



AIR UNIVERSITY **review**

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Theodor von Kármán



from the editor's aerie

Traditionally, *Air University Review* has emphasized technological breakthroughs and their application in a military environment. It seems fitting, then, that we practice what we preach by applying recent computer-assisted typesetting techniques in our own production process. The text of the last issue of the *Review* was done by Optical Character Recognition (OCR), a process utilizing an electronic light beam to produce type directly from a typewritten manuscript. Further along, we will bypass the scanner and set type from a tape generated by a text-editing typewriter. These techniques eliminate rekeyboarding by the typesetter and a proof cycle and enable us to reduce commercial printing costs significantly. The regional Government Printing Office has informed us that the *AU Review* was the first federal publication to incorporate this entire process into its contract specifications. We will also use this procedure in our Spanish and Portuguese editions.

A recent new element appears on our cover here. It is the International Standard Serial Number (ISSN), which enters the *Review* in a worldwide computerized network of periodical publications.

At our present rate of computerization, the whimsical thought inevitably suggests itself that we may soon receive articles on magnetic tape generated by computers, which may then be read by electronic scanners and entered in memory banks, thus eliminating the need for authors, editors, the printed page, or even a human readership. Somewhere in this developmental process the *AU Review* staff promises to draw the line.

If this issue can be said to have a theme, it would relate to technological progress. The lead articles, by Colonel Robert Detweiler and Colonel James Strub, provide instructive summaries of where the Air Force has been and where it ought to be going with its research programs. Our cover pays tribute to Theodor von Kármán (1881–1963), the “father of the supersonic age” and chief architect of today’s Air Force research structure.

Nuclear technology and its place in our national strategy considerations are analyzed by Major General Edward Giller, USAF (Ret).

The management process receives its share of attention by Major General Edmund Rafalko and by a team of authors, Lieutenant Colonel Russell Pierre and frequent contributor Jerry Peppers.

The employment of tactical forces is treated by Brigadier General William Holton, USAF (Ret), and Major Donald J. Alberts. General Holton examines the use of TAC forces in Special Operations, and a regular contributor, Don Alberts, in a particularly provocative article, projects the lessons of the Yom Kippur War to possible future encounters with Communist bloc forces.

Concluding this issue, aside from book reviews long and short, is a backgrounder on the recent turmoil in Lebanon by Drs. Lewis Ware and Paul Godwin, resident members of the Air University staff.

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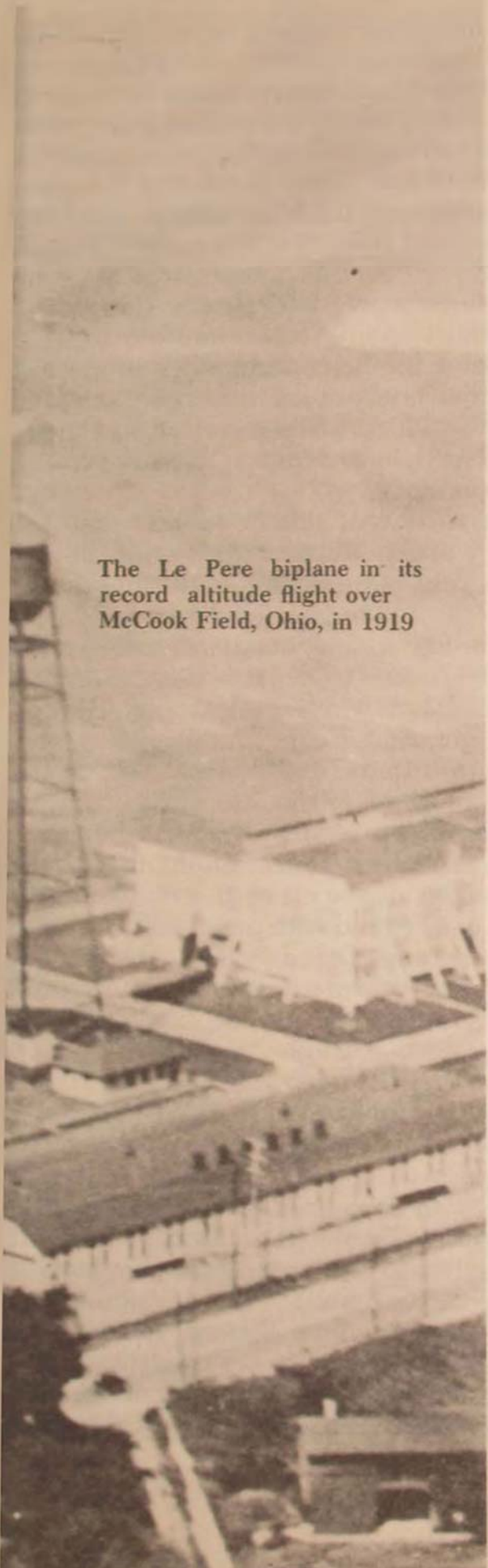
ATTENTION

The *Air University Review* is the professional journal of the United States Air Force and serves as an open forum for exploratory discussion. Its purpose is to present innovative thinking and stimulate dialogue concerning Air Force doctrine, strategy, tactics, and related national defense matters. The *Review* should not be construed as representing policies of the Department of Defense, the Air Force, or Air University. Rather, the contents reflect the authors' ideas and do not necessarily bear official sanction. Thoughtful and informed contributions are always welcomed.



AIR FORCE RESEARCH
IN RETROSPECT

COLONEL ROBERT M. DETWEILER



The Le Pere biplane in its record altitude flight over McCook Field, Ohio, in 1919

AT SOME point during the past two decades, America embarked on a new industrial revolution, which will have an impact on the destinies of men and nations potentially as great as that which so radically altered men's lives in the eighteenth and nineteenth centuries. The nature and dimensions of this revolution are not easy to grasp. The terms of science and engineering which describe this revolution, once confined to the university, are bantered about in nearly every walk of life; the jargon of business has even taken on a new space-age vocabulary. The core of this revolution can easily be traced to a galloping technological advance. Radically new scientific techniques for systematized application have been coupled to problems of almost infinite complexity.

Out of this technological revolution has evolved a close relationship between science and government which has existed for nearly two centuries. But the close relationship that exists today has come about since the Second World War. This partnership progressed into an interdependent vitality which now provides security and welfare for the nation and stable growth and support for science.¹

The critical place that research and development (R&D) occupies in our culture and the amount of resources being invested in it require that much more be known about its functions. C. W. Sherwin, former Deputy Director of Defense Research and Engineering, wrote: "Within one generation, modern science and the complex, sophisticated technology, which both springs from it and supports it, have suddenly become the

primary basis of national wealth and military power and also a primary tool of social and economic revolution."² Our survival as a free nation is directly related to our technological superiority maintained by the R&D effort.

The nation's expenditure in basic research has risen to about \$4.0 billion in current dollars. However, inflation has eroded the increases over the last 15 years so as to hold funding at about the 1965 level. The proportion of all R&D funds expended for basic research has remained essentially constant at about 13 percent since 1965. The portion of Department of Defense (DOD) funds invested in basic research has consistently been about three percent of the total R&D budget.

As a country so well known for its achievement in science, little in our early history shows a sustained interest in scientific work. In general our early work was entirely in applied science, carried on in random, sporadic fashion and, for the most part, outside the university or the government.³ In the early days such men as George Washington, Thomas Jefferson, and Benjamin Franklin contributed to and influenced scientific development through their own engineering, inventions, and discoveries and in the thought and wording of the Constitution. Patent rights, national surveys and census, and a standard for weights and measures are only a few of the basic ideas of data taking and scientific procedures that pervaded the writing of the Constitution. Alexander Hamilton made the keystone of his system for the development of American manufactures a system of government bounties and subsidies to scientists and inventors, to accompany the use of tariffs and other government policies for the encouragement of industrialization.⁴

John Quincy Adams believed that the key to the preservation of the Union was the use of all the resources of applied science to create a system of transportation and communication throughout the nation.⁵ But he was the last of the great statesmen of the Federalist period who combined politics with a personal interest in science. As Secretary of State he personally prepared for the Congress a "Report upon Weights and Measures."⁶ In later life he continued his support of a wide variety of scientific programs, and he was killed while traveling to Cincinnati in 1848 to dedicate an astronomical observatory.⁷

A review of the Republic's first 150 years of experience with science shows a coherent pattern on two distinct levels. On the pragmatic level of science responding to the needs of society, the story is one of great accomplishment; steamboats, wireless telegraphy, the cotton gin, motor cars, and airplanes, etc., all attest to this ability. However, on the higher plane of the attempt to create a comprehensive organization of science as a fundamental institution of state, the record is not so clear. In the event that science crossed with practicality, or with government needs, the government gave short-term support.⁸ The Lewis and Clark expedition and the Coastal Survey were early examples of the use of short-term applied science in the field.⁹ During the period of the Civil War, glimpses of other uses of science widened its scope, and in the four decades following 1865, an organized scientific establishment evolved within the government oriented to the immediate problems it faced.¹⁰ Two isolated acts are significant: the creation of the National Academy of Sciences in 1863, to give scientific advice to any requesting government agency; and the Executive Order of 11 May

1918, which set up the National Research Council, "to stimulate research in the mathematical, physical, and biological sciences, and in the application of the sciences." They were ineffective, however, because they were not government agencies supported by Congress and thus always lacked adequate funding.¹¹

With World War I the establishment had to shift into the field of weapons on a large scale for the first time. By the 1930s government science had become so interrelated with society, other research institutes, and the economy of the country that it in turn was affected by the upheavals of the Depression era.¹² The main point is that the nature of this early twentieth-century American scientific organization was entirely applied. The numbers of scientists engaged exclusively in basic research were so few that all of them in the United States could gather in a college auditorium with room to spare.¹³

The only basic research in the world of the nineteenth and early twentieth centuries was done in Europe. The first research laboratories organized solely for pure science were the "teaching laboratories" under Dr. Justus von Liebig at the University of Giessen. These laboratories placed the young student scientist under von Liebig solely for research. The enthusiasm was such that the only problem encountered was getting them out of the laboratory long enough to clean the floors.¹⁴ The idea and organization of such a laboratory have been extremely popular in Germany and still exist today.¹⁵ The renowned research efforts of Germany perhaps are a direct result.

From the very beginning, pure scientific research was government subsidized in the principal European countries.¹⁶ This support is in marked

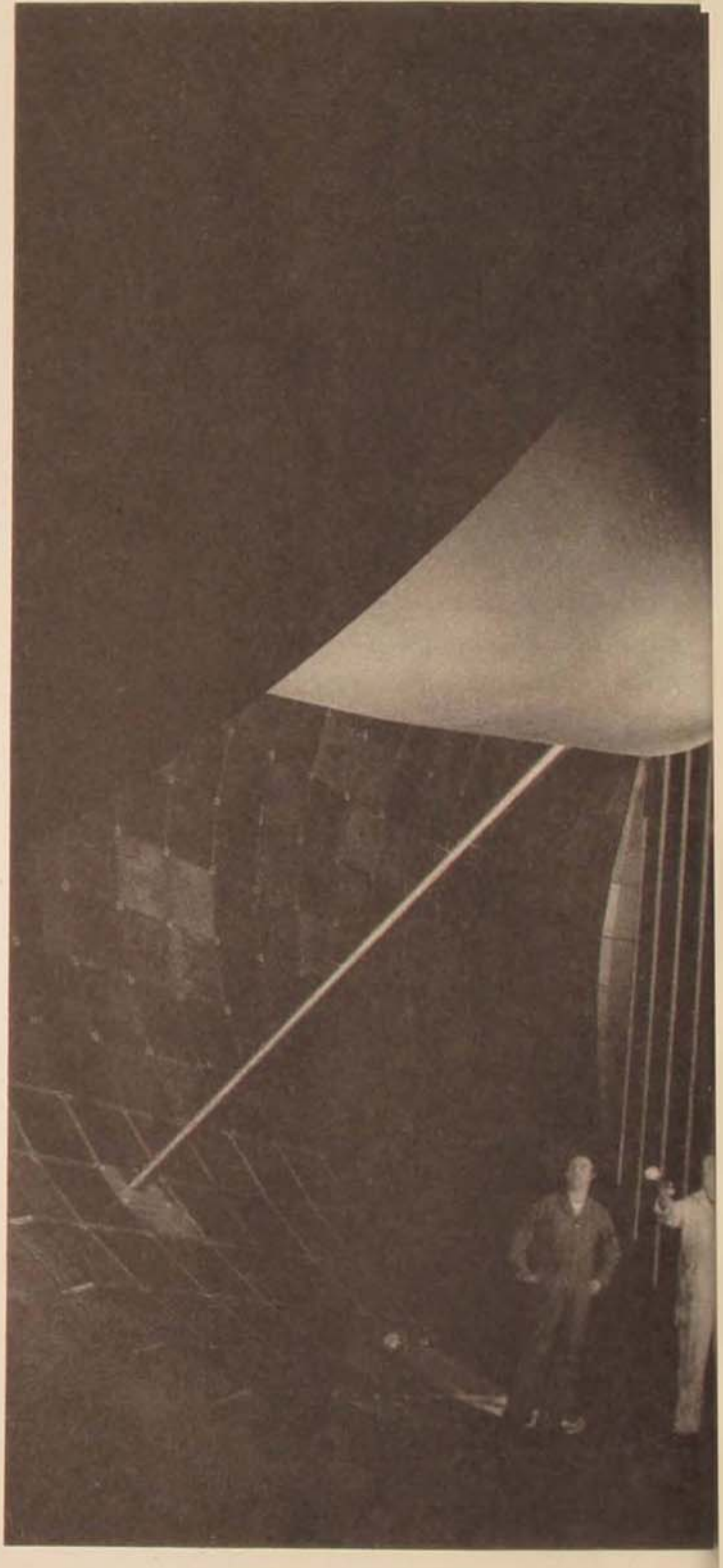
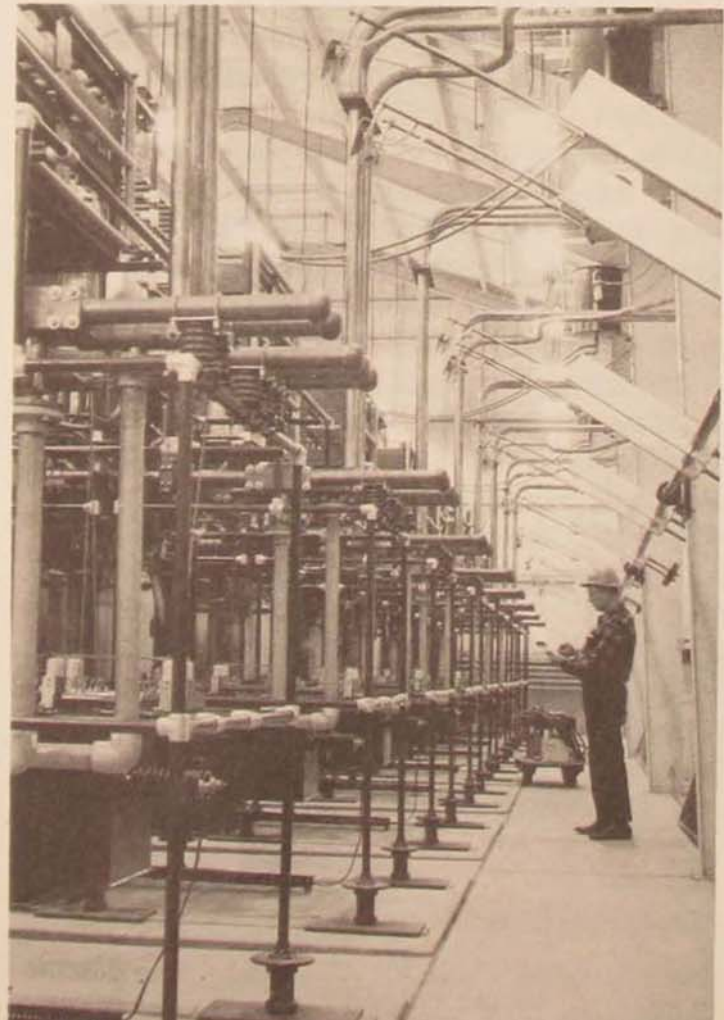
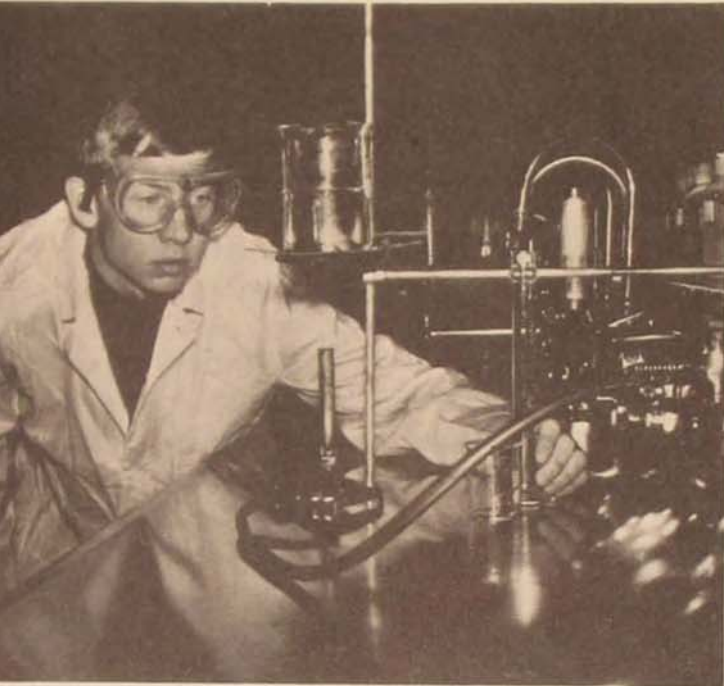
contrast to the practice of the U.S. Congress to fund only limited and strictly utilitarian projects.¹⁷ Not only was there a lack of government support but also a lack of private gifts or bequests. It is interesting that the first large sum of money bequested for the support of science in America came from a foreigner, the Englishman James Smithson. It took Congress nearly ten years to accept the gift and create the Smithsonian Institution. In the last decade of the nineteenth century, the large fortunes of Andrew Carnegie, John D. Rockefeller, and James Lick endowed science with private research foundations.¹⁸ Early in the twentieth century, the federal government established its own scientific bureaus: the Bureau of Mines, the National Bureau of Standards, the National Institutes of Health, the Naval Research Laboratory, and the National Advisory Committee for Aeronautics are a few examples. By 1940 a credible government scientific organization existed. Its emphasis was on applied research, but there was also some expenditure for pure research.¹⁹

