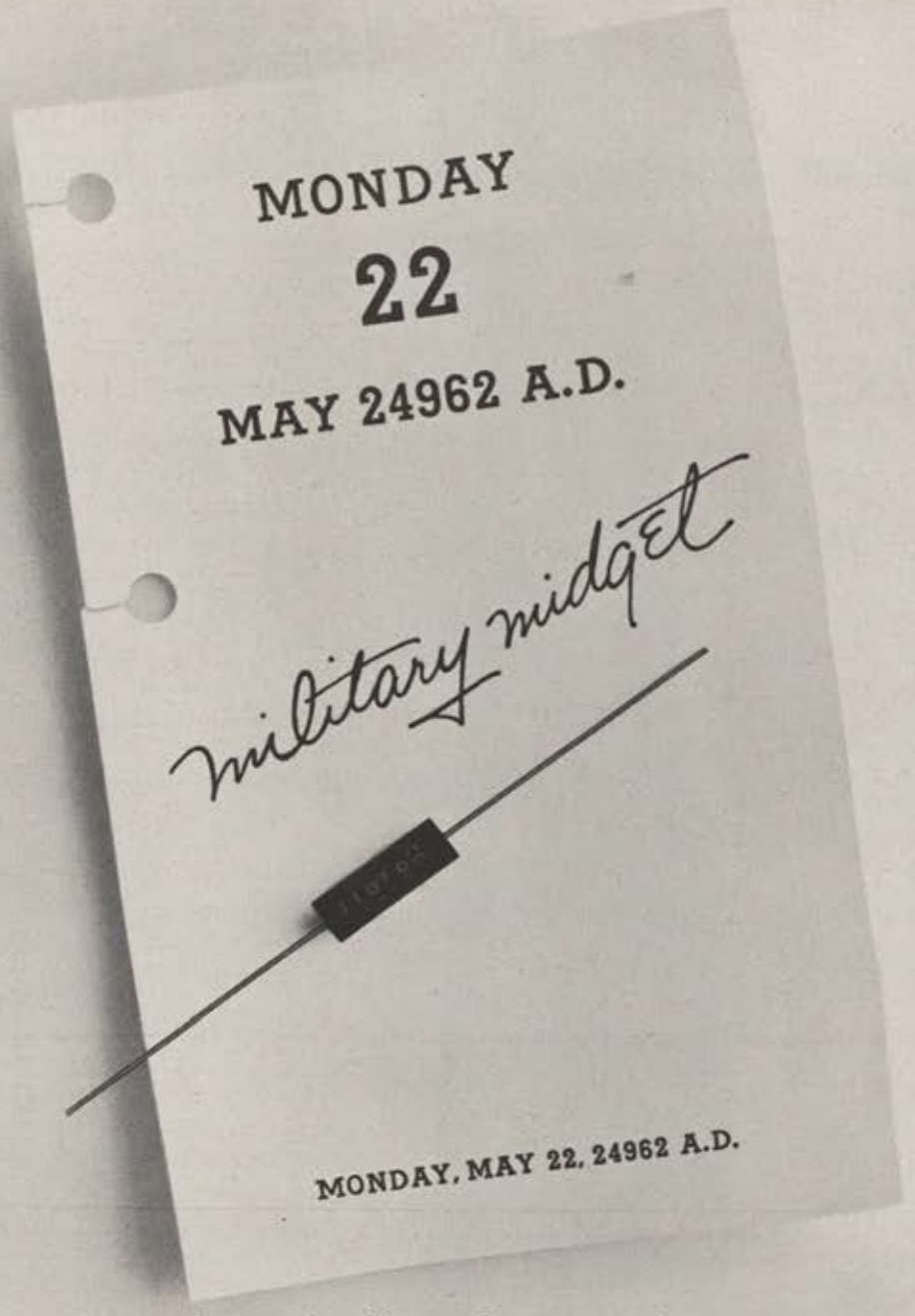
On technical matters, a couple of questions that came up at the briefing will serve to illustrate the point.

There was, for example, the matter of body wastes. At the briefing, this admittedly delicate but still universally interesting question was posed. The answer was: "We have no plans for bodily wastes," which when you think about it, is a really funny phrase. Now it is true that the well informed newsman who had carefully read his press kit in advance would know that so far as solid body wastes were concerned, the effort was to avoid their production at all by keeping the Astronaut on what is called a low-residue diet. The Mercury capsule is small, the time of the mission endurable without intestinal activity, and the logistics difficult, hence the low-residue diet.

But liquid waste is an entirely different matter. The logistics, as any senatorial filibusterer might confide in private, are not insuperable. The main point, though, is that aeromedical people have to date no real long-term information on the urinary process in weightlessness. And so far as could be deduced from perfectly candid discussions with them *outside* the press briefings, the Astronaut was being encouraged to maintain a normal fluid balance, and urinary data obtained from the flight would be welcome.

Another item—which many of the newsmen on hand at that memorable briefing will recall as the "battle of the base-line data." The newsmen were told that they would be receiving at periodical intervals during the planned orbits a roundup of Colonel Glenn's heart, pulse, respiration rate, etc. This elicited a question as to whether base-line (prelaunch physiological) data would be supplied also. The answer was a firm and repeated no. To many newsmen, having in-flight data but no base-line data made little sense. Further inquiry with medical personnel underscored the point and brought out quite firmly that *no* data—base-line or in-flight—was going to be available on the perfectly acceptable grounds that they might be misinterpreted if quick comparisons were made by doctors or laymen remote from the program. This answer, given by Mercury medical personnel, again in perfect candor and accepted with equanimity, was the one that should have been given at the press briefing or gotten quickly to settle the matter.

There were notable gleams of clarity in a fog of half-information. They were provided, for example, by the Jet Propulsion Laboratory technical people who briefed the press on the ill-fated Ranger shot at the moon. Without talking down to newsmen and with an obvious desire to make things understandable for those who had not yet memorized their press kits (which were, incidentally, very nicely informative), the technical people associated with Ranger did their best to answer even a few naïve questions, including a query on when the Ranger's wings, which of course are not wings, would start flying. It was a pity that NASA's public information policy precluded having Mer-



If this new type deposited carbon resistor were placed in service today, would it perform until 24962 A.D.?

Frankly, we do not expect a single resistor to last that long. However, this 23,000-year life span is expressed in another way—not more than one failure in 23,000 resistor years, or a rate of .0005%/one thousand hours in certain missile system resistors for which the Bell System is responsible.

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For missile systems employing millions of these resistors to be practical, the above failure rate must be attained. The Bell System—through its manufacturing and supply unit, Western Electric—found that manual methods of manufacturing were inadequate.

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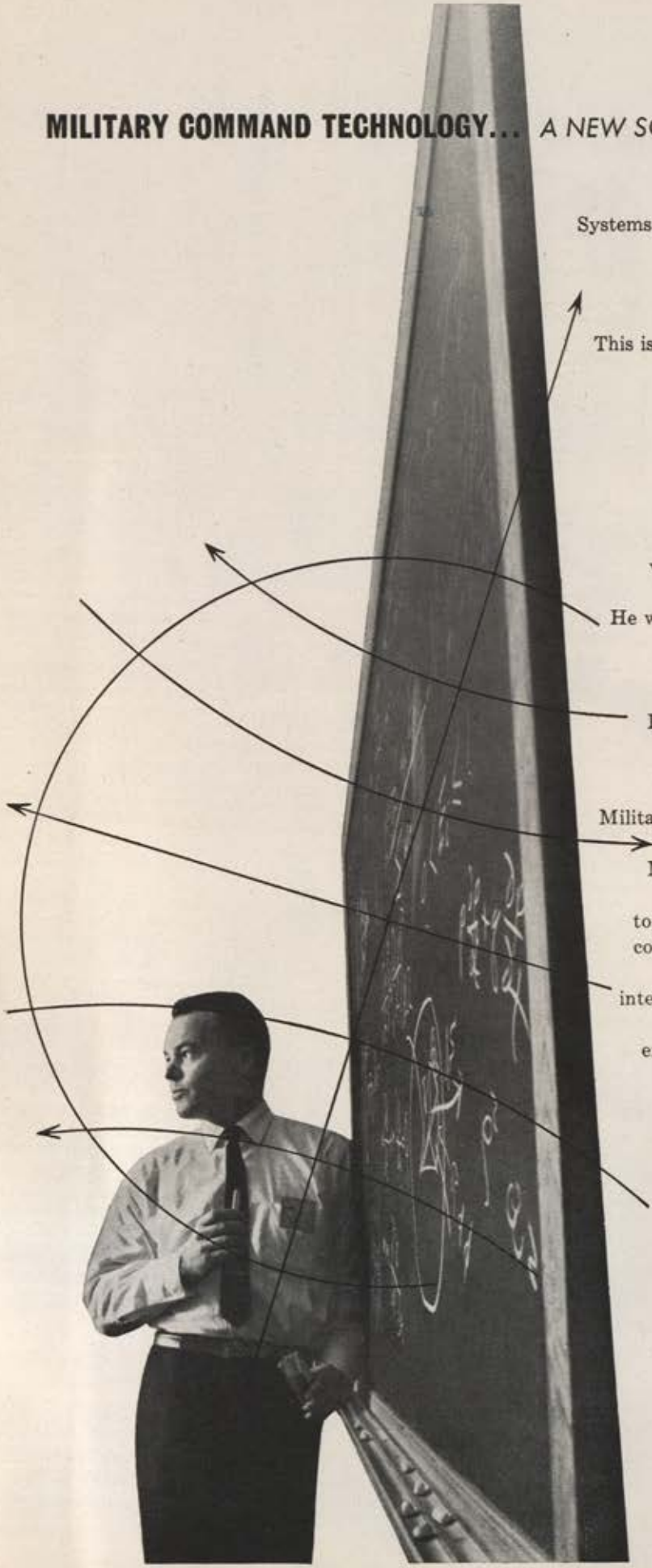

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cury technical people on hand to give authoritative answers to reporters' questions.