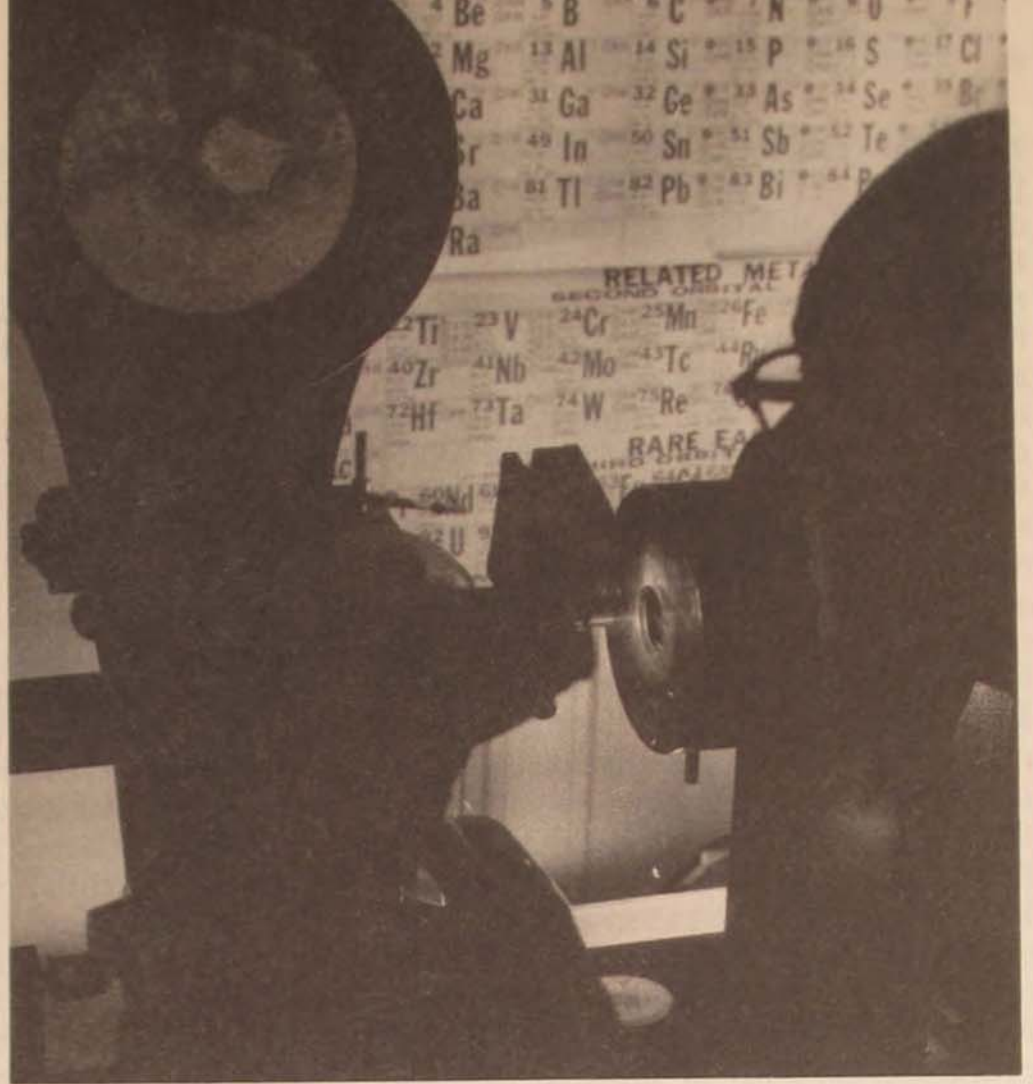
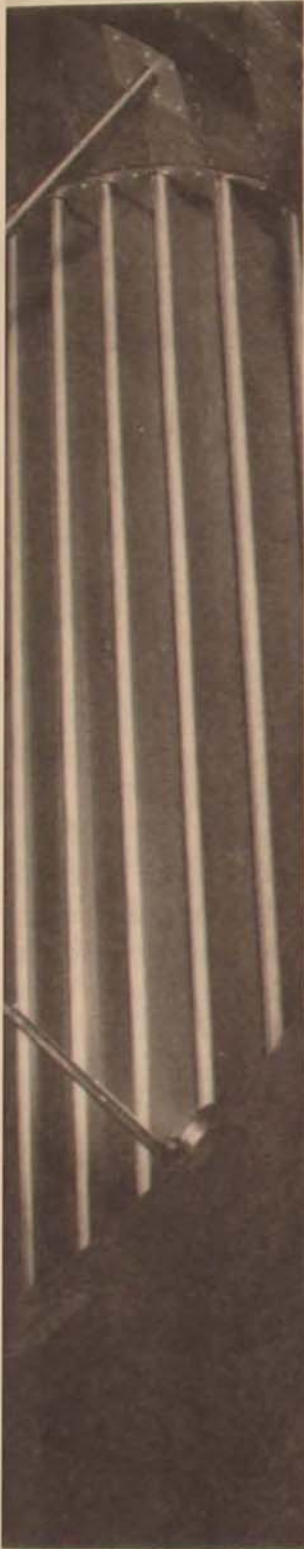
The threats of war were plain by this time. In anticipation of American involvement, President Roosevelt set up the National Defense Research Committee (NDRC) on 27 June 1940 for the express purpose of improvement of instrumentalities, methods, and materials of warfare, with Dr. Vannevar Bush as its director.²⁰ It was expanded into the Office of Scientific Research and Development (OSRD) on 28 June 1941 and given full powers to organize the scientific effort of the nation on a wartime foundation.²¹ Thus, by the time the United States was drawn into the war, science was organized to meet the challenge.

With the end of World War II in 1945 and the demise of the OSRD, its many

**Aspects
of Air Force
Research**

A cadet (below) works in the chemistry laboratory at the Air Force Academy. . . . Power plant (bottom) generates 50 million watts to operate the Electro-Gasdynamics Facility at Aeronautical Systems Division, AFSC, Wright-Patterson AFB, Ohio, for hypersonic flight research. . . . At Arnold Engineering Development Center, Tennessee, the compressor tip and 38-foot diameter fan (center) control airflow of the Propulsion Wind Tunnel. . . . At Air Force Cambridge Research Laboratories, Massachusetts, research is done into the fundamental properties of materials (right). . . . AFCRL scientists use radars at Wallops Island, Virginia (bottom right), for a variety of studies.





scientific projects had to be either phased out or distributed among existing civilian and military agencies, for the scientists who had been engaged in OSRD returned to the universities or to private research laboratories, leaving a large gap in technically competent people.²² The main concern of the military services during the war years was almost solely with advanced engineering and production.²³ Whether the military could shoulder the additional responsibilities of applied and basic research during peacetime was a question still to be resolved.

In Dr. Bush's report, *Science, the Endless Frontier*, he spoke out on military research. He proposed that military research be under civilian control and that the military engage only in "research on the improvement of existing weapons." He further recommended that civilian-controlled military research be made one of the responsibilities of a "National Research Foundation," an agency proposed by Bush to promote the national interest of science.²⁴

Such a civilian orientation to military research was in direct opposition to the already existing plans of the Army Air Forces (AAF), under General H. H. Arnold, to develop "a Buck Rogers program for the next twenty years." General Arnold had already created, in November 1944, an Army Air Forces Scientific Advisory Group with Dr. Theodor von Kármán, a Hungarian-born aerodynamicist, as its chairman.²⁵ Possibly because of his foreign background but more because this did not conform to his concept of military research, von Kármán could not accept civilian control of research and conducted an eight-month-long investigation of the problem. To state his case, he prepared the AAF Scientific Advisory Group report, *Toward New Horizons*, which held that a

national program in basic research was a "necessary adjunct" to the maintenance of a strong military posture.²⁶ He contended that "Every scientific development eventually finds its way into the field of military applications." It was essential, therefore, that government sponsor basic research. But this sponsorship should not be concentrated in one controlling organization; several competing federal agencies should foster research, including an agency of the Army Air Forces. The AAF should not delegate its responsibility to pursue scientific knowledge to any other agency but should be free to call upon any scientific organization or individual for scientific assistance. It was imperative that the AAF be permitted to expand its direct relations, both spiritual and contractual, with the scientific community. No one should act as "the only source of information" between science and the AAF.²⁷

However, von Kármán's report was not translated into action. To begin with, General Arnold, suffering from a chronic heart ailment, retired in March 1946. His successors, as well as many on the Air Staff, favored leaving research to civilians. Then came the problems of declining budgets and demobilization and, in 1947, the establishment of the Air Force as a separate service. The Air Staff had its hands full with the problems of creating an Air Force in-being.²⁸

Nevertheless, government science did not remain static. OSRD went out of existence, and the newly created Atomic Energy Commission (AEC) and the military services fell heir to its offices.²⁹ The Department of Defense was established, and the Secretary of Defense was placed in an authoritative position over the affairs of the three services. The Congress placed particular emphasis on giving the Secretary of Defense direction

and control over the field of research and engineering. The National Security Act of 1947 contained the following provisions:

In enacting this legislation, it is the intent of Congress to provide a comprehensive program for the future security of the United States; to provide for the establishment of integrated policies and procedures for the departments, agencies, and functions of the Government relating to national security; to provide a Department of Defense, including the three military departments of the Army, the Navy (including naval aviation and the United States Marine Corps), and the Air Force under the direction, authority, and control of the Secretary of Defense; to provide that each military department shall be separately organized under its own Secretary and shall function under the direction, authority, and control of the Secretary of Defense; . . . ³⁰

The Navy, by this time, had already persuaded Congress to create the Office of Naval Research (ONR) with a broad charter to conduct research (1946). It was clear that no matter what decisions were made at DOD concerning military research, the Navy would control and conduct its own research program.³¹

The actual overall control in DOD went to the Research and Development Board (RDB), which had authority to preside over military research and development. Dr. Bush was placed at the helm, but without money, facilities, or power the board served only as a high-level coordinating committee.³²

The Air Force, in the meantime, found itself restricted in research to aeronautical sciences, although it was recognized that its efforts would have to be closely correlated with other sciences outside this area. The job of correlation fell to the RDB.³³ Why, the Air Force could ask, should the Navy, through the Office of

Naval Research, engage in the full spectrum of research, while the Air Force was narrowly restricted? It was a question that no one outside the Air Force appeared to ask, much less answer.

The problem at hand was to create a research organization and get on with the actual business of doing the research. There was yet another hurdle to cross. Stuart Symington, then Secretary of the Air Force, was convinced that the Air Force R&D program should be decisively emphasized, but only for development. There would be a research division, but merely to seek answers to problems posed by the development program.³⁴ To von Kármán, a research program subservient to development was no research program at all.³⁵ Symington could not accept the idea that an agency of the Air Force, with a strictly military outlook, was the proper place to conduct research. "It is more fitting," he wrote to Secretary of Defense James Forrestal, "that an agency such as the proposed National Foundation look after basic research. . . . Since there was no national foundation at that time, Symington concluded that, as an interim measure, "the military establishment must . . . pursue basic research on a broad scale."³⁶

Earlier, in the summer of 1947, von Kármán had recommended to the Air Staff that a research organization similar to ONR be established, which would conduct both a contrasting program with universities and industry and an in-house program of research. The Air Staff was receptive, but Lieutenant General Benjamin W. Chidlaw, the Commander of the Air Materiel Command (AMC), the organization with the bulk of the Air Force R&D, provided the most vigorous opposition. Chidlaw contended that the office should be located at Wright Field instead of the proposed site at Washington, D.C.,

and should fall under the Engineering Division of AMC, where it could serve and be controlled by the Air Materiel Command.³⁷ Chidlaw carried the day, and after undergoing several organizational changes the office was established as the Office of Air Research (February 1949). It was moved from under the Engineering Division to a slot parallel to it, and Colonel Leighton I. Davis was appointed the organization's first chief.³⁸

After the first year of operation, the office was no closer to a viable research organization than it had been in the beginning. Staffed with only 33 people and no laboratory facilities, the organization was threatened with failure. Its budgets were disapproved, which deterred everything else. In August 1949, Colonel Davis was selected for the Air War College and left his command feeling that a miracle would be necessary in order to put research on a sound footing in the Air Force.³⁹

At the DOD level, several attempts were made to coalesce all basic research in the physical sciences into a single organization. The Navy attempted to take advantage of this kind of thinking by suggesting that ONR be given the responsibility. Only a determined effort by von Kármán and members of the Air Staff prevented this from occurring.⁴⁰ At about the same time, the Research and Development Board, DOD, suggested that a new civilian research agency similar to OSRD be constructed and given charge of all government research. This proposal, in turn, was defeated by von Kármán.⁴¹

The main problem was that the Air Force was not organized for R&D management. An independent research or development command did not exist; what R&D did exist was part of Air Materiel Command, which encompassed sup-

ply, procurement, testing, advanced engineering, exploratory development, research, and many other small pocket organizations.⁴² The normal operation was channeled into quick-payoff development at the expense of research as well as much of the development projects of a long-term nature. In short, immediate demand, procurement, maintenance, and supply were conflicting with efforts in research.⁴³

Another major problem was separate funding for R&D. Without a budget of its own, R&D could never argue its case before the Air Staff or defend itself from the monetary policies of Air Materiel Command. R&D usually got what money was left over from logistics.⁴⁴

Contributing greatly to this problem were the personnel policies governing a career in Research and Development. In 1949, a career in R&D was considered a one-way street to oblivion. More-aggressive officers sought duty in the operational commands, while officers of less competence tended to gravitate to organizations like AMC. It was with such officers that R&D offices were often staffed.⁴⁵ However, aggressive officers with a scientific background were at a premium in the military. With the great exodus after the war of nearly all the scientists and engineers, there simply were not enough to go around. Low pay, the lack of challenging work in research, and the unending government red tape did little to lure scientists away from the congenial atmosphere of university laboratories.⁴⁶

With so many internal problems, it was obvious that some sort of reorganization would have to take place. A civilian committee headed by Dr. Louis Ridenour, physicist (soon to become the first Chief Scientist of the Air Force), concluded the investigation in September 1949. The

recommendations to the Air Staff were to give full representation to R&D on the Air Staff, create an independent R&D command with a separate budget, and eliminate discriminatory personnel policies.⁴⁷ These findings were corroborated by a similar military committee, which based its report on the work done by the Air University staff.⁴⁸

After considering both the Air University Report and the Ridenour Report, the Air Staff, late in January 1950, created the Air Research and Development Command (ARDC), which would be devoted entirely to problems of research and development.⁴⁹ The goals relating to research were defined broadly by the Ridenour Report. They included supporting a program in basic research by contract, establishing an Air Force science fellowship program, and transforming the Air Force Institute of Technology into a first-rate graduate school of engineering. The Office of Air Research would play the key role in the dispatch of these goals. The kind of research that would be done in-house was not left to conjecture: the report stated that the research would be of potential interest to the Air Force but that it would also be in broad fields and would not be directed toward definite goals or applications. The research contract itself did not even specify what was to be investigated, except in terms proposed by the investigator. Moreover, contracts were awarded less with regard to the description of the project than with regard to the ability and promise of the principal investigator. It was evident that the Ridenour Report endorsed a systematic pursuit of fundamental science for the Air Force.⁵⁰

To implement the program was yet another matter. The many small research projects scattered through AMC had to be transferred along with the

work that was going on in the Office of Air Research. This removal was accomplished fairly easily, since nearly everyone agreed that research should be under the auspices of ARDC. However, development projects were transferred only after a bitter fight, which lasted a full fifteen months. It was April 1951 before the new command became operational.⁵¹

The job of organizing ARDC's research efforts went to Brigadier General Donald J. Keirn. He proposed to create an academic atmosphere conducive to scientific thought and envisioned the organization as similar to the Office of Naval Research, comprising both a contract and an in-house research program. Scientists attached to the command would monitor relevant contracts, do in-house research, and advise on supervisory duties. The main item in the program was a modern in-house laboratory where the scientist could be free to pursue his projects and from which the Air Force could draw inspiration and ideas as well as have a pool of in-house competence.⁵²

The idea never got off of the ground. The main opposition came, strangely enough, from Chief Scientist Ridenour, who looked at the proposed research laboratory as a private scientific playhouse. His opinion was formed from an inspection trip of Air Force laboratories, where he found ramshackle facilities, manned by second-rate scientists, strangling in a maze of red tape. He had come to the conclusion, since writing the Ridenour Report, that Air Force laboratories could never attain the stature of even a mediocre university laboratory.⁵³ The whole idea of an internal laboratory was dropped, and the dismemberment of Keirn's command took place. His job, the Assistant for Research in the Basic Sciences, was changed to the Office of

Scientific Research, and Colonel Oliver G. Haygood, a subscriber to the views of Dr. Ridenour, became the new head of the research agency.⁵⁴

AFTER SEVEN years of turmoil, a course had been set for Air Force research. By embarking on a program involving research solely by contract, the Air Force was admitting that it could not manage an in-house research program. Perhaps, at the time, this judgment was correct. The Air Force research program had a great deal of growing to do, but it was evident that it would only be a matter of time before some sort of in-house program would be started. The beginning would have to come from the applied sciences, which it did some six years later.