The big space week proceeded; there were welcome missile successes—an Army Pershing, an Air Force Minuteman, and the spectacular last-of-the-Titan-I-series firing reportedly seen as far off as the Carolinas. There was a spectacular murder at the Starlite Motel, a manhunt, and a surrender. There was the really beautiful but unsuccessful predawn Composite I Thor-Able-Star "quintuplet" satellite firing, whose instrument package fell back into the sea. There was the daytime and seemingly perfect firing of the Ranger, the news that it was off course, the tantalizing hope that it would take moon pictures, and the final, funereal, and incredibly jargonish announcement that the pictures would be meaningless. And there was the marvelous dowager, complete with sturdy cane, who denounced "that horrible man" who had made the television documentary about Cocoa Beach, painting the once-sleepy hamlet as a rocket-and-roll Gehenna—and who then stormed off with her friend to watch a missile firing scheduled for that evening.

There was that incredible morning of January 27, when the countdown for Colonel Glenn reached T-minus-twenty before the shot was called off because of "weather." There was the rescheduling to February 1 or 2, and then the sudden January 30 announcement that all bets were off until at least February 13 because of "technical difficulties," the reasons for which were cloaked in "security." During that moment of transfiguration the NASA Atlas-Mercury vehicle became again an Air Force missile that didn't seem to be working too well.

Why all these public relations problems with Project Mercury, as touched on above? Does the answer lie in the old shibboleth, commented on in earlier columns, that there is too much discussion and coverage prior to the event? That answer is too pat. Indeed if it were accepted and the press *were* barred, then the rationale for the existence of NASA itself would begin to dissipate. For under secrecy ground rules, it might be arguable that the whole business ought to be turned back to the military—which is *not* the suggestion being made here.

The answer is more complicated. Project Mercury seems to be suffering from what for lack of a better term observers are calling "imageitis." From the start of the program, for example, the seven Astronauts have been portrayed as dully perfect, cheerful specimens of American manhood, peas in a pod, interchangeable, an impression that is patently untrue. As the program has proceeded through the suborbital stages and to the orbital flights which were bound to attract a flood of news coverage, this fantasy ought to have been dissipated. But NASA's information policy has tried to keep it alive until, as happened during the Glenn vigil in January, the facts of a running news story of high interest to the American people were made subordinate to the preplanned "image." This phenomenon was reflected throughout the NASA information operation at the Cape, and it was a sad thing to watch, particularly because just a few minor adjustments in the philosophy of public relations would have sufficed to fulfill NASA's legal obligation to keep the country informed as to what was really going on.

For example, there seems no reason why representatives of the technical people working directly on the Mercury program could not have been produced to answer questions at the important prelaunch briefing. A panel of such technical representatives would have been infinitely more helpful than a spokesman's recitation of "the sense" of what Colonel Glenn had said that morning. It's interesting to note that several days after the postponement, Colonel Glenn, visiting the White House, complained to the President that too much emphasis was being given to the personal reactions of himself and his family. The President sympathized and pointed out that, although it might be a little annoying, reports on personal reactions tended to humanize the story. But actually, most of the picture of Colonel Glenn that has emerged has been through a filter anyway. How refreshing it would have been to have heard him say "damn!" after his final vigil. He would certainly have had the right.

There is no question that telling the Mercury story to the country and the world is a tough job, for the people who have the public relations assignment. The toughness of the job requires the very coolness, willingness to answer questions even repeatedly, production of the technical people to answer questions when appropriate, and the plain patience that has to characterize an efficient and candid press relations operation. Certainly the press, including those nonspecialized people who perhaps need more attention than the regulars on the space/missile beat, ought not to be looked on with condescension. For it is the press's responsibility to relay the best and most accurate Mercury information to the country.

As one reporter put it, Project Mercury is carrying the flag. It deserves the best. If it is damaged in the eyes of the people and the taxpayers, the

damage will carry over into the follow-on Apollo moon programs. The way to avoid that damage in an open society is to concentrate—not on fleshing out a preplanned "image"—but on doing the very best job possible of telling what's happening. There is some current talk in Washington that since the January experience NASA has been re-examining its public relations and information program. It seems like a good idea.

Space Capsules

Physicians and others interested in biomedical data emerging from the 1961 suborbital flights by Mercury Astronauts Shepard and Grissom may obtain the report "Results of the Second US Manned Suborbital Spaceflight," by writing to the Superintendent of Documents, Government Printing Office, Washington, 25, D. C. Price is 45 cents. . . . The summer 1961 issue of the *Air University Quarterly Review* has an interesting piece entitled "Cartographic Support of Aerospace Operations" by COL. ROBERT E. HERNDON, JR., USAF, that describes USAF map-making contributions to the Project Mercury operation and the recently completed USAF Lunar Atlas. Write to Air University Book Department, Maxwell AFB, Ala., for information on availability.

Dayton, Ohio, will be the May 1-3 site for a symposium and workshop on "Biologistics of Space Systems"—the problems of sustaining man in space missions of long duration. Sponsor is the Aerospace Medical Research Laboratories, Air Force Systems Command. Write to Office of Information, Aeronautical Systems Division, Air Force Systems Command, Wright-Patterson AFB, Ohio for information. . . . Astrochimp Enos suffered from hypertension during his orbital flight last November 29, according to analyses released by the University of Southern California. DR. JOHN P. MEEHAN of USC, who designed and built the recording device that took physiological data, reported: "Enos developed hypertension at the start of his journey, and it persisted until his recovery. . . . In spite of this he continued to perform tasks for which he had been trained throughout the flight, even during the exit and peak reentry accelerations."

The chimp's "good work" at pushing levers in response to the flashing lights that cued him may have ironically contributed to the hypertension, suggested the doctor, who went on to say, "Enos was trained to give certain responses. For correct responses he was automatically rewarded with food and water. For incorrect responses he got an electric shock. However, due to a malfunction of the psychometer equipment, Enos got shocks for both the wrong answers and the right ones. Nevertheless, he performed beautifully and remained in generally good . . . condition even during the most stressful period of the flight."

Dr. Meehan suggested that the failure of the stabilizing jets—which Enos was unprepared for and couldn't correct or compensate for—may have also contributed to the hypertension. "One can assume," added Dr. Meehan, "that Enos did not 'volunteer' for his circumnavigational tour of duty. He didn't even like the training. He was by far the most pugnacious of the animal group and at one time wrecked the inside of the couch to prove it." Enos, like most of the other simians used in space tests, was a graduate of the Air Force's Aeromedical Field Laboratory at Holloman AFB, N. M.

A team of Boeing scientists has concluded after a four and a half year study that the odds against a spacecrew getting a fatal dose of proton radiation from solar flares on a one-week mission are 120 to one. The 120-to-one odds, DR. E. L. CHUPP, team chief, says, would go up even higher if the spaceship were designed so that its fuel and equipment were used as radiation shields. An aluminum or polyethylene plastic shielding would further enhance protection, raising fatalities odds to 1,000 to one. Factors considered in arriving at the conclusions included: the number of solar flare events between February 1956 and September 1960, the radiation dosage tolerable to most people, and the extra safety afforded by solar flare prediction. Presently, the report says, solar flare prediction is useful only for space missions of no longer than one week. The report warns that ignoring solar flare prediction data would heighten the chances of solar flare radiation damage to personnel. The study concluded that on a three-week trip into space and return, with the spaceship shielded to ten grams per square centimeter and the trip planned with regard to solar flare prediction data, a spacecrew would stand about a ninety-seven percent chance of avoiding lethal proton radiation. But there are other forms of radiation that have to be considered also, such as the Van Allen belts of trapped particles as well as cosmic radiation. Although these were not studied directly as part of the solar flare project, DR. DAVID DYE, a member of the Boeing team, believes that on three-week trips, Van Allen radiation should be manageable and cosmic radiation should be no problem.—END

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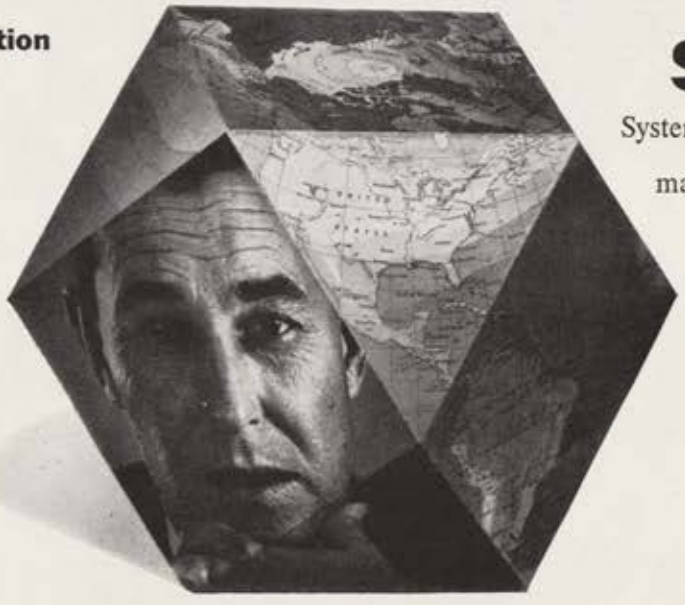

DECISION-MAKING ON A GLOBAL SCALE

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HOW 6 TRANSISTORS CAN WORK 7 TIMES HARDER WITH ONLY HALF TRYING

(a report from Delco Radio)

Sound like a riddle? Well, it was . . . almost. Here's the story.

Delco Radio engineers wanted to build a precision static inverter that was smaller, simpler, lighter, more economical and considerably more powerful than previous models.

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This new Delco 250 VA power supply converts 28 volts DC to 115 volts, 400 cps. Its circuits are a model of simplicity.

The unit is designed for continuous full-load operation at 71 degrees C. still air, yet weighs only 10 lbs., measures 6¼" x 7⅜" x 5". A minimum of components assures extra-high reliability.

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Ready Room

RESERVE AND AIR GUARD NEWS AND VIEWS

By Jackson V. Rambeau
AFA DIRECTOR OF MILITARY RELATIONS

Get It On the Record

The Air Reserve Forces Policy Committee will assemble for its spring meeting in Washington next month, immediately following a visit to Reserve Forces units in Europe.

Three months ago we took issue with the committee's performance, on the grounds that it concerned itself with too many matters that could well be handled through existing administrative channels while it neglected vastly more significant policy problems (*see "A Constructive Critique," in December 1961 "Ready Room"*).

We note some improvement in the agenda for the April meeting. There are again several matters hardly fitting for the committee's concern, but the agenda does contain at least two subjects of vital interest to the Reserve Forces.

One is a recommendation that organized units of the Ready Reserve be authorized 100 percent manning. This subject has been treated before by the committee, and supported by the Air Force, only to bog down each time under the Department of Defense's arbitrary 135,000 drill-pay ceiling for the Air Reserve Forces.

But this time the committee will have new evidence to show that recalled Reserve Forces squadrons were hampered in reaching peak combat readiness by having to assimilate individual Reservists representing fifteen to twenty percent of the unit's total strength.

A second key recommendation urges that units now on active duty retain their aircraft and support equipment upon their return from active duty. This one is certain to precipitate argument, inasmuch as the Air Force has already said it will need to keep some of the aircraft when these units go off active duty.

Obviously, Air Force needs must come first. But open discussion in the committee should establish at least two points: first, a commitment from the Air Force to return the aircraft to the Reserve Forces, or provide suitable replacements, as soon as possible; second, that Reserve Forces units deprived of essential equipment cannot be expected to achieve combat-ready status until a reasonable period after their equipment is restored.

There is still time to add one more important subject to the April agenda. The committee should be briefed on the Air Force's new program for officer education, one which is designed to replace the Air Force ROTC program. A change of this magnitude will have an immediate and lasting effect on the source of young officers for the Reserve Forces as well as the active Air Force. We recommend that the committee give it some attention before the matter is set in concrete at the DoD level.

Parsons Chairman, **Baugher**, **Castellano**, **Corning**, **Spruance**, **Turner**, **Williams**
Members of AFA's Air National Guard Council

Price Chairman, **Andrews**, **Briggs**, **Dawson**, **Gustke**, **Lerom**, **Wilson**
Members of AFA's Air Force Reserve Council

AFA Guard, Reserve Councils Meet

The 1962 edition of AFA's Air National Guard and Air Force Reserve Councils, whose members are pictured above, were to hold their first meeting in Washington on February 23. A report will appear next month.

The Air Guard Council is made up of Brig. Gen. **Jack Parsons** of Montgomery, Ala., chairman; Brigadier Generals **Vito J. Castellano,** Armonk, N. Y.; **William W. Spruance,** Wilmington, Del.; and **Joseph W. Turner,** Tulsa, Okla.; and Colonels **David W. Baugher,** St. Louis, Mo.; **Duane L. Corning,** Sioux Falls, S. D.; and **Walter E. Williams,** Denver, Colo.

Chairman of the Air Force Reserve Council is **Col. William D. Price** of Washington, D. C. Members are Brigadier Generals **Alex B. Andrews,** Raleigh, N. C.; **Russell F. Gustke,** Ellington AFB, Tex.; and **John I. Lerom,** Washington, D. C.; and Colonels **Charles D.**

(Continued on following page)

Briggs, Jr., Andrews AFB, Md.; **Donald S. Dawson,** Washington, D. C.; and **George H. Wilson,** Dobbins AFB, Ga.

You Can't Recover Missiles

The Department of Defense is seeking to starve out the Air Force Reserve's recovery program. Only a determined effort by those who believe in the recovery mission is likely to keep it alive another year.

This is the conclusion we reach in studying a recent letter to **Senator Carl Hayden** of Arizona, chairman of the Senate Appropriations Committee, signed by Deputy Secretary of Defense **Roswell Gilpatric.** Mr. Gilpatric wrote:

"The Secretary of Defense has decided to continue support of the program during fiscal year 1963 on a provisional basis, subject to certain limitations."

The limitations are these:

- Expenditures are limited to $11 million.
- Units are authorized no more than twenty-four paid drills, plus fifteen days' field training, and a strength ceiling of 20,000.

Rep. F. Edward Hébert (D.-La.) has been named chairman of a House Armed Services Subcommittee that will handle matters affecting Reserve Forces. Mr. Hébert succeeds Rep. Mendel Rivers of South Carolina in this assignment.

- No personnel may be on flying status, and only men with prior service may be enlisted.

Without being allowed to recruit nonprior-service personnel, strength of recovery units is sure to decline. Air Guard and Reserve flying units have not been able to attract enough veterans to fill their ranks, even with forty-eight paid drills a year.

Mr. Gilpatric gave as the Department's reason for curtailing the program that, "as initially conceived by the Air Force," it would have mushroomed in five years to 145,000 people and a budget of $78.2 million. He noted that these increases would contribute no combat power—in fact, he said, the units would be of "questionable value" to the Air Force mission and the national defense.

Two curious points in that paragraph are, first, that Mr. Gilpatric should choose to reach back to the "initially conceived" plans for recovery units rather than cite more realistic projections based on a year's operating experience. Second, why did DoD authorize $11 million to operate the program in fiscal year 1963? Why not cancel the program now if it is of questionable value?

One guess is that DoD prefers to avoid the seeming paradox of urging expanded civil defense preparations to survive attack ($700 million in FY '63), while rejecting a workable military program designed to improve survivability of combat aircraft and crews. By authorizing a limited recovery program, but with killing restrictions, DoD may be hoping to do away with the recovery program without precipitating a battle now.

Mr. Gilpatric hinted as much when he told Senator Hayden that "the future course of the program beyond fiscal year 1963 has not been finally determined."

But, assuming this is the DoD strategy, one question remains: Why, if it recognizes the validity of civil defense preparations for national survival, does it degrade the importance of aircraft recovery? Presumably for the same reason that the Secretary of Defense has turned down funds for procurement of manned strategic aircraft in favor of buying more missiles and missile submarines. In effect, DoD is saying: Manned strategic weapon systems are becoming obsolete, and you can't recover missiles.