In May 1958 Lieutenant General James H. Doolittle, Air Force Reserve, officially dedicated a new physical sciences building at Wright Field to pioneer in applied research for military application. The building was a part of the Office of Scientific Research and was staffed by scientists who had been doing basic research for years. By this time, despite the purport of Doolittle's words and despite preoccupation with research with specific applications, this new laboratory had already begun to function as a basic research laboratory.⁵⁵

That same year, the Department of Defense was reorganized so that research and engineering became functionally organized throughout the Department. The Defense Reorganization Act of 1958 defines the responsibilities of the Director of Defense Research and Engineering as follows:

The Director performs such duties with respect to research and engineering as the Secretary of Defense may prescribe, in-

cluding, but not limited to, the following: (1) to be the principal advisor to the Secretary of Defense on scientific and technical matters; (2) to supervise all research and engineering activities in the Department of Defense; and (3) to direct and control (including their assignment or reassignment) research and engineering activities that the Secretary deems to require centralized management.⁵⁶

To enable the Director of Defense Research and Engineering to carry out these responsibilities, the Secretary of Defense, by means of Department of Defense Directive 5129.1, delegated authority to him to:

Approve, modify, or disapprove programs and projects of the military departments and other Department of Defense agencies in his assigned fields to eliminate unpromising or unnecessarily duplicative programs, and initiate or support promising ones for research and development.⁵⁷

The Joint Chiefs of Staff have been given responsibility for advising the Secretary of Defense on the military worth of R&D objectives. Their duties are stated in Department of Defense Directive 5100.1 as follows:

To advise and assist the Secretary of Defense in research and engineering matters by preparing: (a) statements of broad strategic guidance to be used in the preparation of an integrated Department of Defense program; (b) statements of overall military requirements; (c) statements of the relative military importance of development activities to meet the needs of the unified and specified commanders; and (d) recommendations for the assignment of specific new weapons to the armed forces.⁵⁸

The effect of this reorganization along with the impact of the Soviet Sputnik inspired an extensive reorganization in ARDC in January 1960. Under the new setup, ARDC was reshaped along function-

al lines. Out of this emerged the Air Force Research Division, into which went nearly all of ARDC's basic research activities, which up to that time had been officially operating as applied laboratories. The remaining development projects were organized into the Air Force Systems Command (AFSC), which still retained a good measure of research capability.⁵⁹

But the process did not end there. A year later, in April 1961, the Air Force Research Division was broken off, renamed the Office of Aerospace Research, and given the status of a major air command. It included three in-house laboratories, which had sprung up under applied research: Air Force Cambridge Research Laboratories, Cambridge, Massachusetts (AFCRL); the Aeronautical Research Laboratory, Wright Field, Ohio (ARL); and the Frank J. Seiler Laboratory, Air Force Academy, Colorado, which was added in September of that year. An office was established to manage scientific contracts other than those handled by the laboratory scientists relating directly to their in-house work: the Office of Scientific Research in Washington, D.C. A number of liaison offices were also added through AFSC and NASA as well as foreign contracting offices in Europe and South America.⁶⁰

The status of research was, indeed, greatly aided by the sequence of events in the late '50s. Principal among these were the launching of *Sputnik I*, the subsequent emphasis on government research in the applied sciences as well as basic research in the physical sciences, and the tremendous demands of a technically conscious public.

The major reorganization in 1961 established research as a separate command directly under the Chief of Staff, USAF, while the development laborato-

ries and product divisions were established in the Air Force Systems Command. Nine years later, research was moved into AFSC and functionally organized as a laboratory. This move stressed the role of research to support the development laboratories and product divisions. Again in 1975, as a result of a study of the utilization of the Air Force laboratories (the Chapman Report),⁶¹ the research laboratories at ARL and AFCRL were reorganized into the development laboratories, and the Office of Scientific Research (OSR), was made single manager of all basic research in the Air Force. OSR still functions under AFSC, but it at once retains the focus of basic research and also ensures close liaison with development needs. The quantity and quality of research problems are by no means diminished but, in fact, are challenged by the deficiencies of weapon systems and their application. Strong leadership in research can keep these lines clear and serve well both an innovative basic research effort and a technology-dependent development and production division.

THE EVOLUTION of the Air Force research laboratory has been a difficult one. The main problems have been, from the very beginning, the lack of military commanders with a scientific background or interest and the absence of a sustained drive by the government to foster basic research throughout government agencies. The original plans of Dr. Bush over thirty-five years ago slowly came to fruition, while General Keirn's dream of an in-house research laboratory was only a few years premature. The military has had a negative inertia, or incompetence, in scientific matters to overcome, and still, today, it is engaged in trying to dis-

pel this stigma.⁶² However, the organization of an in-house basic research effort with a basic research mission geared to development needs now forms the nucleus around which creative scientists can work. Perhaps it is not yet the optimum organization, but in consideration of its historical development, the scientist and the necessary environment are at last conversant in a military household.

The long-range objectives of the military services are supported primarily by the technology evolved from our basic research today. The Air Force development laboratories are making a significant contribution to this objective in basic research and in applied and developmental projects. This organization can meet the challenge.

Air Force Office of Scientific Research

Notes

1. A. Hunter Dupree, *Science in the Federal Government* (Cambridge, Massachusetts: Belnap Press of Harvard University, 1957), p. 1.
2. C. W. Sherwin, "A Challenge to the Scientific Community," *Naval Research Reviews*, November 1963, p. 2.
3. Don K. Price, *Government and Science, Their Dynamic Relation in American Democracy* (New York: New York University Press, 1954), pp. 4-31.
4. "Report on Manufactures," in *The Works of Alexander Hamilton* (New York: Williams and Whiting, 1810), vol. 1, pp. 235-36.
5. Price, p. 6.
6. John Quincy Adams, Secretary of State of the United States. *Report upon Weights and Measures, Prepared in Obedience to a Resolution of the Senate of the Third March, 1817*. Washington: Gales and Seaton, 1821. Thomas Jefferson, as Secretary of State, had submitted to the House of Representatives on 17 July 1790 a *Report of the Secretary of State on the Subject of Establishing the Uniformity of the Weights, Measures, and Coins of the United States*.
7. Price, p. 7.
8. Dupree, p. 380.
9. *Ibid.*, p. 375.
10. *Ibid.*, p. 376.
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12. Dupree, p. 376.
13. Ralph E. Lapp, *The New Priesthood* (New York: Harper & Row, 1965), p. 3.
14. E. Mendelsohn, "The Emergence of Science as a Profession in Nineteenth-Century Europe," *The Management of Scientists* (Boston: Beacon Press, 1963), pp. 18-21.
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19. *Ibid.*, pp. 79, 81.
20. Executive Order, pursuant to section 2 of the Act of 29 August 1916 (39 Statute 649), for "Establishing the National Defense Research Committee," signed by Franklin D. Roosevelt, 27 June 1940.
21. Executive Order Number 8807 (as amended by Executive Order Number 9389, dated 18 October 1953), "Establishing the Office of Scientific Research and Development in the Executive Office of the President and Defining Its Functions and Duties," signed by Franklin D. Roosevelt on 28 June 1941.
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23. Bush, p. 28.
24. *Ibid.*, pp. 33-34.
25. H. H. Arnold, *Global Mission* (New York: Harper and Brothers, 1949), pp. 532-42, 580.
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28. Ethel M. DeHaven, *History of the Separation of Research and Development from the Air Materiel Command* (AMC Historical Study, 1952), pp. 35-39.
29. Joseph Stefan Dupre and Sanford A. Lakoff, *Science and the Nation* (Englewood Cliffs, New Jersey: Prentice-Hall, 1962), p. 65.
30. United States Congress. *An Act To Promote the National Security by Providing for a Secretary of Defense; for a National Military Establishment, for a Department of the Army, a Department of the Navy, and a Department of the Air Force; and for the Coordination of the Activities of the National Military Establishment with Other Departments and Agencies of the Government Concerned with the National Security*. Public Law 253, 80th Congress, 1st Session, 1947, vol. 61, p. 495.
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43. Letter, von Kármán to Symington, 15 January 1949, MS.
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48. Memo, General Muir S. Fairchild to Eugene M. Zuckert, Subject: "Establishment of a Deputy Chief of Staff for Development and a Research and Development Command," 1 February 1950, MS.
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53. Memo, Louis N. Ridenour to General Schlatter, Subject: "Office of Air Research," 12 October 1950, MS.

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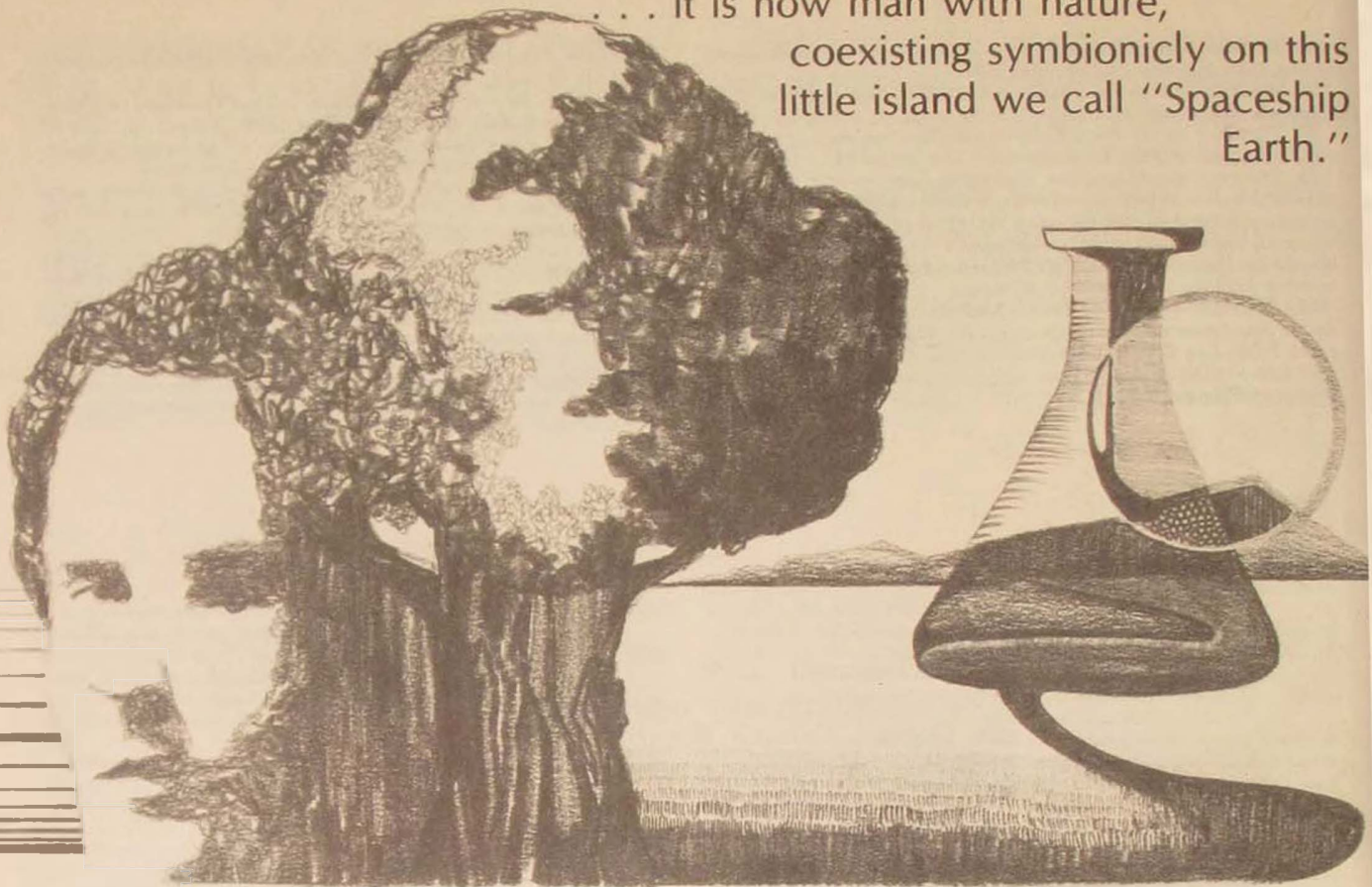
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Acknowledgment

We wish to express our appreciation to Lieutenant Colonel Enrique Ramirez, Directorate of Mathematical and Information Sciences of the Air Force Office of Scientific Research, Air Force Systems Command, for his assistance in coordinating the articles by Colonel Robert M. Detweiler and Colonel James E. Strub.

The Editor

... it is now man with nature,
coexisting symbionically on this
little island we call "Spaceship
Earth."



RESEARCH HORIZONS

Where the Air Force ought to be going

COLONEL JAMES E. STRUB

THE research paths we choose now will have a direct bearing on how strong the Air Force is in the future, particularly in the period from 1985 to 1995. Such a cause-and-effect relationship is well known. What is not well known is what those research paths should be, and as time goes on the requisite decisions become more and more difficult to make. Each year there seem to be twice as many candidate projects as before, and each year we seem to have fewer real dollars to spend on research. There is also that old circular question of whether new requirements call for new avenues of research or whether the successes of research foster new requirements. Thus,

in addition to considering a burgeoning of possible avenues and a gradual cut in spending power, we must also ask questions such as "Does each project have to support a formally validated system requirement?" or "Do we pursue a project because it shows great promise for some important or novel application, even though there is as yet no validated system requirement?"

These are questions that are not always answerable. But a visionary researcher could make a pronouncement such as the following:

The next ten years should be a period of systematic, vigorous development, devoted to the realization of the potentialities of scientific progress, with the following principal goals: supersonic flight, pilotless aircraft, all-weather flying, perfected navigation and communication, remote-controlled and automatic fighter and bomber forces, and aerial transportation of entire armies.¹

This would be a balanced program in that it calls for realizing "the potentialities of scientific progress," which is the research-fosters-requirements side of our stated circular question but with specified "goals," which is the requirements-calls-for-research side. And what are these goals? The statement says "supersonic flight," which could mean Mach 4, ramjets, heat sinks, etc. It says "pilotless aircraft," which could mean cruise missiles, drones, remotely piloted vehicles (RPV). It says "all-weather flying," which could mean all-weather tactical operations in any combat theater. It says "perfected navigation and communication," which could mean the NAVSTAR Global Positioning System, jam-resistant data links, and a host of satellite-borne communications relays. It says "remote-controlled and automatic fighter and bomber forces," and that could mean a

new class of highly sophisticated RPV's with advanced capabilities for communications warfare and with flight regimes from low-level terrain following right on up to ballistic missile trajectories. And, finally, it says "aerial transportation of entire armies," which could refer to the upgraded C-5, the stretch C-141, the Advanced Tanker Cargo Aircraft, and the Advanced Medium STOL Transport. All told, this is a fairly representative list of the broad goals we would like to achieve during the next ten to twenty years.