* * *

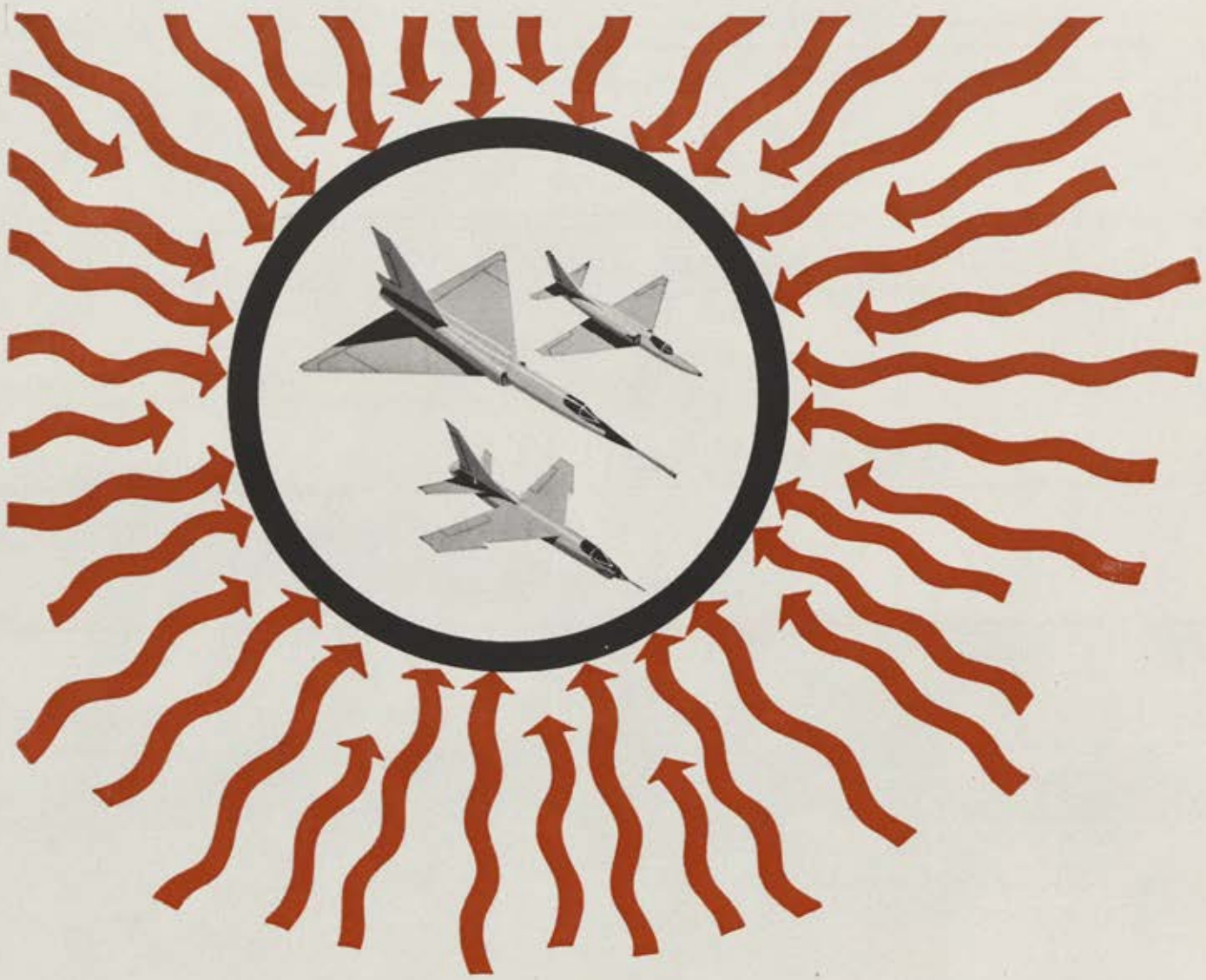
PARTING SHOTS. . . . The annual orientation conference of Reserve Forces units assigned to the Air Force Communications Service will be held at Orlando AFB, Fla., March 26-30. **Secretary Zuckert** will address conferees, representing 37 Air Guard and 24 Air Force Reserve comm units. . . . Four more Air Guard squadrons will convert from fighters to transports this summer. They are the 103d Fighter-Interceptor Squadron, Philadelphia, Pa.; 142d Tac Fighter Squadron, New Castle, Del.; 158th Interceptor Squadron, Savannah, Ga.; and 180th Tac Recon Squadron, St. Joseph, Mo.

Brig. Gen. John W. Richardson *(see cut)* deputy commander of the 5th Reserve Region at Selfridge AFB, Mich., in civil life an executive of DuPont, is being transferred to his company's home office in Wilmington, Del. He'll commute between Wilmington and Selfridge until his successor is named. . . . **Col. D. E. Losasso** *(see cut),* commander of

Losasso **Richardson**

the Reserve's 7th Aeromedical Evacuation Group of Pittsburgh, Pa., received the Air Force Commendation Medal in January for outstanding contributions to the Air Force and its Reserve program. Award was made by **Col. R. E. Gallagher,** new chief of staff of the 2d Reserve Region. Included in the 7th Group are squadrons in Florida, Alabama, Kansas, Texas, and Pennsylvania. Colonel Losasso, first Reserve Forces doctor to receive the award, is retiring after twenty-five years' service.

Boards to consider active-duty Reservists and all Air Guard majors for permanent ROPA promotion to lieutenant colonel will convene in Washington March 19. About 500 majors are eligible. Reserve majors not on active duty aren't included. Zone of consideration includes promotion service date of June 30, 1956, or earlier, and total years service of June 30, 1942, or earlier. As usual, promotions won't apply on active duty. Criteria will be modified to give more lieutenants a chance. . . . Senators **Ralph W. Yarborough** of Texas and **Henry Jackson** of Washington have sponsored a bill to extend eligibility of recalled Reserve Forces personnel for educational benefits under the Korean GI bill and War Orphans' educational assistance.—END



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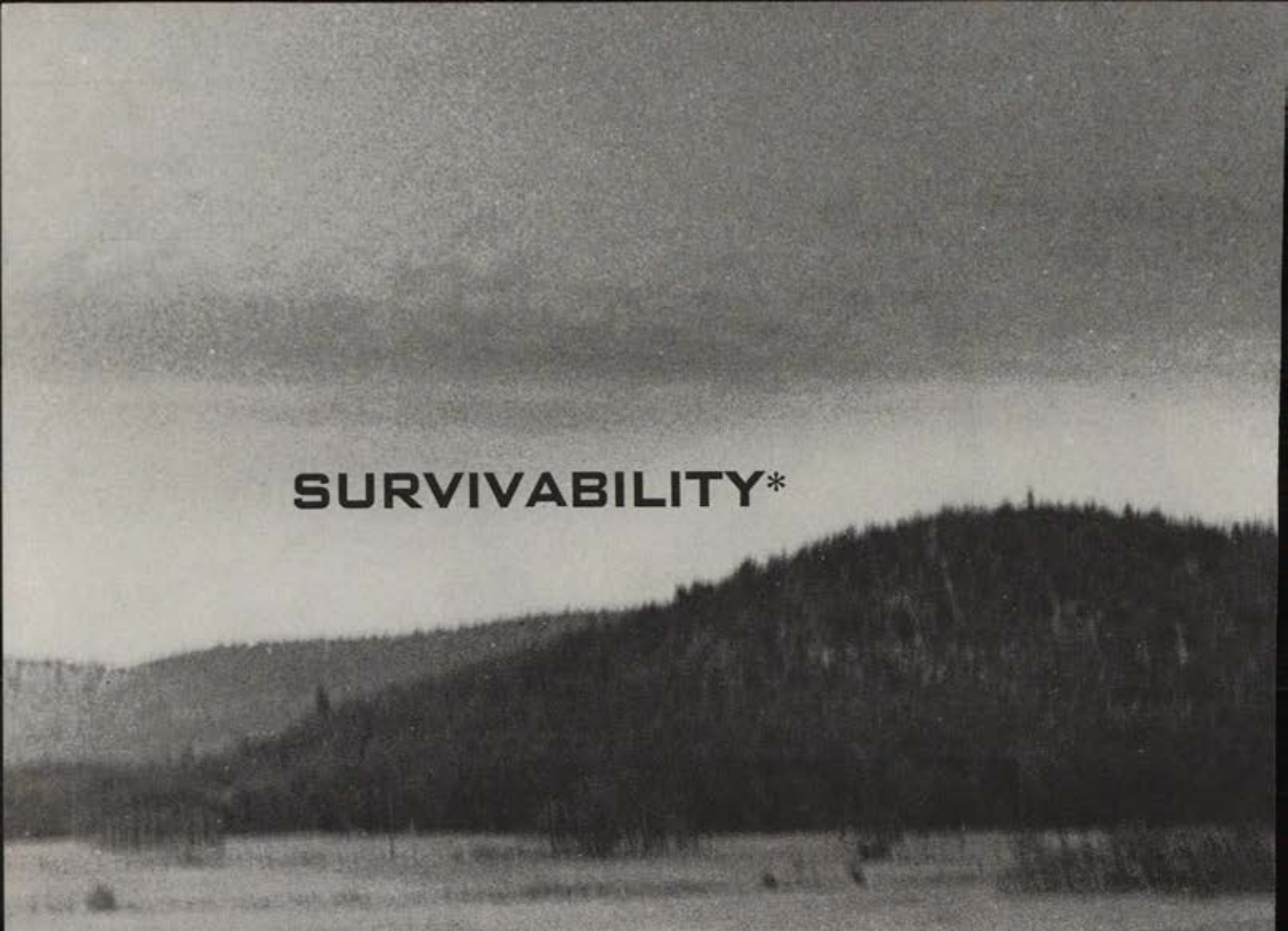
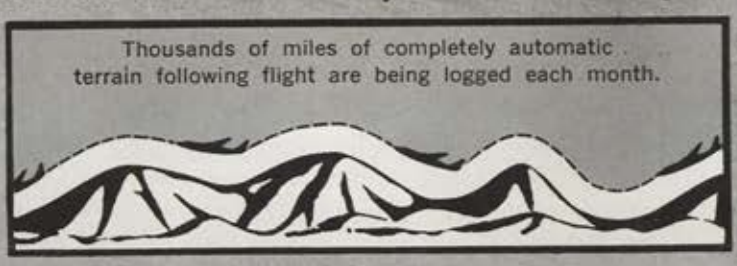


SURVIVABILITY*

Success of a military mission is measured in terms of accomplishment. For manned and unmanned aircraft, a major parameter of accomplishment is survivability (*ability to fly to, and return from, the target).

Survivability is currently being studied at very low altitudes. Texas Instruments Incorporated, working with the U.S. Army Signal Corps, the Air Force, and prime aerospace contractors, conceived and developed a completely automatic low-altitude navigation system. This system is light, simple, and relatively inexpensive. It flies the aircraft accurately over an extremely low-altitude terrain profile . . . automatically!

For complete technical information, write Apparatus Division, Texas Instruments Incorporated, P. O. Box 6015, Dallas 22, Texas. Qualified "NEED TO KNOW" respondents only, please.



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AFA NEWS

SQUADRON OF THE MONTH

Santa Monica, Calif., Squadron Cited for exceptional initiative and outstanding effort in arranging a series of meetings designed to promote the betterment of the community's educational interests.