Yet, surprisingly enough, the quoted statement is more than thirty years old! It was written by Dr. Theodor von Kármán in his letter² that transmitted the report "Toward New Horizons" to Chief of Staff General H. H. "Hap" Arnold in December 1945. When von Kármán specified a goal of "supersonic flight," he meant any aircraft that could cruise appreciably above Mach 1. When he spoke of "all-weather flying," he was referring to instrumented navigation and landing systems and weather-avoidance systems. When he said "automatic bomber forces," he was thinking of the German buzz bombs of World War II, and so on. But the goals he spoke of, i.e., the words he used, are almost the same words we use to describe our goals now. And that is an interesting point—our broadly stated goals do not change very fast; only the details change.

evolution and breakthroughs

The process of aerospace research is largely evolutionary, with only an occasional discontinuity or breakthrough. But such breakthroughs can change the world, so we tend to nurture anything that appears to have that potential. In making our research choices, we look for opportunities—projects budding now in



Dr. Theodor von Kármán, space-age genius and military-scientific mentor sans pareil

the backrooms—that seem to offer the most promise for significant change in the 1980s or beyond, regardless of what the exact application might be. For example, we are aware now of an opportunity for producing structural plastics from agricultural products rather than from petrochemicals, thus taking advantage of resources that are renewable rather than using up those that are exhaustible.³ In a similar vein, we are aware of an opportunity for producing structural plastics that are self-reinforced from molecular orientation rather than being fiber reinforced, thus saving on both cost and weight.⁴ We are becoming aware of the advantages of using fiber optic circuits instead of or in conjunction with electrical circuits.⁵ We are also becoming aware of the possibility of exotic new fuels, such as metallic hydrogen,⁶ and so on. Any one of these budding technologies could bloom and change the world.

Meanwhile, there are some cases in

which given requirements do clearly call for new avenues of research or, for that matter, *demand* substantial jumps in state-of-the-art capability. A good example is the concerted effort now to achieve the break-even point in controlled fusion electric power. Another is the problem of responding to what our competition is doing. What must we cope with? What are the threats, whether in the military sense or in the competitive market sense or to national pride? From these threats, someone will inevitably derive requirements, and then the research and development (R&D) process will be expected to react accordingly. A celebrated example of this phenomenon is the crash program in a “have-not” nation to become a “have” nation in the world of nuclear detonation.

available resources

Whatever the crash requirements of 1976 or whatever the budding opportunities of 1976, the course of our research must also be appropriate to the resources available in 1976. For some years now there has been a growing concern over the ever increasing rate at which we use our natural resources, particularly those which are not, in a practical sense, replenishable. In 1972 we had the Club of Rome report on “Limits to Growth.”⁷ In 1973 we had the long-expected energy crisis. In 1974 Dr. Robert C. Seamans told a *U.S. News & World Report* interviewer,

We are in a new era today. In the past, with America’s superabundance of resources, we didn’t have to be so careful. Today, many resources in this country are scarce.⁸

In 1975, a group of 400 scientists, scholars, businessmen, and political leaders meeting in Houston agreed that it is

a gloomy world, indeed, wherein seemingly unrelated problems such as the energy crisis, famine in underdeveloped nations, financial breakdown in New York City, drug use among the young—all are portents of unprecedented dangers in the next 25 to 100 years, in the industrial and nonindustrial societies alike.⁹ The message here is that there are very real limitations to land, water, energy, fertilizer, etc.; that science, industry, and government are not keeping up, most probably cannot keep up, with the public's expectations of overcoming such limitations through application of new technology; and that civilization as we know it will suffer sudden and catastrophic breakdown before our *Tricentennial* unless total material consumption is reduced.

What does all this have to do with Air Force research objectives? It simply means that as time goes on we should give increasing attention to avenues of research that lead to products amenable to a world of scarcity, at least until breakthroughs in energy and materials research do occur. This view of the future represents a significant departure from the potential world of plenty in which von Kármán found himself at the end of World War II.

Along this same line of thought is the matter of funding. The research budget climate may be getting better this year, but over the last several years research funds have been gradually dropping in terms of both absolute dollars and of real buying power. "Research funds" here are taken to mean the spending for Program 6.1, the seed of all development that follows. In the Air Force, this funding as a percentage of all research, development, test, and evaluation (RDT&E) has steadily dropped from 3.0% in Fiscal Year 1971 to 2.3% in FY 1976,¹⁰ a downward

change of 23% in just five years. With recent favorable comments on research from President Ford¹¹ and favorable support of the Defense budget by the Congress, we may see some easing of the decline in funding for research; but any improvement will probably be relatively small in the foreseeable future.

shared and joint programs

Potential limitations on natural resources, stringent limitations on funding—these are significant factors in the 1976 world from which we view our research horizons. There is also a third factor: the realization that we are not alone. Our research horizons are inextricably interwoven with those of NASA, ERDA, ARPA, the Navy, the Army, the aerospace industry, universities, and foreign governments, including the Soviet Union. Thus, in the constant reappraisals of our own horizons, we must be as aware as possible of the horizons in focus elsewhere. We do so not only to conserve resources but also to avoid duplication and to take fullest possible advantage of what others are doing. Accordingly, it becomes increasingly important to combine forces, either in outright joint ventures under joint management as in the case of the NASA/USAF program in Highly Maneuverable Aircraft Technology, or by explicit agreements in which each party has assigned responsibilities as in the case of the Shuttle, or, at the least, in mutual cognizance in which each party is to have use of the results produced by each other party. In this way, security considerations permitting, friendly rivalries can be turned into friendly cooperation, to the economical and technological benefit of all concerned.

In a similar way, the Air Force often benefits from research pursued by other

parties for their own reasons. A case in point is computer technology, one of the most economically appealing avenues of research ever undertaken by industry, and this is done almost entirely without Air Force instigation or funds. In cases like this, all we have to do is take advantage of the results.¹²

As for research we do ourselves or have done under our control, it will be increasingly important to make maximum possible use of all existing laboratories, test facilities, test ranges, etc. If some other organization owns and operates a facility that we need and do not have, then we should make every effort possible to obtain use of that facility rather than try to justify building one of our own. Likewise, when another agency requests use of our facilities, we should accommodate them in every way possible. A good example of this kind of cooperation is the excellent working relationship between the Air Force and NASA, particularly with respect to use of the joint collection of wind tunnels and engine test stands.

In such ways as these we can make our limited research dollars go further and at the same time help hold down the growth rate of government R&D facilities, military test ranges, etc. More important, by employing the conservation practices previously mentioned, we shall be doing our part to avoid the ultimate demise forecast by the Club of Rome and by that group of 400 in Houston.

changing objectives

Even so, it will be a more constrained world, a world that forces one to examine his objectives ever more closely. Regarding Air Force research, this means examining how to use the results of our research. In the past, our general objec-

tive of a strong Air Force implied almost total emphasis on higher performance, which often led to greater and greater cost per increment of improvement. Consequently, in many systems we are now reaching the point where a one percent improvement in performance might cost as much as all previous improvements put together. Indeed, as Dr. Michael I. Yarymovych often observed, "We are modernizing ourselves into bankruptcy!"¹³ This could be particularly true in the areas of aircraft propulsion, flight dynamics, metal alloys, and many others. There are performance limits or asymptotes for every device conceived by man, and when we get near those limits, we might well back off and shift our emphasis elsewhere.

In recent years, that "elsewhere" is more and more turning out to be efficiency. This is especially true in the context of the constrained world discussed earlier, in which it becomes increasingly important to use new state of the art as a means for reducing acquisition costs, or for increasing system reliability, or for reducing operating and maintenance costs, rather than giving first priority to raising performance characteristics. To some extent this is the same theme played in the new approach known as "life-cycle cost," one of the six "future objectives and priorities" specified in General David C. Jones's testimony earlier this year to the House Appropriations Committee. In that presentation the Chief of Staff said,

As part of both R&D and acquisition improvements, we must strive to develop systems with lower life cycle cost, particularly costs for operations and maintenance. We need to concentrate on systems designed for high reliability, ease of maintenance, and low manpower demand in order to reduce the

overall costs of operating and maintaining the Air Force of the future.¹⁴

We can expect to see more and more emphasis on this particular management objective. Granted, it is a more cautious approach than in the past, but certainly in concert with a world of increasingly limited resources per capita.

This entire approach may seem rather conservative, and it is—literally. Thus, any contemporary view of research horizons is a view through lenses colored by limited supplies of energy and materials, relatively limited funding, increased cooperation with other agencies, increased use of their facilities and results, and increased emphasis on efficiency and lower life-cycle costs. It is also a changing view, but one changing slowly and with only an occasional breakthrough to pure brilliance.

new horizons

What does one see through such lenses? What are the opportunities on which we should focus? Perhaps the most current and comprehensive answer to these questions is to be found in the seven-volume report of Project New Horizons II, the most recent of many successors to von Kármán's "Toward New Horizons."¹⁵ The cochairmen, Dr. Yarymovych and Major General Foster Lee Smith, summarized their conclusions as follows:

Our assessment of future world conditions and military trends points to several broad Air Force needs for the period 1985–2000. Salient among these is the need to exploit new technology to achieve required Air Force capabilities within a period of resource austerity. Fundamental to achieving those capabilities is a stable and

In 1945 Dr. von Kármán projected goals for the next ten years and mentioned "automatic bomber forces." He probably had German buzz bombs of World War II in mind. A copy of that V-1 buzz bomb yields important data in tests conducted by Air Force research engineers at Holloman Air Force Base, New Mexico.



adequate level of effort by the Air Force in basic and applied research. At the same time, the burgeoning of technology presents a continuing challenge of selecting from many approaches those few that will best contribute to Air Force combat capability.¹⁶

With this assessment in mind, they recommended eight "near-term actions appropriate to meet study goals," from which we can infer attendant research goals. In the New Horizons II briefing, which was presented to some forty audiences over a one-year period, the first such action received special emphasis and was always presented separately, as in the next paragraph. The remaining seven, in approximate order or priority, were that "the Air Force should:

- Greatly expand the exploitation of space technology through integrated systems applications for projecting air power anywhere in the world.
- Build into future space systems appropriate survivability, to include establishing a survivable post-attack launch capability for space missions critical to national survival.
- Explore more vigorously the potentiality of directed energy weapons, first by pursuing now the requisite technologies for weapons-grade power and fire control, leading towards application in airborne and space weapons platforms.
- Pursue the development of tactical air forces which can operate independent of visibility conditions.
- Establish a digitalized cartographic reference system in GPS-related coordinates for worldwide operations by US forces against targets below, on and above the earth's surface.
- Postulate configurations of a heavy-lift, global-range transport aircraft in terms of the technology, cost, and energy regimes expected in 1985 and beyond.
- Develop a space defense system, us-

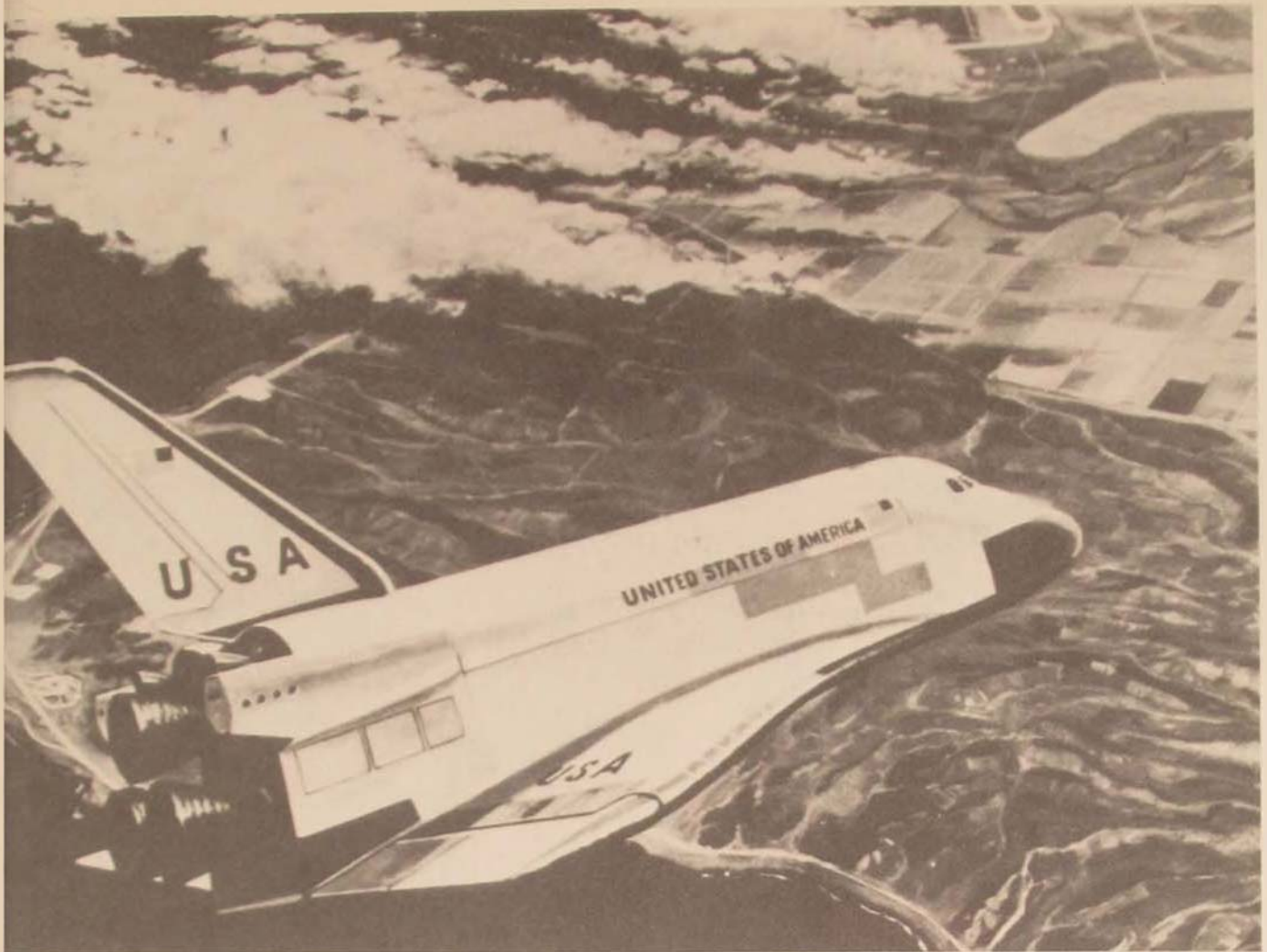
ing an airborne or space-based laser or other nonnuclear weapon, to be ready for deployment when unhindered use of space should be challenged."¹⁷

For their principal near-term action, the cochairmen of New Horizons II focused on an area which requires considerable improvement: command control systems; and on a paradox: for a fraction of the price of new weapon systems, we could finance command control systems that would appreciably multiply the *usefulness* of these systems. They concluded that the key factor here is intelligent application of the fruits of research in microelectronics and advanced computer technology or, in other words, that the Air Force should exploit what the study called "computational plenty."¹⁸

Here is their major conclusion and recommendation:

Today, as in the past, the Air Force is organized to develop, operate, and support aircraft. It performs these tasks superbly, and it must continue to do so. The principal new challenge, however, is to exploit burgeoning opportunities for more efficient and effective control of forces. If this challenge is to be met, [the Air Force should] reorient the principal focus of Air Force management and organization toward development, operation, and support of systems through which control of forces and weapon systems is exercised, particularly the control of general purpose forces. Fullest advantage should be taken of accelerating advances in signal and data handling technology.¹⁹

WHAT, THEN, are the research horizons before us now? In specific terms, we do not know; nor can any one agency know, let alone establish, such goals in much detail. In general terms, we do know and have for a long time because such goals



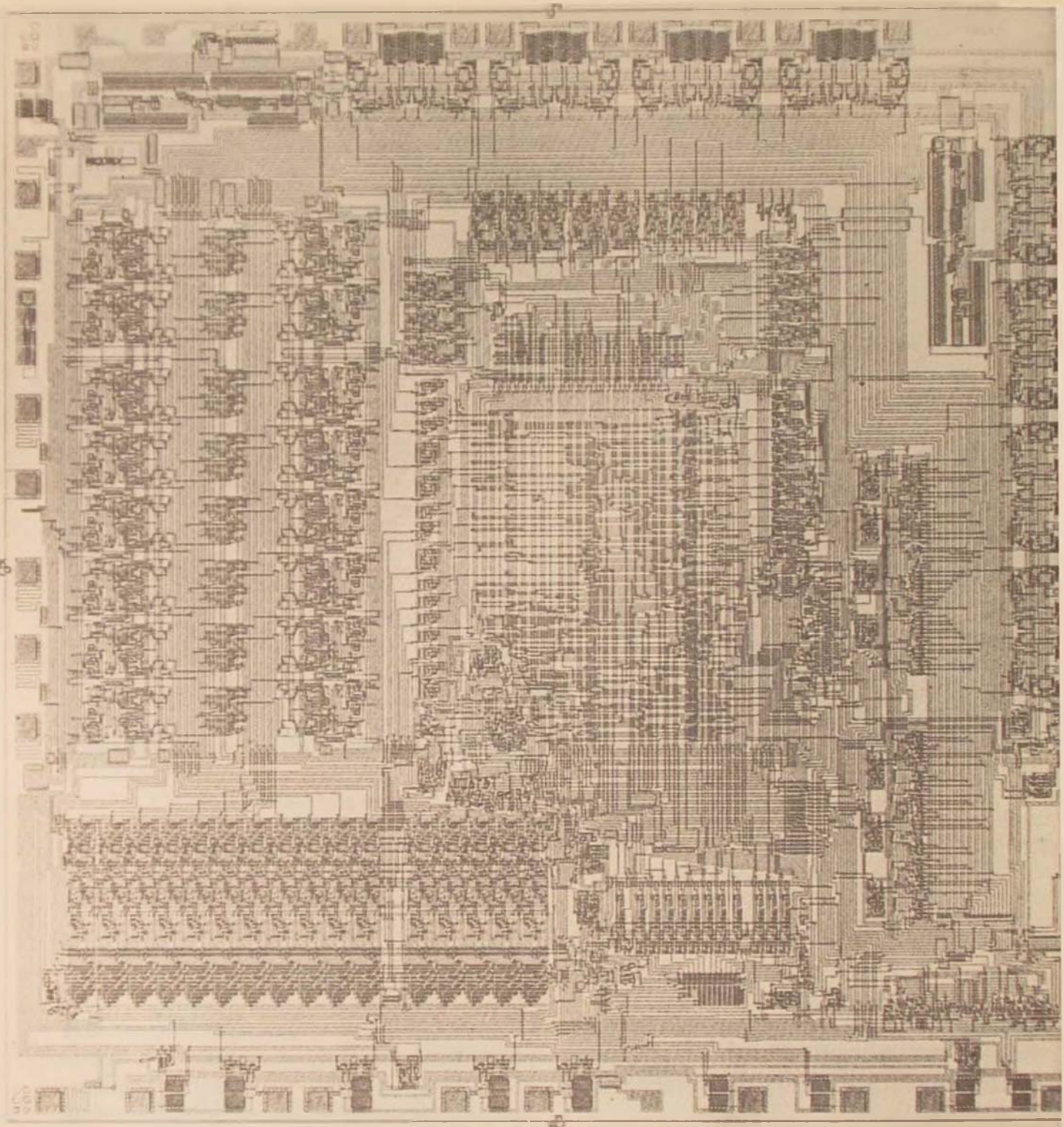
In an era of limited appropriations and diminishing natural resources, joint programs and the sharing of facilities and materiel become increasingly vital. The Space Transportation System with its Space Shuttle orbiter (seen in artist's concept) is a NASA project in which the Air Force will play a significant role, for example, in the landing site at Vandenberg Air Force Base, California, for use in the 1980s.

are almost totally evolutionary and continuous rather than revolutionary or discontinuous. Perhaps we can state them in general terms:

- We are maintaining our research focus on state-of-the-art disciplines that support steady improvement of strong strategic deterrent forces, a subject deliberately not addressed by New Horizons II.