Dr. John H. Harris, Superintendent of Schools in Des Moines, Iowa, was a guest recently of the **Santa Monica, Calif., AFA Squadron,** but we doubt that he knew how much impact he would have on the California community when he accepted the engagement. Three times in a single day he was placed before the public to speak on "This Business of Education—Who Collects the Dividends?"

He first delivered a breakfast address to the **Santa Monica Credit Women,** a meeting of over 175 people active in community affairs. At noon he addressed a special meeting of the faculty at **Los Angeles State College,** arranged by **Dr. Marian Wagstaff,** a Squadron member, and that evening he spoke to the regular meeting of the Squadron at the Miramar Hotel.

Among the many influential leaders of the Southern California area who were impressed with Dr. Harris' remarks were **Dr. Glen Goodwill,** Superintendent of Santa Monica Schools; **Mrs. Mary Tingloff,** of the Los Angeles Board of Education; the full membership (ten members) of the **Santa Monica Board of Education;** and **Dr. William Briscoe,** Dean of the Education Department at UCLA.

Dr. Harris, who has attended several of AFA's national education programs, probably never worked any harder than he did on this tour, and we have been asked by **Walker M. Mahurin,** Commander of Santa Monica, and the Squadron members, to express the gratitude of the city. We're happy to do so, and at the same time pay appropriate tribute to the Santa Monica Squadron for arranging such a fine program for the area's educators.

° ° °

Denver's Front Range Squadron cosponsored an Aerospace Education Seminar on November 18 with the Colorado Department of Education, attracting top education leaders from the area. **Dr. Byron Hansford,** State Commissioner, was among the honored guests, with his Assistant, **Dr. Leo Black.** Both have long been active in this type of program.

AFA's National President, **Joe Foss,** was guest speaker at the closing banquet, held at Lowry AFB *(see cut)*, and spoke on the importance of aerospace education and AFA's emphasis on it in recent years. He commented

(Continued on following page)

Dr. Leo Black, left, Assistant Commissioner of Education in Colorado, talks over a thorny educational problem with AFA President Joe Foss, State Education Commissioner Byron Hansford, and Dr. James G. Allen of Colorado University, during Aerospace Education Seminar sponsored by AFA's Front Range Squadron.

Herb Fisher, left, chief of the New York Port Authority Aviation Development Division, admires trophy awarded to him by Passaic-Bergen Squadron. Nathan Lane, Commander, and Edward Karns, Sales Manager of Aircraft Radio Corporation, presented award during annual Wright Day Dinner.

At a testimonial dinner, Art Storz, center, receives congratulations from NBC newsman Chet Huntley, left, and Owen L. Saddler, KMTV General Manager on his selection to receive the television station's annual award for "distinguished contributions to Omaha's past, present, and future."

on the efforts of AFA's Aerospace Education Council, represented at the Conference by **Dr. James Allen,** Chairman of the University of Colorado's History Department, and originator of a new course there, "The History of Space."

Ken Costello, first Commander of the Front Range Squadron, was in charge of the program. Honored guests included **Carl Lundberg,** Colorado Wing Commander; **Karl Caldwell,** Rocky Mountain Vice President; and **Keith Nichols,** Utah Wing Commander.

° ° °

AFA's **Arthur C. Storz** *(see cut),* Board member from Omaha, received a high honor on January 10 when at a civic banquet in his honor at the Blackstone Hotel he received the coveted **Public Service Citation** from television station KMTV.

John W. Davis, President of the First National Bank of Omaha, and cowinner of the 1960 Citation, made the presentation to Storz, citing him as "a man who has been giving of himself to our city for a lifetime." Among his many efforts have been his chairmanship of the **Omaha Airport Authority,** constant projects dealing with **Strategic Air Command,** and leadership in numerous civic programs. In 1961 Storz became the third person to receive AFA's highest individual award—a solid-gold Life Membership card.

Assisting the community in honoring Storz were Governor **Frank Morrison;** Omaha Mayor **James Dworak; Edward May,** President of the May Broadcasting Company, owners of KMTV; and **Thomas E. Knode** and **Carl Lindeman, Jr.,** Vice Presidents of NBC. **Chet Huntley,** NBC newsman, was the banquet speaker.

° ° °

Col. Donald E. Matthews *(see cut),* Chief of the Operations Control Division, Military Air Transport Service, headed a team of three officers from Scott AFB, Ill., recently when they appeared before the members and guests of the **Syracuse, N. Y., Squadron** to present a formal briefing and to answer questions about the role of MATS in the worldwide requirements of the USAF.

The other officers were **Lt. Col. James M. Segraves,** Assistant Chief of MATS's Community Relations Division, and **Maj. John Dillon, Jr.,** Chief of MATS's Internal Information Division and a former resident of Syracuse.

Squadron Commander **Douglas Deal** served as Chairman of the program.

° ° °

The **St. Louis, Mo., Squadron** announces that it will sponsor the Second Annual **Aerospace Education Seminar** on March 9 at St. Louis University, with a windup Banquet to be held in the Coronado Hotel. President **Joe Foss** will deliver the principal address. The next day, the **Missouri Wing** will hold its annual convention at the same hotel.

A feature of the Seminar will be a panel discussion led by **Dr. Hubert Wheeler,** Commissioner of Education for Missouri and a member of AFA's Aerospace Education Council. Appearing with him will be **Everett Collin,** NASA; **Marshall C. Benedict,** FAA; and **Ray O. Mertes,** United Air Lines. The keynote to the Seminar will be delivered by **Dr. E. S. Obourn,** US Office of Education. **Dr. Philip Hickey,** Superintendent of Public Instruction in St. Louis, will open the Seminar, and AFA's Midwest Vice President, **Chess F. Pizac,** will serve as toastmaster for the banquet.

The Wing convention program will include briefings on MATS and the Air Force Communications Service, a luncheon, and business sessions, one feature of which will be the election of officers. **Cameron S. Orr,** Wing Commander, is in charge of arrangements, assisted by **Edwin Howard,** St. Louis Squadron Commander, and **Truman Mellies,** Secretary.

—Gus Duda

Syracuse Squadron Commander Douglas Deal, right, is shown with team of officers from MATS who presented a detailed briefing to the Squadron's January meeting. They are Col. Donald E. Matthews, Lt. Col. James M. Segraves, and Maj. John J. Dillon, Jr.

Mayor Robert Wagner of New York City, who proclaimed "Wright Brothers Week" in December, is shown here presenting the original Proclamation to Sam Hananel, left, of Mitchel AFA Squadron, and Alfred Warwick, Vice President of the Queens Chamber of Commerce.

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Las Vegas, Nevada • September 18-23, 1962

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Others Sharing Room

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INDEX TO ADVERTISERS

For All AFA Members / **AFA ACCIDENT INSURANCE GIVES YOU AND YOUR FAMILY COMPREHENSIVE COVERAGE AGAINST ACCIDENTS!**

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AFA's uniquely flexible Accident Insurance offers you accident coverage, twenty-four hours a day, every day, in amounts up to $50,000.

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2	10,000	5,000	1,000
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4	20,000	10,000	2,000
5	25,000	12,500	2,500
6	30,000	15,000	3,000
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8	40,000	20,000	4,000
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$15,000	☐$28.50	☐$18.00
$20,000	☐$38.00	☐$24.00
$25,000	☐$47.50	☐$30.00
$30,000	☐$57.00	☐$36.00
$35,000	☐$66.50	☐$42.00
$40,000	☐$76.00	☐$48.00
$45,000	☐$85.50	☐$54.00
$50,000	☐$95.00	☐$60.00

†Family plan includes 50% of basic amount for wife and 10% of basic amount for all children, regardless of number.

airman's bookshelf

Reaching 1975 Alive

***Deterrence and Defense*, by Glenn H. Snyder (Princeton Univ. Press, N. J., 1961, 289 pp., $6.50).**

Reviewed by Col. Paul S. Deems, USAF

If strategist Snyder has failed to excite either the praise or polemic that still attends Herman Kahn's book, it is not for want of sounding warlike.

While Kahn in *On Thermonuclear War* addresses himself to the real-world problem of reaching 1975 alive, Snyder presents one more rationale for finite deterrence and surface warfare in a third area.

Strategic forces, in Mr. Snyder's view, exhibit their primary deterrent value in adding a cost to aggression that the enemy must consider in his calculus of risks and gains. If the cost appears sufficiently high in terms of damage to his economy and population, the enemy may be deterred. This is the *punitive* aspect of deterrence which works on an enemy's intentions.

Strategic forces have a secondary value in *defense:* If the inventory holds a sufficient quantity, they may be partially expended to reducé damage at home or to limit territorial loss if they fail in their primary role. (Defense, as Mr. Snyder uses the term, is actually a combined offensive-defensive capability, in a sense similar to the way we interpret its usage in Department of *Defense*.)

Conventional, tactical forces also have both a deterrent value and a defense value. Readiness to respond at any level of aggression increases the cost to the aggressor of territorial gain —the obvious objective—and a US local-war-fighting capability can make the probability of payment high enough to be important in the calculation.

Most useful—though by no means original—of Mr. Snyder's ideas is that determined local resistance to armed trespass forces the aggressor to reveal both the importance he assigns to his objective and the size of his commitment. The decision to preempt is made easier since the size of the aggressor's marshaled forces indicates the price he is *prepared* to pay.