- We are gradually, and at the same time, shifting our research focus onto disciplines having strong application to goals such as those recommended by New Horizons II.

Stated another way, the answer to the question of "where the Air Force ought to be going" is that we ought to keep our research going in about the same direction, but with fresh awareness of the in-



Another area where the Air Force has benefited from "sharing" is computer technology, which the Air Force can sometimes assimilate ready-made from industry into its own systems. The microprocessor "chip," the control unit for an ACTRON microprocessor set called UDAM (Universal Digital Avionics Module), contains 4413 electronic devices and measures 1/5" to a side. Other chips are the arithmetic unit and the memory, similar in size and complexity.

creasingly constrained world around us. The real challenge is not so much in deciding what research to pursue but rather in how best to apply the results. Even if our "research horizons" were to remain fairly unlimited, the *application* of new state of the art would come up more

and more against decisions of the ultimate. It is no longer a matter of man's overcoming the elements or of his exploiting nature; it is now man *with* nature, coexisting symbionically on this little island we call "Spaceship Earth."

Office of the Chief Scientist

Notes

1. Theodor von Kármán, Director, AAF Scientific Advisory Group, in a letter to General of the Army H. H. Arnold, Commanding General, Army Air Forces, Washington, D.C., 15 December 1945, p. ix.

2. *Ibid.*

3. *New Horizons II*, volume IV, "Technology Emphasis" (Washington: USAF/XOD, June 1975), pp. 2-6.

4. *Ibid.*

5. *Ibid.*, pp. 2-12.

6. *Ibid.*, pp. 2-5, A-34.

7. Donella H. Meadows, Dennis L. Meadows, Jørgen Randers, and William W. Behrens III, *The Limits to Growth* (New York: Universe Books, 1972).

8. Robert C. Seamans, Jr., President, National Academy of Engineering, in an interview by *U.S. News & World Report*, 23 September 1974, p. 74.

9. Kenneth R. Sheets, "As the Future Closes in on Us," *U.S. News & World Report*, 3 November 1975, p. 88.

10. Source: Robert W. Cox, Programming Division (RDXP), Directorate of Planning, Programming and Analysis, DCS/R&D, Hq USAF, March 1976.

11. Gerald R. Ford, "Remarks of the President upon Signing the Transmittal of the Science and Technology Message," Washington, Office of the White House Press Secretary, 22 March 1976.

12. *New Horizons II*, volume IV, p. 2-1 to 2-4.

13. Michael I. Yarymovych, Chief Scientist of the Air Force (1 August 1973-30 April 1975).

14. David C. Jones, "FY 1977 Posture Statement," presentation to the Committee on Appropriations, U.S. House of Representatives (Washington: Department of the Air Force, 2 February 1976), p. 36. (Note: General Jones presented similar statements to the Senate Armed Services Committee and Senate Appropriations Committee, February 1976.)

15. Theodor von Kármán, et al., *Toward New Horizons*, AAF Scientific Advisory Group (Washington, D.C., 1945; published by Hq Air Materiel Command, Dayton, 1946).

16. *New Horizons II*, volume I, "Executive Summary" (Washington, D.C., June 1975), p. iii.

17. *Ibid.*, pp. iii, iv.

18. *New Horizons II*, volume IV, p. 2-1 to 2-4.

19. *New Horizons II*, volume I, p. 29.

Since reason condemns war and makes peace an absolute duty, and since peace cannot be effected or guaranteed without a compact among nations, they must form an alliance of a peculiar kind, which may be called a pacific alliance (*foedus pacificum*), different from a treaty of peace (*pactum pacis*), inasmuch as it would forever terminate all wars, whereas the latter only ends one.

Immanu one.
Immanuel Kant:
Perpetual Peace. II, 1795.

NUCLEAR TECHNOLOGY IN SUPPORT OF OUR STRATEGIC OPTIONS

MAJOR GENERAL EDWARD B. GILLER,
USAF (RET)



There is every reason to expect that the arming of the USSR on all fronts and in all the branches of the service will continue unabated. *Détente* with the United States will have little if any bearing on this matter; it sets limits on certain types of weapons, perhaps, and calls perhaps for some caution, but it is most improbable that a single Soviet leader thinks relations with the U.S.A. could or should influence the rate or manner in which the USSR meets what it considers its defense needs. The idea of "parity" remains entirely alien to them.

RICHARD EDGAR PIPES
Director, Russian Research Center
Harvard University

THE primary objective for U.S. strategic forces is the deterrence of nuclear attacks aimed at the destruction of the United States as a national entity. This is to be achieved by the retention, in the words of Secretary of Defense Donald Rumsfeld, of the ability to "strike back with devastating force at an enemy's economic and political assets. Such a force is essential not only as the basic deterrent, but also as a capability that can be withheld so as to deter any attack on U.S. and allied cities and population. Such a capability is a minimum essential foundation of strategic deterrence." The U.S. also requires the capability to strike selectively at a wide range of military targets and do so with low collateral damage. We do not rule out the capability to attack some elements of the Soviet strategic force posture on a second strike. It is the Soviets' perception of these capabilities and our will to use them that is the essence of deterrence.

Soviet strategic objectives, as we now understand them, emphasize deterrence of conflict and, should this deterrence fail, victory through survival of the Soviet Union and destruction of the West. There is a growing recognition that the

Soviet defense programs are aimed at increasing their ability to wage general nuclear war and to emerge victorious.

The Soviet Union has recently begun the deployment of new and far more capable strategic weapon systems. In 1976, the Soviet deployment program involves six variants of four new intercontinental ballistic missiles (ICBM's) and enlarged versions of the Delta class intercontinental range missile submarines. We are also aware of the development of improved models and a new generation of ICBM's and submarine-launched ballistic missiles (SLBM's) as well as new missile submarines.

While the Soviets' thrust during 1965-1972 was primarily quantitative, their post-1972 qualitative advances are striking. They have introduced sophisticated multiple independent reentry vehicle (MIRV) systems and warheads. Soviet progress in accuracy has been very substantial, and it seems that there will be rapid progress in the near future. Their research and development program is extremely aggressive and is beginning to pay substantial dividends in improved weapon performance.

The Defense Department now projects that by 1980 the Soviets will have

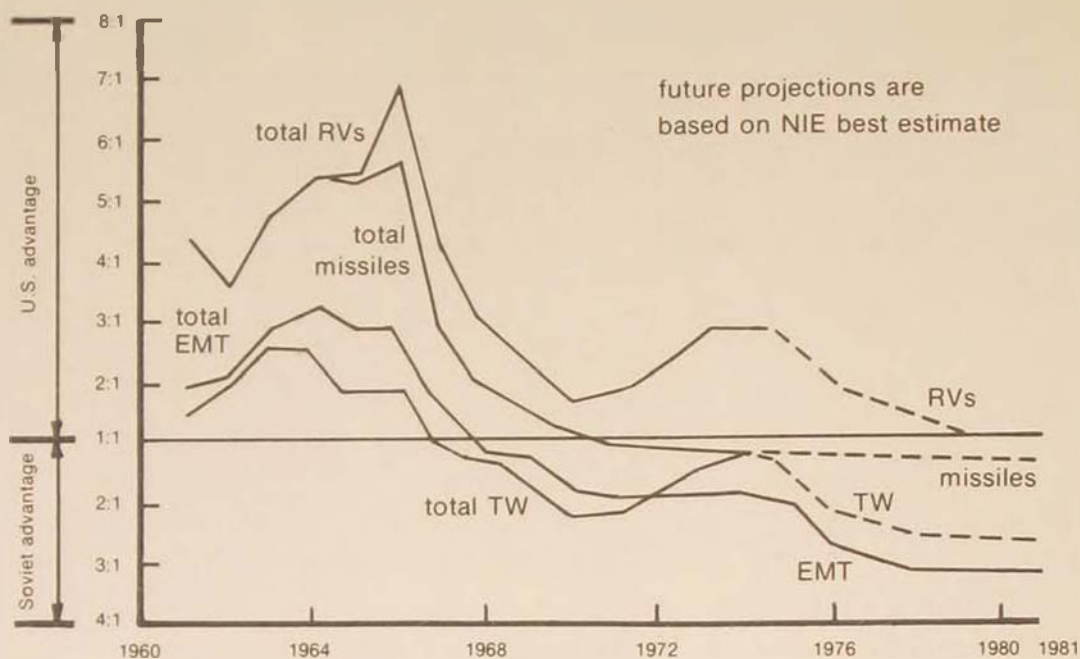


Figure 1. U.S.-U.S.S.R. strategic missile advantage

eliminated the U.S. lead in the number of missile warheads. (See Figure 1.) The average Soviet MIRV yield will be about three times the highest U.S. MIRV yield, resulting in an overall Soviet force equivalent megatonnage superiority of three to one.

Even though the quantitative balance of strategic forces is shifting, the U.S. still maintains its technological superiority, and its capabilities are well understood by any would-be adversary. The determination of the U.S. to ensure that we maintain this technological superiority is demonstrated in the FY77 defense budget, which for the first time in several years includes real increases in defense spending.

This discussion gets us to a fundamental question. What can advanced nuclear technology contribute to the capability of the United States to develop strategic options and to modify Soviet perceptions of nuclear war? Writing in the mid-1940s, the distinguished British histori-

an-general, J. F. C. Fuller, indicated that weapons technology determined 99 percent of the outcome of war. He was exaggerating, of course, but not very much. The human factor has played, and always will play, a major role in the outcome of war, but there are degrees of technical superiority that no amount of human effort can overcome.

During the middle 1960s, a number of American scientists active in the political arena put forth the concept of a "technological plateau." They argued that strategic stability existed and that no foreseeable technological development would be significant enough to change the outcome of a strategic exchange which assumed the total destruction of both sides. This view was partly abandoned when these same individuals launched a major campaign against MIRV and antiballistic missiles (ABM) in the late 1960s arguing the virtual antithesis of the former view—that these technologies were so effective and destabilizing

that even the limited deployments then contemplated by the U.S. would upset the strategic balance. Ironically, on many occasions, both views are presented, sometimes almost in the same breath. Hence, we frequently hear talk about how much "overkill" exists on both sides and simultaneously how the next generation of U.S. weapons will so threaten the Soviet Union that there will be a massive stimulation of the arms race.

The notion that technological progress is destabilizing still exists. For a time in the late 1960s and early 1970s it significantly hampered U.S. technological progress. It is difficult to build a new missile, for example, that is not more accurate than the one it replaces, and hence under the logic of mutual assured destruction, the new missile would be destabilizing. But technological advance is inevitable in an industrialized nation. Attempts to place unilateral controls on U.S. technology only increased the cost of achieving necessary military capabilities, narrowed those technological gaps that still existed in the U.S. favor, and contributed to the Soviet goal of achieving a war-fighting capability.

The Soviets have a very different view of technology that is closely related to their basic view concerning nuclear war-fighting requirements. They place great importance on equaling and then surpassing the West in the critical areas of military technology, and they are prepared to invest the resources required to do this.

Technical advances can do a number of things to improve the military potential of a nation and to influence the perceptions of adversaries and allies. Among these are:

- compounding of the enemy's planning due to uncertainty in new

weapon characteristics. Military planners recognize that new weapons are an unknown quantity and may turn out to be much more effective than is thought. The capabilities of older enemy weapons are usually more completely understood.

- improvement of war-fighting and winning capabilities. New technology can make drastic improvements in the capabilities of both offensive and defensive forces to obtain military objectives and to limit damage.

- increased flexibility in execution of military options. Technical advances can conduce to the destruction of previously unattackable targets and result in lower collateral damage.

- provision of options to respond to unforeseen threats or technical surprise. The existence of prototypes can drastically reduce the time necessary to respond to unforeseen threats or technical breakthroughs.

- increased morale and effectiveness on the part of military personnel. The psychological impact of new weapons on the troops is often ignored by those infatuated with economic analysis. Yet morale is an important factor, and it can be improved by providing the armed forces with superior weapons that increase the probability of their survival in battle.

- strengthening alliance ties. The perceptions of our allies concerning the military technological balance can be critical to the maintenance of alliance morale, cohesion, and effectiveness.

- lower cost in achieving any planned level of military capabilities. Improvements to the kill capability of any given weapon can mean very substantial reductions in the numbers of weapons required to achieve a military objective.

In 1947, following the successful development of the atomic bomb by the Manhattan Project earlier in the decade,

Congress created the Atomic Energy Commission (AEC) and charged it with broad authority over the development and control of both the civil and the military applications of this new form of energy. For a variety of reasons, in 1974, Congress abolished the AEC and divided its responsibilities between two new agencies. The Energy Reorganization Act of 1974 established the Nuclear Regulatory Commission, to regulate the growing nuclear energy industry, and the Energy Research and Development Administration (ERDA). ERDA assumed the national security related activities of the AEC together with an expanded mandate to develop nuclear and nonnuclear energy technologies.

The Energy Reorganization Act retained most provisions of the Atomic Energy Act of 1954. It established the Office of the Assistant Administrator for National Security, one of six major program offices, to direct the weapon program and the other Restricted Data functions of the new agency. The technology-related functions under this office include weapon design, testing, and production as well as a number of international security related functions, nuclear power, export control, safeguards, intelligence, and nuclear arms control. The 1974 Act also mandated that:

During the first year of operation of the Administration, the Administrator, in collaboration with the Secretary of Defense, shall conduct a thorough review of the desirability and feasibility of transferring to the Department of Defense or other Federal agencies, the functions of the Administrator respecting military application and Restricted Data.

We have now completed this study, and it has been recommended to the President that the weapon development program remain within ERDA.

The nuclear weapons program exemplifies the most successful type of technical development. Over the last three decades we have seen a hundred-fold reduction in weight and a thousand-fold increase in yield of weapons we have or could stockpile. In an era when almost every generation of weapons has become larger and substantially more expensive, nuclear weapons have become cheaper and lighter. The U.S. success in miniaturizing nuclear weapons allowed the development of smaller, cheaper missiles. Nuclear warhead costs represent on the average only about 10 percent of the cost of a weapon system over its life cycle. Advanced nuclear design can result in very substantial cost savings in the future.

There are some who look at the success of continued nuclear weapons development as a horror story. They argue that despite the ever increasing costs of our military programs and the growing destructiveness of our nuclear arsenal, we are really less secure.

This view in many respects is built on a series of myths. The resources that have been invested in U.S. nuclear systems have been on the decline for over fifteen years. Current U.S. population vulnerability is, in at least a significant part, the result of the policies we have followed de-emphasizing strategic defenses and civil defense. Mutual population vulnerability would have resulted even if nuclear weapons technology had never developed beyond World War II devices. The major difference is that this development would have involved vastly greater delivery systems expenditures for both sides, and the forces involved would be far more vulnerable to surprise attack. Without the progress we have made in nuclear weapons design, ballistic missile submarines would not have

been feasible. The greatest long-term effect of the development of fusion weapons has not been the development of weapons with drastically greater yield than the fission weapons developed in the early 1950s but, rather, that weapons have been made small enough to be carried by delivery systems that could be hardened against nuclear attack or made mobile. It enabled the development of weapons that were far safer and more secure than existing fission bombs. These weapons were also generally significantly less expensive. Hence the net effect of technological progress in nuclear weapons design since World War II has been far cheaper and more survivable strategic deterrence forces and a nuclear arsenal that can make a major contribution to the security of the U.S. and its allies.