"Perhaps the crucial difference between deterrence and defense is that deterrence is primarily a peacetime objective, while defense is a wartime value," Mr. Snyder says. "Deterrent value and defense value are directly enjoyed in different time periods. . . . Thus we must measure the value of our military forces on two yardsticks, and we must find some way of combining their value on both yardsticks in order accurately to gauge their aggregate worth or 'utility' and to make intelligent choices among . . . forces. . . ."

War can be won or lost, according to the author (regardless of whether the economic and social fabric survive), as military dominance is assured for one side or the other. Mr. Snyder, despite his familiar use of the term "counterforce," confuses it conceptually with a "first-strike only" or, alternatively, a strike-second "mitigating damage" capability. Instead of combining deterrence and defense (war-fighting) on a *single* yardstick, he examines a variety of strategic and economic options in order to arrive at a stable, finite deterrent force supporting a conventional war force as the optimum.

Can the Balance of Terror, as Mr. Snyder suggests, be separated permanently from the Balance of Power, like the yolk of an egg? What suicidal resignation compels us, like lemmings, to accept the terrible threat of oblivion as the ultimate price of freedom? What exquisite and masochistic delight do we derive from contemplating—for years to come—a return to the sea and eternity if the finite deterrent fails? Do the contradictory assurances of arms control and equivalent atomic forces guarantee that we will reach 1975—safely, or not at all?

Mr. Snyder is right to relate force structure to economics, but he should have gone a little farther; the nation's economy is such that it can support what is necessary—not for threats and postures—but for ensuring that military competence and superiority which will improve, rather than lessen, our chance of arrival at the end of the century.

The book contributes little to your understanding of current Air Force doctrine but is still a good mental discipline. The mathematical examples are easy to understand (and this is part of the conversational pattern these days), and the arguments deserve a critical examination: expect to hear them from your Army peers. After reading, place the volume on your bookshelf between *The Uncertain Trumpet* and *The Economics of Defense in the Nuclear Age*.

NOTE: Any book reviewed in Airman's Bookshelf may be obtained, postpaid, from the AeroSpace Book Club, 1901 Pennsylvania Ave., N.W., Washington 6, D. C. Full payment must accompany order. Information on the Book Club may be obtained from the same source. Club members are eligible for substantial savings on Club selections.

ABOUT THE REVIEWER: *Colonel Deems has written several articles for* AIR FORCE/SPACE DIGEST, *the most recent, "Paradise Beguiled," in the January 1962 issue.*

An Air Force Career

***Boring a Hole in the Sky*, by Robert L. Scott, Jr. (Random House, N. Y., 1961, 292 pp., $5.95).**

Reviewed by Maj. Clyde R. Bergwin, USAF

This is the autobiography of Brig. Gen. Robert L. Scott, now retired, whose earlier book, *God Is My Co-pilot*, was a best seller and movie.

The new book is both a vivid account of General Scott's wide variety of flying experiences and an equally vivid description of his relationship throughout his stormy and often controversial career with his superiors and with what he calls "the system."

Of the airman's world the General writes movingly:

"All at once we were in the midst of an electrical display which dwarfed into insignificance the show put on by the afterburner. Jagged lines leaped from cloud to cloud, flashed and arched and burned. I could smell the ozone and imagined I could taste the brackish static. Insulated by my bubble-canopy capsule I couldn't hear the thunder but knew it was out there. . . . Then my ship rocked with the closing vacuum. When I stretched out my hand to rub away the condensation from the armor-thick windshield, Saint Elmo's fire played between my fingers and the Plexiglas dome. I had to concentrate hard on my instruments, particularly in order to keep that little silhouetted plane superimposed exactly right within my artificial horizon. That instrument was about the only reference left to me, swallowed up as we were by the clouds. I moved my controls carefully, tenderly. Then, just as I'd center that little one-inch plane on a three-

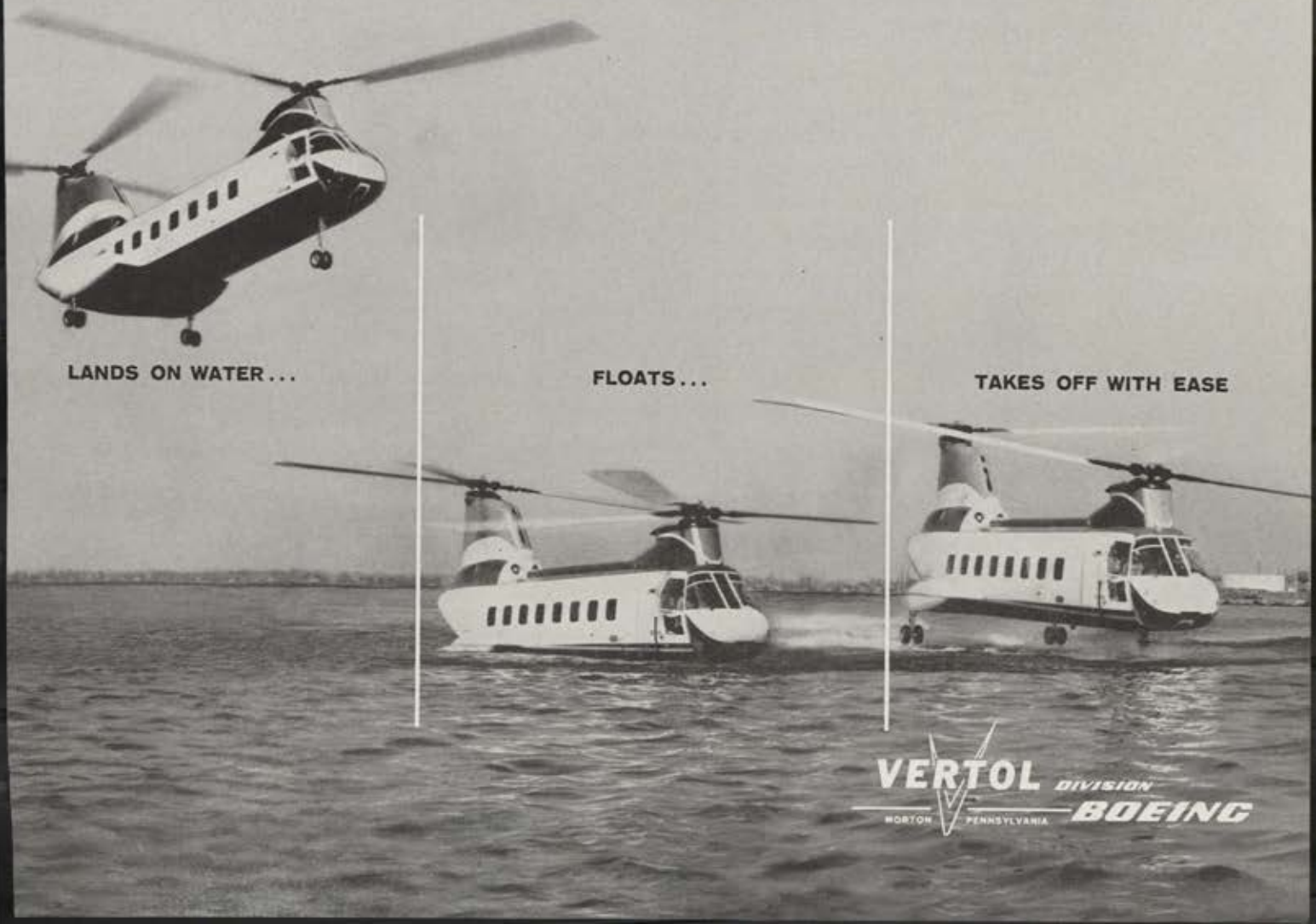
(Continued on page 82)

THE EXTRAORDINARY WATER CAPABILITY OF THE BOEING-VERTOL 107

In the 107 helicopter, water landing capability has been achieved without special flotation equipment or the weight or drag penalties of floats or boat hull. Its design combines a sealed-in-production fuselage with short "fuel stubs" on either side. These, in addition to housing the fuel tanks and landing gear support structure, provide lateral stability.

The Boeing-Vertol Model 107 prototype has proved its water capability in more than 1500 nautical tests, some of which have subjected it to Sea State 3 (waves up to five feet high). Its water taxiing characteristics are excellent; low-visibility and night landings are mere routine. The rear rotor is elevated to permit descent and landing in a nose-up flared attitude of as much as 30 degrees with no change in fuselage attitude before touchdown.

The 155 miles-per-hour 107 is not only slated for inter-airport service in the New York metropolitan area but has been ordered by the U.S. Marine Corps, Royal Canadian Air Force, Royal Swedish Navy and Air Force, and the Japanese Maritime Self-Defense Force.



inch world, a giant hand would shake us as though we were some metal bug daring to sully the sanctity of space. . . ."

The book includes much of the color and drama of the early days of the Air Force, particularly during 1934 when the Army Air Corps flew the US mail. The reader also is given an insight into prewar pilot training and follows the author's persistent effort to get into combat after Pearl Harbor. Then comes a graphic description of Scott's flight in a B-17 to India and his first combat missions.

The author faithfully records the details of his self-styled "one-man war" against the Japanese and his simultaneous difficulties with his superiors. His two-front campaign apparently succeeded since he was chosen to command the 23d Fighter Group of the China Air Task Force, under General Chennault.

Scott's determination to gain increased recognition and support for the Flying Tigers was his motivation, he says, for writing *God Is My Co-pilot* in only three days and later serving as technical adviser for the movie.