ERDA has five weapons, four of them strategic, under active development today. They are improved warheads for the Minuteman III (W-78/Mk 12A) and Trident (W-76/Mk 4) strategic missiles; two strategic bombs, the improved B-61 (Mod 3, 4, 5, multipurpose bomb), and the new B-77 (full-fuzing option high-yield strategic bomb); and the new eight-inch shell (W-79 low collateral damage artillery projectile).

Four systems are under advanced pre-engineering development. Preliminary engineering development has been completed on a high-yield MIRV suitable for deployment on Trident or an advanced land-based missile (M-X). Development is also underway on low collateral damage warheads for the Pershing II, a warhead for future air-to-surface or cruise missiles, the Mk-500 evader maneuverable reentry vehicle (MARV), and low collateral damage bombs.

Both the Trident and Minuteman MIRV will greatly increase the yield of existing alternative systems. In the case of Tri-

dent, the improved yield of the warhead will mean large savings compared to the cost of replacing the Polaris/Poseidon force with an equally capable Trident force carrying the older Poseidon MIRV. The improved yield of the Mark 12A for the Minuteman III, combined with the improvements being made to the guidance system, will prevent a major disparity in counterforce capabilities developing in the Soviet favor, at least in the near term. The Mark 12A and the high-yield MIRV are potential candidates for the M-X. Deployment of the M-X in the mid-1980s would go far toward regaining parity in hard target kill, and in a number of the quantitative indications such as number of warheads, megatonnage, throw weight, and megaton equivalents.

The new variants of the B-61 bomb now under development will have improved safety/security devices including nonviolent command disablement. The B-77 full-fuzing option (FUFO) bomb was designed to provide the Air Force with a weapon in the high-yield range with the flexibility of the lower yield B-61. It will provide delivery capabilities consistent with 1980 penetration requirements and at the same time incorporate advanced safety features such as insensitive high explosives to prevent fissile material scatter in the event of a crash. The weapon also minimizes the nuclear material costs.

A number of ERDA programs in conjunction with DOD delivery systems in early developmental stages could provide the U.S. greatly improved penetration capabilities against advanced Soviet defenses. For example, development of MARV evaders hedges against the threat of possible Soviet clandestine upgrade of their surface-to-air missile (SAM) systems or the rapid deployment of one of their

new ABM systems. The new cruise missile warhead will help maintain the penetration capability of our bomber force in the 1980s.

The Threshold Test Ban Treaty (TTBT) limits the further development of higher yield strategic bombs and warheads. As a result of the accelerated test program, we feel we can meet our strategic weapons requirements for the foreseeable future. Under the TTBT limit of 150 kilotons, the U.S. can still develop advanced penetrators as well as improved strategic and tactical warheads designed for lower collateral damage. We can, to a lesser degree, test the stockpile reliability of our nuclear systems.

We have completed a long series of negotiations with the Soviets, the principle objective of which is to allow the exploitation of what they believe to be the considerable economic potential of peaceful nuclear explosives (PNE) while prohibiting their use as a cover for the development of advanced military applications.

The most important advancement in weapon design in the next decade, however, is likely to come in areas other than simple yield-to-weight ratios. These areas include:

- development of a variety of low collateral damage weapons with controlled output of radiation, lower fission content, or earth penetrators.
- still smaller and lighter weapons that can be adapted to a greater variety of delivery systems, including the precision delivery systems.
- crashproof weapons that will not scatter radioactive material after an impact.
- cheaper weapons utilizing less special nuclear material.
- further development of more advanced variable yield and insertable

capsule weapons that might permit reduction of stockpile numbers without loss of military effectiveness.

- improvements in weapons safety and security.

In the tactical area, controlled output devices combined with precision guidance can dramatically improve our capabilities to destroy a variety of military, economic, and logistic targets with low collateral damage. In many cases the yield required for target destruction can be reduced by a factor of several hundred. The combination of yield reduction and controlled output can improve military effectiveness by allowing attacks on enemy troops closer to the forward edge of battle area (FEBA) without endangering friendly troops. Reduced collateral damage makes the U.S. nuclear guarantee more credible and hence improves the capabilities of our forces to deter.

It is sometimes argued that the development of low-yield, low collateral damage weapons will increase the likelihood that these weapons will be used. This fear has little relation to reality. Low-yield nuclear weapons have been in the stockpile for about twenty years. They have never been used despite the fact that the risk associated with their use in the 1950s and 1960s—an era of massive U.S. superiority in both strategic and tactical nuclear systems—was probably substantially less than the risk would be today. The only conceivable use of U.S. tactical nuclear weapons is in response to aggression of sufficient magnitude to change the international balance of power.

The Soviet Union regards tactical nuclear weapons as a fundamental part of their war-fighting capability. The Soviets have traditionally stressed the importance of pre-emptive, massive, in-depth,

surprise nuclear attacks that can be exploited by their highly mobile, armored, and mechanized infantry divisions. As their tactical nuclear capabilities have improved, they have increasingly recognized a distinction between intercontinental and theater nuclear warfare.

Early Soviet tactical nuclear systems were apparently high-yield weapons. We are much less certain about the systems they have introduced in recent years. Those who argue that U.S. introduction of low collateral damage tactical nuclear weapons is meaningless as long as the Soviets maintain high-yield systems ignore the possibility that the Soviets have already moved toward lower-yield systems or will do so in response to the U.S. initiative.

The new eight-inch shell will be the first U.S. weapon specially designed to reduce collateral damage from blast and radioactivity. The Pershing II will also be considered for a number of low collateral damage warheads. Preliminary work is underway on a number of tactical bombs and strategic warheads that would result in far less collateral damage because of controlled outputs and alternative delivery modes.

THERE is little room for complacency in assessing the continuing Soviet drive for technical superiority in military technology. As Dr. Malcolm R. Currie, Director of Defense Research and Engineering, notes:

I would suggest that all of us, in examining the current technology balance and its dynamics, would agree that the Soviet Union has a large and determined effort and that the Soviets are inexorably increasing their level of technology relative to ours and are, in fact, seizing the initiative in important areas. This technological develop-

ment is molding future Soviet strategy. . . . The Soviet effort is dominated by their often-stated goal of surpassing the U.S. in science and technology.

While there is much uncertainty concerning Soviet nuclear weapon technology since the end of atmospheric testing in 1963, we are certain that the Soviet nuclear weapons development program is vigorous and is supported by large Soviet basic research in weapons-related nuclear technology. More than ten Soviet tests since 1970 have been in the megaton or multimegaton range, presumably related to the development of efficient nuclear warheads for their new strategic weapon systems. Only one U.S. test since 1970 has been over one megaton—the warhead for the Spartan ABM system. At least parity probably exists in the field of high-yield strategic warhead technology. While we know comparatively little in the area of Soviet tactical nuclear weapons, the variety of their nuclear-capable tactical delivery systems is visibly increasing, probably indicating comparable Soviet progress in weapons design.

A superior technical base is critical for the national security of the United States. U.S. technical superiority is being rapidly eroded by current Soviet efforts. In the nuclear weapons area the threat is particularly severe because of the larger scale of Soviet efforts, the reduced funding for U.S. nuclear weapons research, development, and production over the last decade, and because of the physical aging of the stockpile. The latter is particularly important, and in the long term all current U.S. weapons will have to be replaced because of age if nothing else.

There is much international pressure today for a comprehensive test ban (CTB) treaty. Because of the aging problem, fissile material limitations, concerns

about nuclear weapons security that create pressures to reduce the stockpile, and the lesser throw weight of U.S. systems, the U.S. must examine, from a technical point of view, the possibility of a much more severe impact on the U.S. weapons program than upon the Soviet Union. While the precise numbers are subject to debate, there will always be a significant yield range that will be below the minimum detectable by national technical means. We must consider the effects of clandestine testing below this threshold and the significance of a weapon test disguised as a PNE for the development of tactical and strategic weapons.

As long as the U.S. is required to maintain nuclear weapon systems that can survive a nuclear attack and respond reliably in a controlled manner, we must be able to maintain, modify, and, when necessary, improve the systems involved. It is less likely that a stable deterrent system can be maintained if the reliability of Western nuclear systems degrade faster than those of the Soviet Union.

There are major political reasons for a comprehensive test ban, but the technical consequences must be

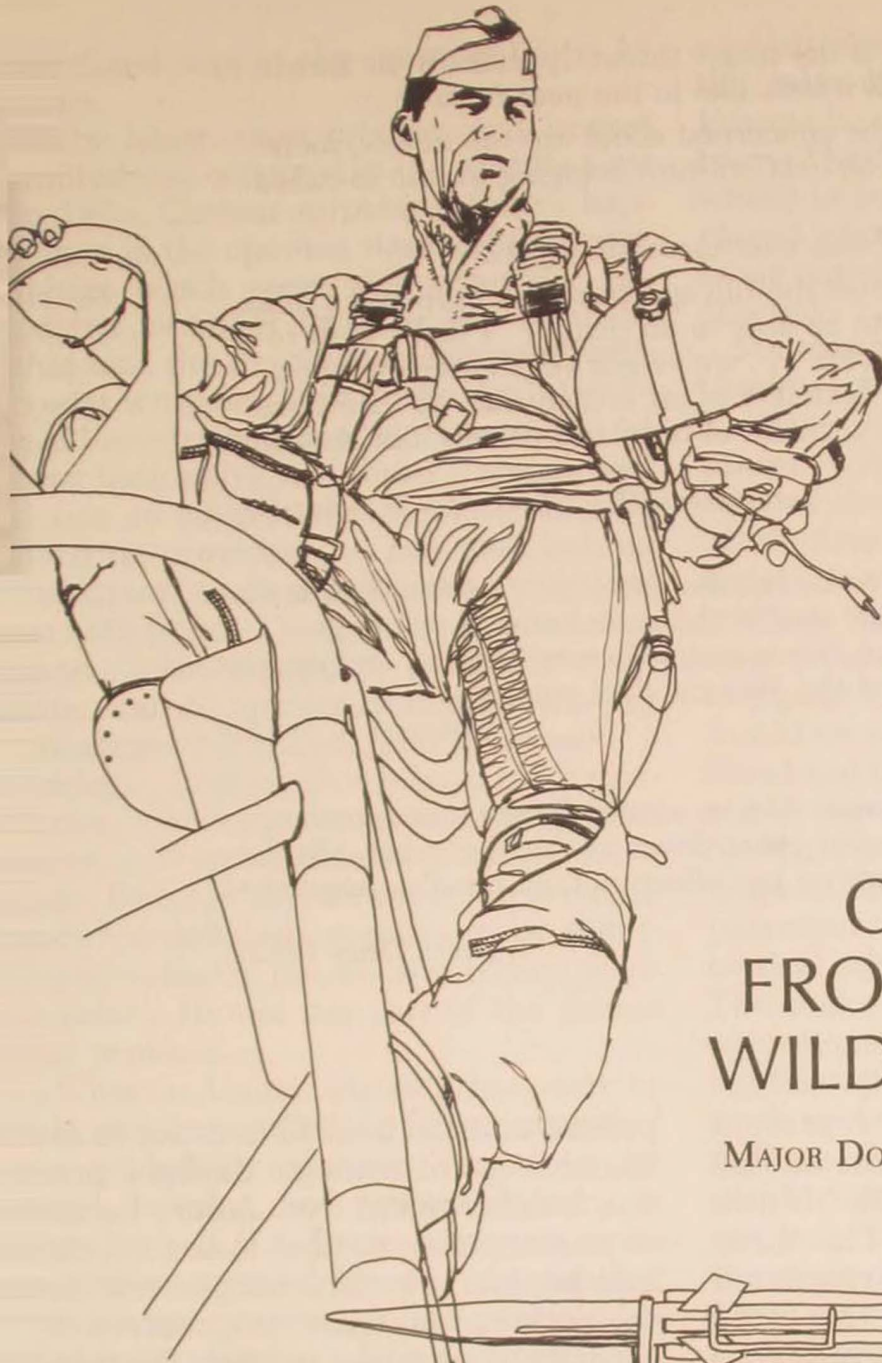
weighed, also. Without a CTB, we could develop and deploy improved nuclear weapons that through controlled output and delivery accuracy can significantly improve the capabilities of our military forces to carry out their wartime missions and at the same time improve the safety and security of our weapons. The cost of these new weapons will not be significantly greater than reinitiating the production of older and in some cases obsolete designs now in the stockpile. The effectiveness of our deterrent will be significantly enhanced if we exploit the potential of the new technologies.

Above all, we must not allow the nuclear weapons development and production complex to erode. In many respects, this complex is unique, and some of its assets are irreplaceable. The weapons laboratories represent a combination of trained manpower and physical resources that is available nowhere else in the West. The laboratories also make a major contribution to U.S. energy programs and to basic scientific research in general. It would be extremely difficult if not impossible to reassemble this complex in a crisis situation.

Washington, D.C.

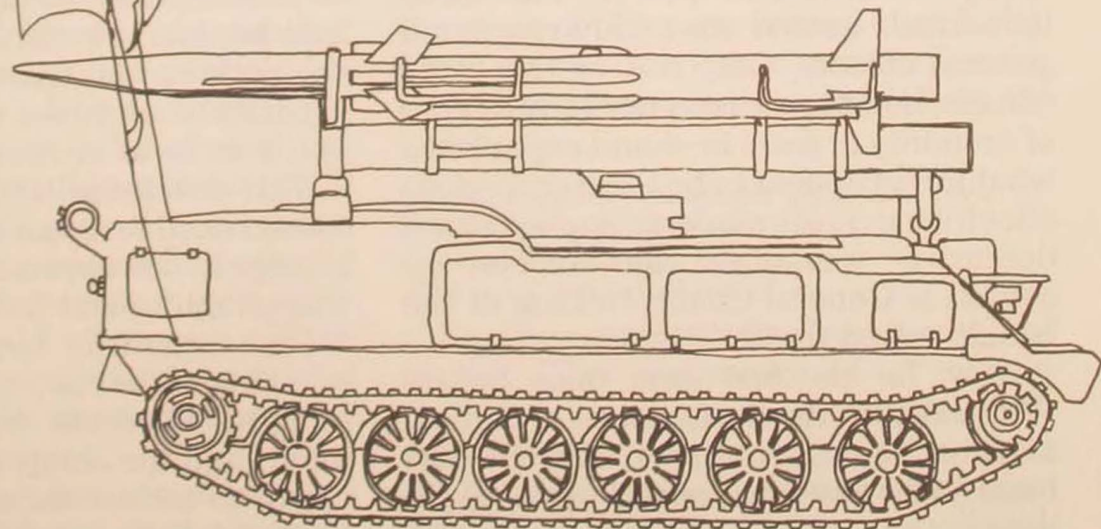
ACKNOWLEDGMENT

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A CALL FROM THE WILDERNESS

MAJOR DONALD J. ALBERTS



Q: General, what do you think is the major threat, specifically air threat, to NATO Europe now and what will it look like in the near future?

A: I think what we all have to be concerned about are the newer, more sophisticated airplanes that the Soviets are now bringing in, the so-called third generation airplanes.

Q: How do you plan to counter this ever-increasing threat?

A: I want to be able to fight across the full spectrum out here and I think most of our commanders want to be able to do that. . . . I don't want to fight with weapons I can't win with. . . . we've got very superb weapon systems for doing this. And the flexibility of air is such that we can move very fast, concentrate very fast, get a lot of ordnance in very fast and cause a lot of damage very fast.¹

Interview with GENERAL JOHN W. VOGT, USAF

For Europe, the military lesson to be learned from the October War is that if there were to be a conventional war in the near future it would go against the Atlantic Alliance. The two essential factors, surprise and missiles, are a positive element in favor of the Warsaw Pact countries.²

GENERAL A. MERGLEN

The total Arab losses in the air were 514, as against Israeli losses totalling 102. . . . Only five Israeli planes were shot down in actual combat. Missiles and anti-aircraft guns, which were no less effective than missiles, accounted for the rest.³

GENERAL CHAIM HERZOG

THESE STATEMENTS represent three divergent viewpoints on the nature and, if one will, the future utility of tactical air power. The three individuals quoted are highly respected general officers. Only one of the three officers, however, knows with any degree of certainty or from firsthand experience what might appear to be the tremendous effectiveness of modern sophisticated defensive weapons. That officer, of course, is General Chaim Herzog of the Israeli armed forces.

Now, for the first time since before World War II, the decisiveness of tactical aviation in conventional combat has been seriously challenged. Just as it became necessary to rethink the role of

pursuit aviation in 1943 in order to save the concept of strategic daylight precision bombardment from failure because of unacceptable combat losses, it might now be time to rethink our present tactical doctrine in order to preserve the capacity of air power to affect the tide of battle in favor of American arms.⁴

This discussion (and the resulting assumed need for some sort of far-reaching change in our approach to conventional war planning and force structuring) involves essentially two main ideas: the meaning of the concept of air superiority in light of recent battlefield developments and the ability of American tactical air to meet a threat to its usefulness in affecting the outcome of a limited con-

ventional war in the coming 10 to 15 years.

The latest, most intense, and largest limited war occurred in the Middle East in 1973. Certain surprising things happened in the opening stages of that war, things which were not generally expected by either Israel or the West. In that war, the Arabs were equipped with Soviet weapons. Most of the Arab forces had been trained by Soviet personnel (at least indirectly), and there is strong evidence to suggest that Soviet offensive doctrine provided the rationale behind the attacks on Israeli defensive positions on both fronts. The Israelis, on the other hand, were equipped primarily with American equipment, trained in part by American personnel, and possessed a strategic doctrine that is hard to characterize but which would seem to reflect more a Western than an Eastern heritage. One can say, however, that Israeli doctrine definitely appears to be different from that of the Arabs and their Soviet tutors. Herein lies part of the future war problem.

Whereas United States forces may or may not engage Soviet forces directly,⁵ the probability of facing Soviet equipment, training, and tactical doctrine is very high, if U.S. forces are again committed to combat. Or, put yet another way, despite détente and the various arguments of what détente means or should mean, if one looks around the world at potential trouble spots, one still finds two principal kinds of equipment: Soviet and U.S. The odds are fairly strong that if the United States must fight again in the next 10 or 15 years, we will be fighting an enemy equipped in arms and practicing doctrine predominantly of U.S. or Soviet origin.

It is possible even now to draw up a spectrum of threat based on the relative

sophistication of enemy equipment. For the sake of discussion, let Korea and Europe be used as the poles of this spectrum. The Middle East would be somewhere in between—at least, it can be so placed when the sophistication and challenge posed by possible enemy forces are charted.

Starting at the lower end of the sophistication spectrum, we find that the North Korean military structure does not present a substantial threat to traditional USAF air doctrine. This is not to say that conducting operations in or over North Korea, along the demilitarized zone (DMZ), or in defense against a combined air-ground assault directed at the military power and territory of South Korea would be easy, for it is likely that much blood and treasure would be spent. However, the present capabilities of the North Koreans are familiar. The anticipated hostile forces are such that employment of traditional concepts of tactical air employment could suffice. The major threat to the conduct of air operations consists of North Korean fighter-type aircraft. The air defense network is deployed to provide homeland defense. The surface-to-air missile (SAM) and anti-aircraft artillery (AAA) threat is not very sophisticated and well within the scope of that experienced over North Vietnam by American aircrews. For the sake of comparison, the relevant data are as follows:

3 SAM brigades (180 missile launchers) SA-2
518 fighters and fighter-bombers
(plus 60 IL-28 light bombers)
2500 AAA guns of all sizes.⁶

Europe represents the "worst case," of course. The probability of a war in Europe is very low, according to estimates of most analysts. However, while the probability may be low, the cost of an attack and defeat in Europe in political,

economic, and psychological terms to American security interests is thought to be quite high. Indeed, Europe has traditionally been of much interest to military planners. It is an open question whether or not a war in Europe would be nuclear or conventional. A case can be made for both scenarios.⁷ In many ways, the conventional war case is the more demanding, yet less certain psychologically, politically, and militarily. To perform our jobs as military officers properly, we must investigate and plan for this contingency.

As a worst case, if we were to posit that present concepts of force employment are sufficient to gain victory (perhaps realistically defined in a subnuclear limited war as avoidance of defeat and retention of at least the political and territorial semblance of the *status quo ante*), then there is no need for widespread doctrinal change. If our preparations are sufficient to meet the worst case, then lesser cases and threats, as in Korea, can also be met. The performance of our arms may not be stellar—the losses may be high and the doctrine only adequate—but if this is so, victory is not endangered, and the cause is not certainly lost. The price and cost will not be disastrous. Victory can cover many sins of omission and commission, and hindsight can leisurely correct the cause of such errors.

On the other hand, if a situation less than the worst case raises doubt about the adequacy of present doctrine to meet the present threat, then the argument is certainly strong for at least a widespread investigation of that doctrine with an eye toward revision. It is this last consideration that gives pause to the concerned tactician and/or strategist. And herein lies a problem. One of the reasons often given for the inability of planners to understand sufficiently

and prepare adequately for the future lies in the inability to agree on the importance of the present. We therefore continue to perform variations of what has proved to be successful in the past.⁸

We have some fairly recent experiences to draw lessons from: Vietnam and the Middle East wars of 1967 and 1973 (one might also include the war of attrition of 1969–1970 if one is so inclined). The utility of the 1967 war to discussion here is tenuous. Others, mainly the people most involved, had already “gone to school” on that war in order to fight the 1973 War more effectively. While there is certain to be violent disagreement over the 1973 War, one cannot seriously challenge the view that the Arab forces had changed and were doing things somewhat differently than they had in 1967. Vietnam is not a particularly good example to draw lessons from right now, partially because, despite the cries for learning these lessons, the issue is still too charged emotionally; perhaps it is best if what each of us took from that war stays in our individual backgrounds.⁹

The Air War North was not a very sophisticated affair, at least compared to the Middle East. It is necessary to mention certain small points, however. Throughout the conflict, American control of the air over North Vietnam was never seriously challenged, although a new threat to this ability to control the air emerged for the first time in combat. This new threat was the SAM. The most serious threat to American air power, at least when cause of loss is measured, was not a new threat but one that had been around since the days of observation balloons. That threat, of course, was AAA.

In the October 1973 War, the decisiveness of tactical aviation in conventional combat was seriously challenged. The weapon of such brilliant decisiveness in

the 1967 war, the Israeli Air Force (IAF), seemed to be, in the opening and very critical stages, almost impotent. This ineffective performance came at a time when it was thought that the Israeli Air Force was able to engage enemy aircraft in the air and defeat them at will.

The central question becomes: What caused the high and, in some projections, nearly prohibitive losses? General Herzog has already provided one answer. The ineffective IAF performance was caused by an inability to control the air. The extremely high initial loss rates were caused not by enemy fighter aircraft but by SAM's and AAA. As the situation stabilized,¹⁰ the IAF was freed from the defensive aspects of close air support.

But, on the Egyptian front at least, the IAF was still not free to follow its preferred doctrine of long-range interdiction and deep battlefield interdiction. A reversal of what air power enthusiasts would like to see happen occurred. Rather than ranging free behind enemy lines, establishing and enjoying local air superiority and clearing the way for a rapid armored advance, Israeli armored units in the Sinai were used to provide "close ground support" for the IAF.

The first mission of our armoured force on the West Bank of the Suez Canal was to knock out the surface to air missile sites, which it did effectively. That force literally swept the area for the air force, and it was then free to attack at will.¹¹

Notice that, according to General Herzog, the Israeli Air Force *needed* ground action before it became truly effective, effective in a manner congruent with doctrinal desires for proper use. The logical inference is that prior to the elimination of certain segments of SAM and AAA defenses by ground action, the IAF was *not* free to attack at will. If it was not free to attack, then it did not enjoy air superi-

ority and could be used, at best, in a defensive role over the battleground where it continued to take high losses.¹²

In the closing days of the war, after the tanks had opened the way for the IAF, the expected *modus operandi* of the Israelis seemed to reassert itself. Both sides were able to continue their efforts only because of the massive resupply efforts of the Soviet Union and the United States. Had not the IAF been resupplied with F-4s and A-4s from the "ready warehouse" of the United States, it is doubtful if the IAF could have been used in the manner in which it was after ground forces had secured the opening. It is further interesting to note that Egyptian sources claim that the IAF discontinued its attacks on airfields (these attacks were not working, and the losses to SAM's and AAA were too high), discontinued the attacks on Port Said (after losing 28 aircraft in five days of raids and failing to put the air defense net out of operation), and fought for air superiority after the tanks had rolled over the SAM sites.

Reputedly, the losses of the IAF were incurred largely in the first few days of the war. Recent information contained in public sources is starting to cast doubt on this thesis, indicating instead that IAF losses were (against Egypt) consistently high throughout the war.¹³ The figure of 102 losses quoted by General Herzog represented approximately 37% of the prewar IAF resources.¹⁴ Again, for comparison's sake, prehostility defenses for Egypt and Syria were as follows:

Egypt

Air defense is provided by 100 SAM sites, each of 6 SA-2 and SA-3 launchers; 20mm, 23mm, 37mm, 57mm, 85mm, and 100mm AA guns; all integrated, through a warning and command network, with 9 Air Force squadrons of MiG-21 interceptors. Soviet-manned equipment

co-ordinated with the air defence system includes some 65 SAM batteries with SA-2, SA-3, SA-4 and possibly SA-6 missiles.

15

Syria

8 SAM batteries with SA-2 and SA-3 37mm, 57mm, 85mm and 100mm guns 100 MiG-21 interceptors 80 MiG-17 day fighter/ground attack¹⁶

It is interesting to note that both Syria and Egypt greatly increased the number of SAM batteries and AAA guns as a consequence of the lessons they learned from the 1973 War. Their aircraft inventory has not increased nearly so dramatically.

Now, what about Europe? Europe is where we have concentrated our most sophisticated weaponry. Europe will get the F-15 and the A-10 as a matter of priority.¹⁷ The A-10s will greatly bolster the capability of USAFE to supply NATO forces with close air support, and the F-15 (and by extension, the F-16 air superiority fighter being purchased by some NATO allies and the United States) will provide air superiority.

The emphasis that present USAF doctrine places on the counterair and close air support roles is based on the nature of the threat. "Counter air operations are conducted to gain and maintain air superiority by destroying or neutralizing an enemy's offensive and defensive air capability."¹⁸ The IAF tried to do exactly that in the last war in the Middle East and possibly failed to do so before the war ended.

The American (and Israeli) concept of counterair is fine if the enemy capability preventing air superiority is enemy air. However, the Israeli experience of 1973 (as well as our own experience over

North Vietnam, although here it was only a glimpse of the possibility) would seem to indicate that hostile air is no longer the primary barrier to the gaining of air superiority over the battlefield. One must seriously examine the possibility that ground-based defenses might be the prime obstacle to the establishment of air superiority.

It is useful to look at the ground-based defensive capability of a Soviet army group, one that can be expected to be responsible for approximately 50 km (about 30 miles) of front to a depth behind the forward edge of the battle area (FEBA) of about 80 km. Each Soviet army group is equipped with the following:

- 3 batteries SA-2
(each battery with 6 launchers)
- 9 batteries SA-4
(each battery with 3 dual launchers)
- 5 batteries SA-6
(each battery with 4 triple launchers)
- 23 batteries 57mm S-60 AAA guns
(a total of 138 single guns)
- 6 troops ZSU 57/2 (36 twin gun tanks)
- 19 troops ZSU 23/2 (114 twin guns)
- 32 troops ZSU 23/4 (128 quad gun tanks).¹⁹

This defensive firepower does not take into account "air defense weapons common to all troops (rapid fire AA guns, MGs), shoulder-fired SA-7 missiles and 64 troops of BRDM-2 vehicles mounting quadruple SA-9 launchers."²⁰ This ground-based defensive network is overlapping, and an ideal defensive setup would mean that any aircraft venturing over the front is within the lethal radius of at least two very dangerous weapon systems at all times—without a single MiG being airborne.

Syrian and Egyptian strength at the initiation of their attacks on Israeli positions was greater than that of a single Soviet army group. But, if one assumes that a war in Europe would start with a Warsaw Pact offensive thrust, one must

also assume that the Soviets would follow their doctrine and mass forces in excess of a Soviet army group at the intended points of penetration. In other words, the area of the front where we must conduct close air support and possibly interdiction to halt the enemy offensive would have the defensive ground-based firepower of several Soviet army groups.

The goal in Europe would be to stop the Soviet offensive thrust into NATO territory, at least under the present strategy of the defensive and flexible response. Soviet doctrine concerning the offensive is subtly different from Western doctrine. The Soviets believe firmly in the combined use of arms and the truly massive application of firepower—massive even by American standards. Soviet doctrine envisages three basic types of operations, all somewhat similar to blitzkrieg warfare.²¹ Without wishing to get into the finer points of offensive operational theory, it is worth pointing out that the Soviets do require at least *local* air superiority before they consider the conditions ripe for offensive operations.

WHAT becomes important is the essence of air superiority. What is it? It is not the ability to destroy enemy aircraft within a certain block of airspace. Nor is it having a fighter that can shoot down 2, 4, 8, 11, or 15 enemy aircraft for each friendly fighter lost to the enemy within a block of sky. These are but means to achieve air superiority. The essence of air superiority is like any other measure of superiority. It is the ability to control; it is the ability to exercise one's will in the manner one desires when and where one desires. If the USAF cannot use the air over the battlefield in the manner that air commanders wish in order to affect the tactical and/or strategic goal

attainment, then the USAF will not have control of the sky. It will not have air superiority. It matters not if the hostile capability preventing control is aircraft or SAM's/AAA. The enemy capability must be suppressed or destroyed before control is gained.

The United States enjoyed total air supremacy over South Vietnam, Cambodia, and Laos. There was nothing we could not do with the aerial weapon had we wanted to do so. We had air superiority over North Vietnam, although we occasionally had to fight for it. Air superiority was only sometimes challenged by hostile fighter aircraft.²² But, even over the North, we had certain rules that we did not often break because to break them meant a sure increase in the loss rates.²³ This was against an enemy whose defenses, even in December of 1972, were toward the lower end of the spectrum of sophistication.

It is not just sophistication that counts, of course. What made Hanoi the "most defended piece of territory in the history of aerial warfare" was not sophistication, but mass: the sheer number of AAA guns and, later, SAM sites occupied and firing. Mass and redundancy are possessed more by them than by us. This seems particularly true of Central Europe.

While there can be no doubt that the USAF needs air superiority fighters to wrest control of the air from enemy fighters (for that is still the dominant threat to use of the air weapon in such places as Korea), perhaps we need to give more *relative* attention to the ability to destroy and suppress the ground air defenses possessed by a sophisticated enemy.²⁴ Critics and opponents of this position might say that we are devoting resources to this problem. And I would agree, we are devoting some resources. What is important—and this factor can-

not be stressed enough—is the relative weight we are presently devoting or are willing to devote in the future to solve the problem presented by SAM systems and radar/optically directed rapid AAA fire. This need for increased emphasis is present in terms of hardware and in terms of doctrine.

For emotional confirmation, let me address a question to the reader, primarily directed at practicing combat crew members, particularly those in fighters. Which of the following scenarios would you feel the more comfortable in, volunteer to fly in, exercise command over, or have the outcome of a war decided by, right now, today, this minute?

1. Fifty miles of sky laterally centered right over the FEBA, no SAM's, no altitude restrictions. The opponent has ground-controlled interception (GCI) and consists of four MiG-21 "Fishbed-Js" in a combat configuration. You have a flight of two F-4E (LES) aircraft with combat configuration. And both you and your wingman are line jocks in an average fighter squadron today. You have Vietnam experience; your wingman does not. The enemy expects your arrival.

2. Two F-4E (LES) must penetrate a European-style FEBA defended by a Soviet army group with ZSU 23/4 reinforcement and attack and destroy a command post located 80 km behind the point man on the line. To win you must accomplish your mission and return to base, walking if necessary, after you re-enter friendly territory out of range of hostile weapons. You and your wingman are line jocks in an average air-to-ground fighter squadron today. You have Vietnam experience; your wingman does not. The enemy knows you are coming.

I know which I would prefer. Unfortunately, we may not have the choice since that is normally the prerogative of the

enemy. In reality, the enemy's defense will be a mix of fighters and SAM/AAA. It was in Vietnam, it was in the Middle East, and there is no reason to expect that in Europe there will not at least be enemy fighters over the front trying to keep friendly forces from providing close air support and/or penetrating the front to carry out interdiction.

If the Middle East use of Soviet doctrine is any indication of the battlefield definition of local air superiority, there will be a heavy mix of fighters and SAM's with emphasis on the latter. One can even make the case that control of the air can be maintained without the use of enemy fighter aircraft. The main requirement, in Soviet eyes, is not to have hostile air roaming freely over their forces. What is important in this context is the local superiority over the battlefield that directly affects the course of the battle and not the means used to achieve it. If Soviet forces can achieve local superiority with fighters, their offensive thrust can succeed in breaking through. If the Soviets can achieve local superiority by denying meaningful access to their front and rear areas by the use of SAM's and AAA, their offensive can succeed in breaking through. The point in question is not whether the Soviets will use fighters to defend themselves or possibly attack friendly positions; the point in question is what is most likely to prevent friendly use of the air over hostile territory.