Fighting the Japanese was apparently easier for General Scott than was his postwar adjustment in the Air Force. He relates with unabashed candor and outspoken detail his many troubles in making himself and his mission understood through a variety of assignments before his retirement.

It remains for the men among whom he served and about whom he writes to judge whether the author is entitled to that chip on his shoulder.

ABOUT THE REVIEWER: *Major Bergwin heads the Operations Branch in the Office of Information, Hq. USAF.*

Three for the Fighters

Back in print by popular demand is *1,000 Destroyed: The Life and Times of the 4th Fighter Group,* by Grover C. Hall, Jr. (Morgan Aviation Books, $7.50). The reappearance of this best-known unit history of World War II is in response to a growing popular demand for the chronicle of the Air Force's top scoring fighter unit in Europe. And rightly it should be, for this book has all the immediacy and the feel of the bitter days against the Luftwaffe which now are looked back on by many who were there with something like nostalgia.

The 4th ended the war with a bank balance of 1,016 kills (550 air, 466 ground), 9½ more than the second-place 56th (679½ air, 327 ground). An ETO theater ruling permitted both air and ground victories to be counted for acedom and unit score. In all fairness it must be pointed out that had only wing-shots been permitted for record—as they were in the Pacific, Mediterranean, and the CBI—the 4th would now be in third place, after the 56th and the 357th (586½ air, 110 ground). But this fact detracts nothing from the book or from the brilliant performance the 4th turned in.

Activated in England on September 12, 1942, the 4th was built from a nucleus of former RAF Eagle Squadron pilots and until March 1943 flew the Spitfire, then converted to the Republic P-47 "Jug." A year later the group went into P-51s and skyrocketed to fame as the scourge of the Luftwaffe. The unit was built on combat-tempered, experienced personnel and flew first-line aircraft throughout the war. The book is brim filled with the heroics of individual air combat. The roster of aces reads like a who's who in fighter warfare.

The fighter sweeps and bomber-escort missions, as superbly narrated by Hall in the language of the times, can find no equal in the towering literature of air war. It may not be so accepted in the parlors and drawing rooms of the higher born for Hall is in there slugging with guys like Godfrey, Gentile, Goodson, Hofer, Beeson, Glover, Megura, Blakeslee, Millikan, George Carpenter, and all the rest. And he's doing it over the German submarine pens, V-weapon sites, Luftwaffe airfields, Wehrmacht troops, supply dumps, roads, bridges, rail lines, and trains; in the high skies over the Fatherland during Big Week and the Normandy invasion, during Holland, the Bulge, and the Rhine crossing.

And it was the red-nosed Mustangs of the 4th led by Col. Don "Horseback" Blakeslee that made the first fighter appearance over Big-B, Berlin, in the beginning of the end for German airpower.

Again over Korea, the 4th, now designated a fighter-interceptor group and equipped with F-86s, flew to fame as one of the MIG-killing units of history's first jet air war, but this is another book that some day will be written. It is not covered here.

1,000 Destroyed is a complete record, down to individual listings, scores, and drawings of American and Luftwaffe combat aircraft. There shouldn't be an air library anywhere without it.

The same recommendation can be given to the newest "Harborough" publication, *United States Army and Air Force Fighters, 1916-1961,* compiled by Lt. Col. K. S. Brown, USAF; Capt. E. F. Heyn, USAF; R. A. Freeman; M. J. F. Bowyer; and P. Berry, and edited by Bruce Robertson (Harley-ford, $9.50). Here is an exquisite photo-narrative encyclopedia of Air Force fighter hardware from the first all-American pursuit type, the 112-mph Curtiss S-3 (100-hp OXX-2 engine) of 1916, to today's supersonic F-105 and -106.

The first half of the comprehensive book tells in detail the story of the development of American Army and Air Force fighter aircraft written against the historical background of war and peace. Some 250 photos illustrate the development of the fighter. Three-view drawings in 1:72 scale of seventy major fighter types spanning Air Force history will be a gold mine for the model builder. A photo gallery of forty-four variants of better- and lesser-known and experimental models, individual reproduction of 333 fighter squadron badges, and a sixteen-page listing of fighter specifications of 430 types, subtypes, and experimental designs conclude this beautifully printed and bound volume. The book, originally a British publication, was produced in cooperation with the US Air Force, and will be followed by a counterpart edition on bombers.

Now there are those prophets who never really did believe in the airplane, and who have been predicting that a black box will be substituted for the pilot. A reading of Leverett Richards' *TAC: The Story of Tactical Air Command* (John Day, $4.50) should help underscore the fact that the pilot will be around for a good long time yet. There isn't a black box yet made that can replace man in the cockpit.

Richards' heroes in *TAC* are the men who fly the fighters, the troop carriers, the recon aircraft. His scenes are the events of recent times that have made recent TAC history. This is not strictly a chronological account but rather vignettes of TAC life, duty, and training with a chunk of the Composite Air Strike Force and its deployments and of the earlier Fox-Able movements that gave fighters their long legs. The stories are real life, based on fact, and the reader can sense Richards' TAC association (lieutenant colonel, AFRes.) by his easy use of the pilot's language.

This book is at its best when it's up in the air, when the author is with the new breed of fighter pilots whose language he speaks so well. It's at its

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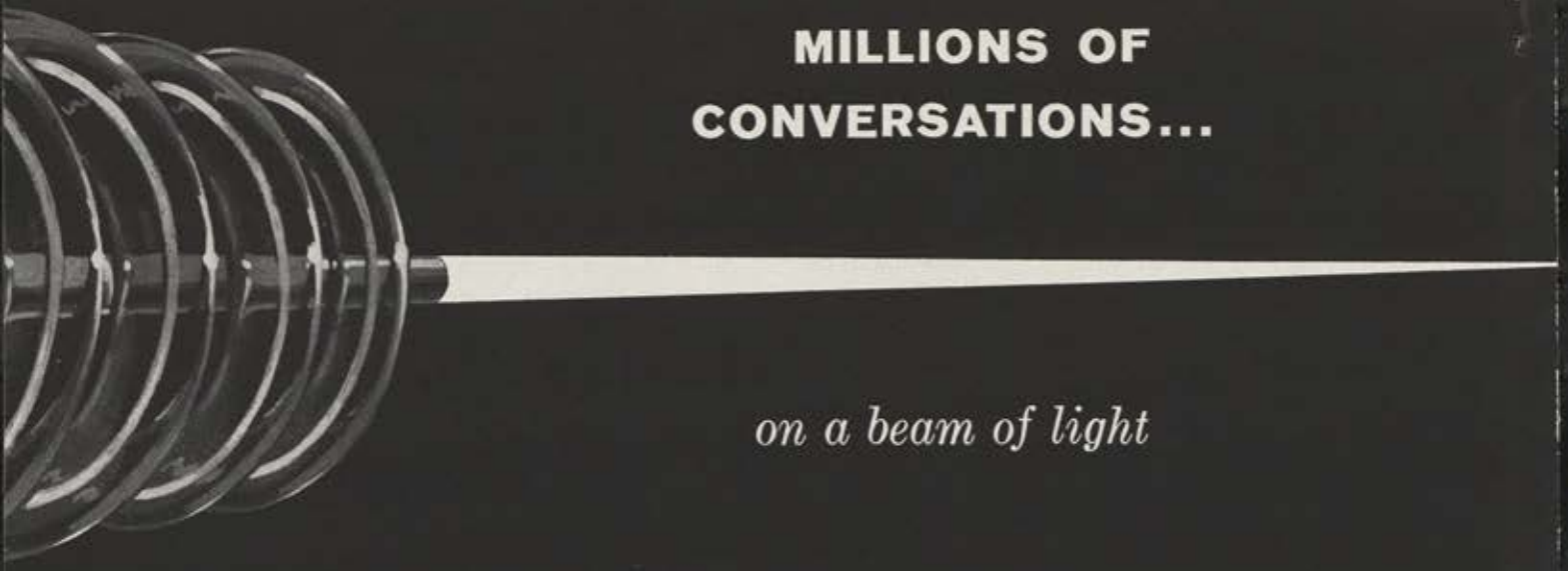
SPACE COMMUNICATIONS



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A Nonprofit Service for AFA Members

AFA Insurance Programs

These programs have been designed to meet the known needs of AFA families. They are constantly under review to provide maximum protection at minimum cost consistent with safety.

NO AMOUNT of insurance can make up for the real loss when the head of a family is disabled or dies. Nor can insurance minimize the hazards that we all accept as a normal part of our everyday lives.

But insurance can and does ward off the pinch of financial hardship when trouble strikes. An adequate insurance program provides money or goods or services when they are needed most. It is the one sure way of guaranteeing security and protection for those we love.

In recognizing these services that are rendered by insurance programs, AFA not only attempts to make them available to members but also keeps its programs under constant review, making revisions and changes as they are deemed necessary. The latest example of this never-ending review program is the new *all*-accident insurance program which has replaced the former policy covering only travel accidents. This and other programs are briefly described below.

All-Accident Insurance

This new program, available to all AFA members, offers full twenty-four-hour protection against *all* accidents except those involving crew members in aircraft accidents. It is offered in units of $5,000 up to a maximum of $50,000 and is available either singly or in the popular new family plan at unbelievably low rates.

Coverage under the family plan provides insurance for each member of the family, under one policy. Under this plan the wife of the policyholder is insured for 50% of his coverage and each child, regardless of number, is insured for 10% of his coverage.

Coverage is also provided for nonreimbursed medical expenses of over $50, up to a maximum of $500. Under the family plan each member of the family is provided this extra coverage. In addition, policyholders receive an automatic 5% increase in the face value of their policy each year (at no increase in cost) for each of the first five years of coverage.

Life Insurance

AFA Group Life Insurance is available to all active duty officers and NCOs of the first three grades. It provides a graded amount of coverage, with a top amount of $20,000, depending on age and flying status. The death benefit is increased by 50% of the policy's face value if death is caused by any kind of accident.

As an additional benefit policyholders may keep their insurance in force at the low group rate after they leave the service, provided their coverage has been in effect for more than a twelve-month period immediately prior to the date they leave the service.

Flight Pay Insurance

Guaranteed flight pay protection is available to rated personnel on active duty. Protection is guaranteed, even against pre-existing illnesses, after a policy has been in force for more than twelve consecutive months. This plan was first introduced in 1956 and since that time AFA has paid more than $1,800,000 in claims. Each month checks go to between 100 and 150 grounded flyers.

Benefits are such that a grounded policyholder receives 80% of his lost flight pay (tax free) for up to twenty-four months for groundings due to aviation accidents . . . up to twelve months for illnesses or other accidents.

AIR FORCE ASSOCIATION

Insurance Division, 1901 Penna. Ave., N.W., Washington 6, D. C.

Please send me complete information about the AFA Insurance Program(s) I have checked below. 3-62

- ☐ All-Accident Insurance
- ☐ Group Life Insurance
- ☐ Flight Pay Insurance

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weakest when Richards, who is aviation editor of the Portland *Oregonian*, discusses the philosophy and doctrine of TAC.

The book appeared before last year's change of command in TAC, before the Guard and Reserve callup and deployment to meet the threat of Berlin, before the formation of the new STRIKE command. Thus missing from this volume is any indication of the new vital force pervading TAC these days. Yet there is enough here to make *TAC* a highly interesting story and to convince even the wariest that —unlike some old soldiers—the United States Air Force fighter pilot is not just fading away.

For the Shelf . . .

Numerous times throughout the 1920s and '30s air forces were used to establish and maintain military and political control of small nations or groups of people. The Italian and British Air Forces were the principal appliers of this technique. Sir John Bagot Glubb, former leader of the famed Arab Legion, now writes about a decade of tribal warfare in the Middle East in *War in the Desert: An RAF Campaign* (Norton, $5.50). He explains how British air intervention in intertribal desert warfare established beneficent rule, and writes of his personal experiences and adventures among the Bedouins of the Arab world who called him Abu Hanaik (Little Jaw) and considered him their protector.

Reader's Digest associate editor and former US congressman O. K. Armstrong has written a popular historical analysis of what he considers the fifteen armed encounters that have had permanent impact on United States history and the course of its political development. Three WW II engagements—Midway, Coral Sea, and the strategic bombardment of Germany—represent modern conflicts in which airpower played a decisive role —the latter, of course, solely an air battle. *The Fifteen Decisive Battles of the United States* (Longmans, Green, $4.95) is interesting general reading.

The United States program to develop the ICBM for defense and space-research uses is treated by British science writer Eric Burgess in *Long-Range Ballistic Missiles* (Macmillan, $5). Here the author of numerous technical and semitechnical books on missiles and astronautics covers fundamental missile theory, the missiles themselves as space boosters, air-land-sea defense weapons, and flight-test facilities.

One of the first detailed, popular books on Air Force missile and space research and development of AF programs to equip man for spaceflight, published in 1956, is now out in a new updated edition. Lloyd Mallan's *Men, Rockets and Space Rats* (Messner, $5.95) adds a current report on American spaceflight progress balanced against that of Soviet Russia where the author toured selected Soviet space-research facilities two years ago.
—Maj. James F. Sunderman, USAF

This Is AFA

The Air Force Association is an independent, nonprofit airpower organization with no personal, political, or commercial axes to grind; established January 26, 1946; incorporated February 4, 1946.

Objectives

• To assist in obtaining and maintaining adequate airpower for national security and world peace. • To keep the AFA members and the public abreast of developments in the field of aviation. • To preserve and foster the spirit of fellowship among former and present personnel of the United States Air Force.

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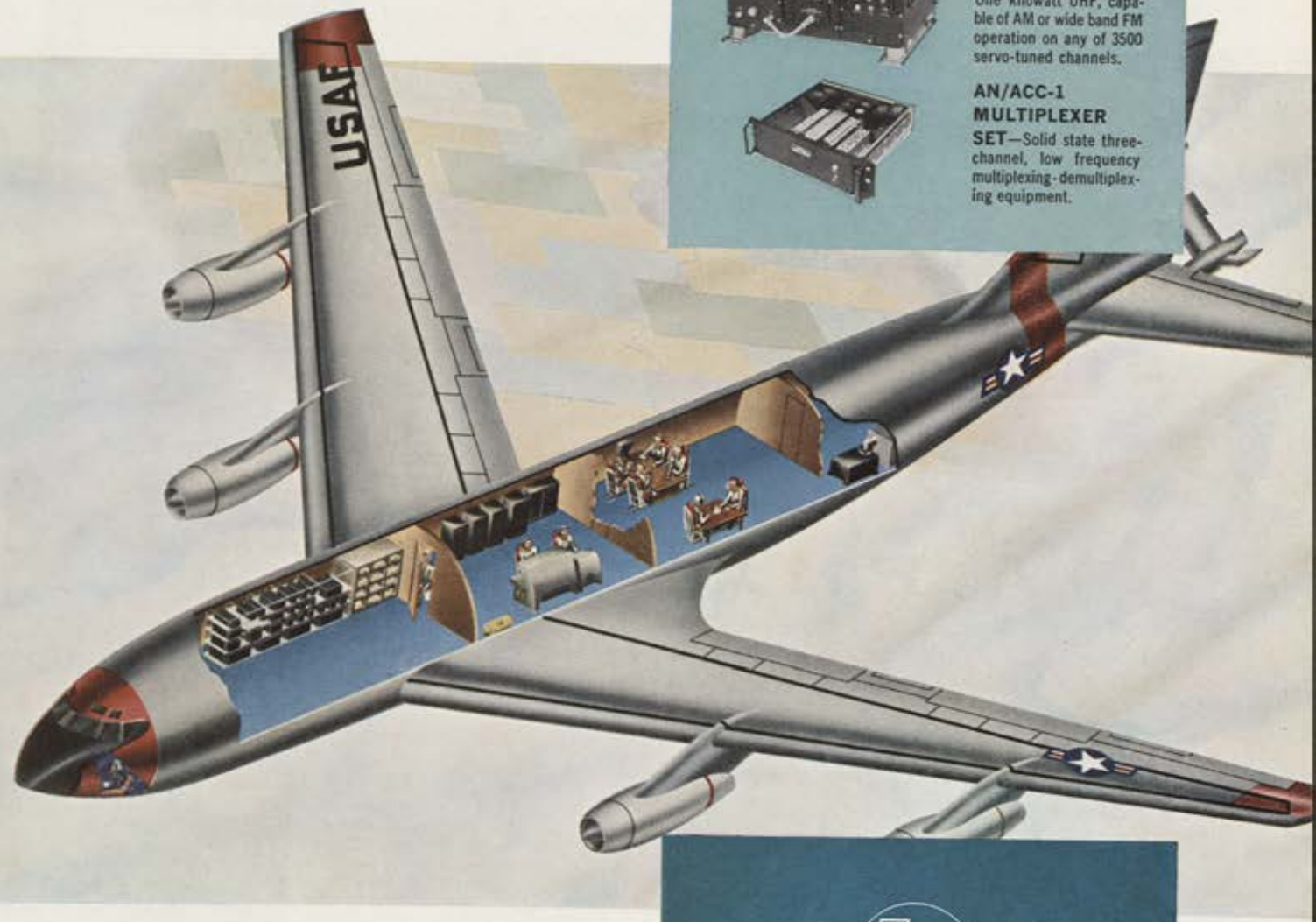

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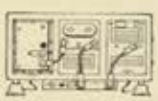

COMMUNICATIONS

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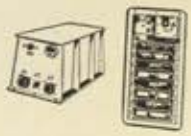

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● The Phantom II holds the world's altitude record for sustained flight, maintaining 66,443 feet at Mach 2.2. With a complement of Sparrow III missiles aboard, the McDonnell-built jet zoom-climbed to 98,557 feet in a further demonstration of maneuverability and ability to launch attacks at extreme altitudes.

● To capture the Bendix Trophy, a Phantom II flew coast to coast in 170 minutes and set a new transcontinental speed record to demonstrate its deployment capability over great distances at high speeds.

● Low-level ground attack capability was emphasized by the Phantom II as it flew Mach 1.2, at times less than 125 feet above the ground, to shatter the 3-kilometer world speed record.

● The Phantom II Air Defense fighter has delivered conventional bombloads weighing twice that carried by World War II Flying Fortresses. Yet even while carrying multi-ton bombloads, the carrier-qualified Phantom II literally "flies its own cover" since it carries Sparrow III air-to-air missiles in addition to its ground attack payload.

● Final proof of the Phantom II's versatility lies in its slow flight and landing ability. Leading and trailing edge flaps, augmented by boundary layer control, allow slower than commercial jet transport approach speeds. The power of the two GE-J79 engines for take-off, matched by very slow approach speeds and para-braking, permits the Phantom II to operate from 5,000-foot runways.

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