AND for the future? Well, we in the field keep hearing rumors about defense suppression developments, about PELSS,²⁵ and a host of other technological things that will make the SAM and AAA problem go away. There are two major dimensions to the problem, however:

doctrine and hardware to successfully support that use of the doctrine. Many programs are being undertaken to find the technological gadgetry that will allow for increased defense suppression. The Air Force already possesses a partial conceptual answer in the Wild Weasel weapon system. Unfortunately, the resources currently possessed and operational are not nearly equal to the magnitude of the task. The current American contribution to the NATO anti-SAM resource is clearly unsatisfactory, particularly when one considers the anti-SAM resource allocation found necessary to negate the very-much-less sophisticated SA-2 and SA-3 threat presented and overcome in North Vietnam. Counterair fighter aircraft must pass through the SAM and AAA defenses even to get at hostile air or hostile airfields, unless, of course, the counterair engaged in is defensive in nature and takes place over NATO airfields. If the SAM and AAA defenses are not suppressed, the loss rates that can be expected from attempting to perform other roles, particularly close air support (which would seem to be an absolute necessity in order to stop a Warsaw Pact thrust), might well prove prohibitive, as they nearly did in the Middle East.²⁶

The International Institute for Strategic Studies states our present and future Weasel resource as follows:

4 electronic counter-measures sqns: 2 with F-105, 2 with F-4C (to be replaced by 4 sqns with 116 F-4E and 2 sqns of 42 EF-111A)²⁷

This is not exactly a booming effort in technological advancement when we are considering replacing the two oldest fighter aircraft on the line with what will be, in good part, old aircraft from off the line. The "advanced Wild Weasel concept" has been with us for almost ten years, and sometime in the future we will end up with off-the-shelf aircraft and

off-the-shelf electronic gear. Advanced is a relative term, of course. Our future Weasels will definitely be advanced . . . in age. But, more important, let us compare some numbers signifying expected employment of our air resource.

Suppose, as General Herzog claimed, that 102 Israeli aircraft were destroyed in 1973, five by air action. This means, roughly, that fewer than five percent of the losses experienced were due to enemy aircraft. Next, USAF projected purchases into the next decade call for upwards of 700 F-15 air superiority fighters, 350 A-10 aircraft for close air support, and an unknown number of F-16 (say 350) plus the above-mentioned anti-SAM force. Now, if a future war in Europe or the Middle East were to progress something like the 1973 Middle East War, this would mean that, at worst, 10 percent of our future fighter force is dedicated to offsetting 95 percent of the threat to our air operations and 65 percent of our force is dedicated to the destruction of 5 percent of the threat to our air operations!

High USAF officials have already called for introduction of the F-15 into NATO.²⁸ I, for one, would rest far easier, however, if the first 72 F-15s deployed to Europe were the two-seat models, with the rear seat filled with the Wild Weasel anti-SAM equipment necessary to locate, seek out, and destroy SAM and radar-directed AAA. Survivability in a low to medium altitude, excessively maneuvering, heavy-weight environment would seem to require an exceptionally high-performance aircraft. Some practitioners of the Weasel art believe that it takes a more maneuverable, better performing aircraft to defeat and destroy a SAM site than it takes to beat a MiG. Something better than the F-15, of course, would mean to start work immediately

on a prototype of an aircraft designed specifically to suppress and/or destroy threat radar emitters and/or SAM sites—and take delivery next month. We all know that this is impossible, of course.

The larger problem is one of doctrine and tactical adaptation. I would find it far easier to accept the assurances of higher authority that the problems were being solved if it were not for a few discordant notes. First, there is history to contend with, and the fact that *we* haven't failed yet, so *our* past experience will carry us through. Second, until quite recently, no overseas-based theater Weasel aircraft and aircrews trained on a day-to-day basis as Weasels.²⁹ Third, although obvious change is evident here, thanks primarily to those who work at Red Flag,³⁰ in the Fighter Weapons Center, and elsewhere, major exercises are still being conducted in which the target area scenario posits SAM threats; yet Weasel aircraft are not fragged as Weasel aircraft but as strike aircraft.³¹ Fourth, the priority that Weasel and defense-suppression-related projects enjoy, compared to air-to-air and close air support, is very low. We adapt what we have, but we will never get ahead of the problem in this manner.

Commanders make decisions based at least partially on the doctrine which their experience tells them is correct. Doctrine is what gives direction to strategy, which in turn dictates initial battlefield tactics and usage of men, money, and materiel in combat. If the doctrine governing response is inappropriate to the strategic and tactical environment, we court the possibility of, at a minimum, squandering resources and lives with little commensurate battlefield gains. If our ability to destroy, suppress, and/or disrupt the hostile ground defensive net is not superior to the capabilities

of that net in the first place, our training, equipment, and resources dedicated to counterair and close air support may prove to be immaterial to the outcome of hostilities, particularly if the envisaged scenario is that of a short, very intense, conventional conflict, characterized by limited political objectives.

Once a military doctrine is established, it is difficult to change, especially if technological advancements in weaponry seriously bring into question a doctrine upon which a specific military service is based. Like policy, doctrine has a gyroscopic effect. And, if service doctrine is questioned by members of that service, there is a tendency for the leadership to brand the critics heretics, especially if the doctrine is the basis upon which the primary goals of a service are constructed. In addition, the formulation and articulation of the doctrine is ordinarily designed to justify fully the service's attempt to obtain or maintain exclusive control over certain missions. Criticism usually results in an undermining of the case the service has so carefully made for certain roles and missions in national defense. Dissent is therefore discouraged, and breakthroughs in technology which might bring established doctrine into question are often ignored.³²

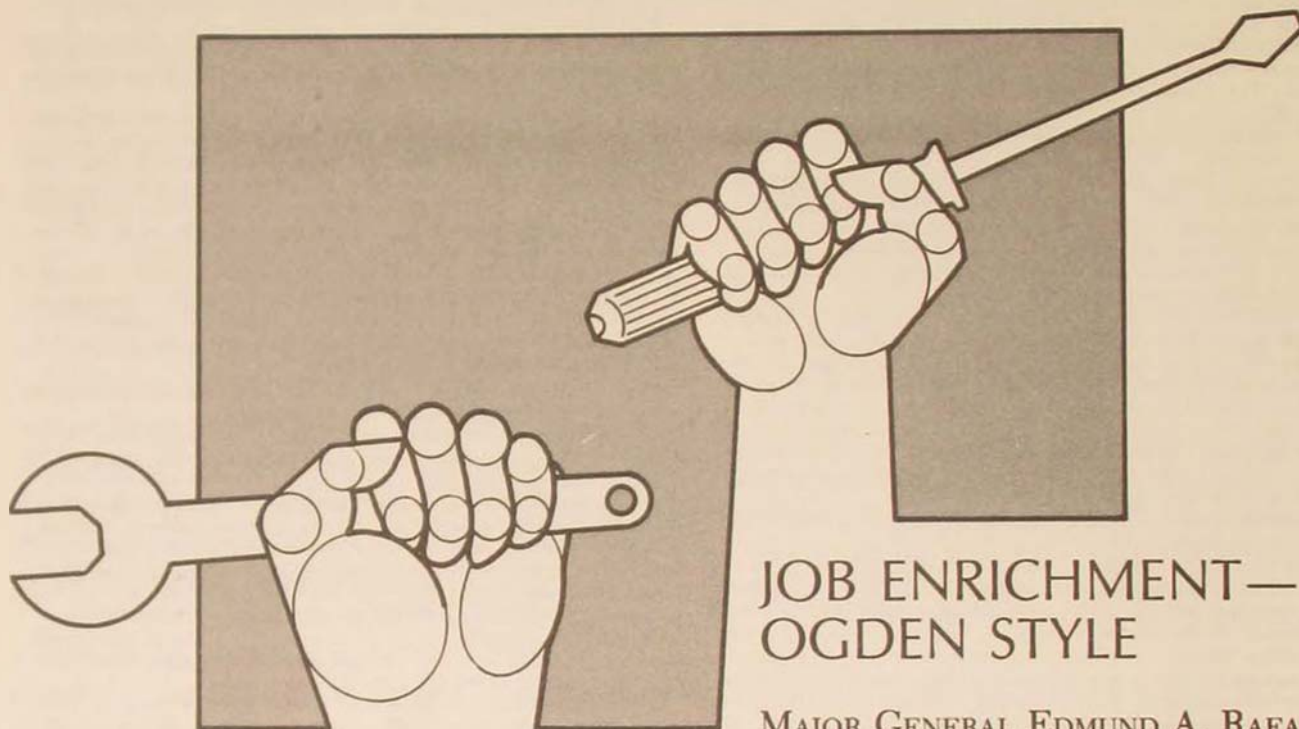
CONTROL of the air is still a necessity. However, we have entered an era where the primary threat preventing control of the air over the battlefield and in the enemy rear is possibly no longer enemy fighter aircraft. Ground-based defenses can now fill that role. To achieve air superiority over the battlefield, it is necessary to eliminate or defeat this threat. We can do that only by realigning our priorities and giving equal consideration to the creation of a survivable anti-SAM force of sufficient size and capability to overwhelm the threat. We will have the capability to defeat enemy aircraft. We

do not yet possess the sure capability of defeating his SAM's.

Kadena Air Base, Okinawa

Notes

1. General John W. Vogt was interviewed by R. Meller in "Europe's New Generation of Combat Aircraft, Part II. NATO Stresses Flexibility," *International Defense Review*, vol. 8, May 1975, p. 341.
2. General A. Merglen, "Military Lessons of the October War," *Adelphi Paper*, No. 114 (London: International Institute for Strategic Studies, 1975), p. 27.
3. General Chaim Herzog, "The Middle East War, 1973," *RUSI Journal*, March 1975, p. 12.
4. See Perry M. Smith, *The Air Force Plans for Peace: 1943-1945* (Baltimore: Johns Hopkins Press, 1970). This book, written by a serving colonel and present planner, is valuable for its documentation as well as its content. Of particular interest to the subject at hand is Bernard Boylan, "Development of the Long-Range Escort Fighter" (Maxwell Air Force Base, Alabama: USAF Historical Study No. 136, 1955).
5. Most analysts of international affairs feel that this is something that will be avoided, literally at all costs. How close we came to such a confrontation during the 1973 War is a matter of conjecture. According to Senator Jackson (at the time) and Admiral Zumwalt (in testimony before Congress on 30 July 1975), the Soviets threatened the United States with direct intervention against the Israelis unless the United States forced the Israelis to stop their exploitation of their breakthrough into the West Bank of the Suez and save the Egyptian 3rd Army. Secretary of State Kissinger put a different construction on the events.
6. *The Military Balance: 1975-1976* (London: International Institute for Strategic Studies, 1976), p. 56.
7. Soviet theoretical strategic and tactical writings of the past few years have hinted at the possibility of nonnuclear "initial stages" for a war in Europe, something that has never been publicly considered before. See John Erickson, "Soviet Military Capabilities in Europe," *RUSI Journal*, March 1975, p. 65.
8. Perhaps more work has been done on the adaptation of organizations to specific technological advances. The really intriguing studies are those investigating the extreme cleverness and innovative rationales used to hold on to outmoded doctrine and strategies. Of particular note, see Edward L. Katzenbach, Jr., "The Horse Cavalry in the Twentieth Century," contained in Robert J. Art and Kenneth N. Waltz, editors, *The Use of Force* (Boston: Little, Brown and Company, 1971), pp. 277-98.
9. This author knows that many of his personal views stem from his combat flying time over North Vietnam. However, he also realizes that someone flying the same type missions four years later will have completely different experiences. It will be a long time before any of us can be truthfully objective in terms of lessons to be learned. Until we are further from the events, it is perhaps wiser to reflect inwardly on our collective experience.
10. Some feel that it stabilized more because of Arab error than Israeli effort—i.e., deliberate decisions made by Arab commanders not to run out from under their SAM umbrellas.
11. Herzog, p. 15.
12. An excellent special edition of *Aviation Week and Space Technology* (hereafter *AW&ST*) entitled "Both Sides of the Suez" (New York: McGraw-Hill, n.d.) casts doubt on the veracity of the public Israeli figures.
13. *Ibid.*, in particular pp. 38-42.
14. *The Military Balance: 1972-1973* (London: International Institute for Strategic Studies, 1972), p. 32. Some analysis and quibbling are necessary. The complete listing has 432 combat aircraft and contains 30 Ouragan fighter-bombers (used mainly for training) and 85 Magister trainers with limited ground attack capability. The numbers do not add up right in this particular case; various combinations do not total 432.
15. *Ibid.*, p. 30.
16. *Ibid.*, p. 35.
17. R. Meller, "Europe's New Generation of Combat Aircraft, Part I: The Increasing Threat," *International Defense Review*, April 1975; Clarence A. Robinson, Jr., "USAF Plans A-10 Deployment to Europe," *AW&ST*, March 1, 1976, pp. 44-47.
18. Air Force Manual 1-1, *USAF Basic Doctrine*, 15 January 1975, p. 3-3.
19. R. Meller, Part I, p. 183.
20. *Ibid.*
21. Marshal A. A. Grechko, *Vooruzhenniye Silyi Sovjetskogo Gosudarstva*, p. 307, quoted in P. H. Vigor and C. N. Donnelly, "The Soviet Threat to Europe," *RUSI Journal*, March 1975, p. 71.
22. At times enemy air would deliberately avoid any contact with U.S. forces. At others, they fought hard. In 1972, the North Vietnamese seemed more determined than they were in the 1965-1968 period. There are those of us who feel our margin of superiority could have been much higher had we not carried so much of the past with us over the North in the form of tactics and procedures taken from another age. Many, but not all, of those problems have been partially solved . . . provided we don't suffer too many training accidents and are careful not to let "them grind us down." Still, we are not allowed to practice much dogfighting at 50 feet above the ground because it is too unsafe. Many, if not most, of the dogfights during the 1973 Middle East War started at 50 feet. Losing 51 feet in a hard turn at that altitude has been known to prove decisive.
23. For example, "one pass, haul ass" around Hanoi, and an altitude restriction below which loss rates rose dramatically.
24. Some critics have brought up the possible use of Soviet air in an offensive role as a counterargument. It is immaterial to the discussion at hand. Looking at present Soviet doctrine, one can see it is entirely possible that such an offensive thrust would commence with widespread conventional attacks on our airfields. So? Does this affect our ability to penetrate Soviet-controlled airspace? The Egyptians started off the 1973 War with an attack on Israeli airfields in the Sinai, and they were fairly successful. Which brings up another related point. We make the assumption that we can always get through their defenses, but they cannot get through ours. If anything, the facts would suggest the converse is true. Soviet airfields are more highly defended against the total span of attack possibilities. How many AAA guns does the USAF or USA own?
25. Precision Emitter Location Strike System. *AW&ST* (April 12, 1976, p. 23) reports that the funds for this system were cut back by Congress. This author, at least, feels there is one overriding inherent flaw in the PELSS system as presently conceived: it is mated with the A-10. But that is another windmill.
26. The United States will not be defending its home territory in such a way. At what point do our losses in a limited conventional war become prohibitive? 25 percent? That was good before, at least once in 1943.
27. *The Military Balance: 1975-1976*, p. 7.
28. Meller, Part I, p. 139.
29. One of the overseas commands is working on the problem. The Weasels have requested a change to their Designed Operational Capability (DOC) from Air-to-Ground to Defense Suppression. 18TFW Msg 171400Z Mar 76 (U) and PACAF Msg "Proposed Defense Suppression Training DOC."
30. Red Flag is perhaps the best thing to happen to the Air Force tactical force in years. Put simply, Red Flag is an attempt to make exercises realistic and meaningful.
31. The latest as recent as May 1976. What is really upsetting is to have a major air command frag a Weasel squadron to simulate an attack upon an airfield and have a strike squadron fragged to bomb a simulated SAM site. It has happened more than once.
32. Smith, p. 30.



JOB ENRICHMENT— OGDEN STYLE

MAJOR GENERAL EDMUND A. RAFALKO

FOR SOME years now, most of my speeches, many of the conversations with my staff, and discussions with my superiors have centered on some variation of the austerity theme. “Do more with your present resources.” Make every dollar count. “We must do better.” Everyone agreed, but we also sensed the frustration that comes from an agreement on end objectives without a definitive plan to achieve them. Rhetoric and platitudes soon wear thin. In late 1972 and early 1973 at the Ogden Air Logistics Center, Hill Air Force Base, Utah, we began looking for some way to lend substance to what we perceived as a willingness among our supervisors and work force to cooperate.

We struggled to discover a feasible rationale that would give ample support to our combat forces yet at the same time reduce the resources required to generate and provide that support.

In 1972–73, Ogden Air Logistics Center was a major USAF installation employing 18,000 personnel and accounting for a \$254,000,000 payroll. It was an important facility in dollar terms, yes, but of more significance, the importance of the weapon systems and commodities managed there. Included are the entire free world arsenal

of ICBM's, the Minuteman and Titan II, and our most widely used fighter aircraft, the F-4. The center also manages all the nonnuclear airmunitions used by the Air Force and recently was assigned as provisional manager of the new air combat fighter, the F-16.

Given the size of the installation, the primacy of the systems, and the volume of the materiel managed, any small overall improvement would be of considerable dollar magnitude.

Two of the major questions that we must continue to study are: How can we increase productivity and improve quality in the face of continuing cutbacks in both funds and personnel? Given the current economic climate, how can we build motivation yet cope with the ever changing problems and needs of our work force?

The Plans and Programs Directorate at Ogden ALC conducted a comprehensive study to determine whether we might benefit from any of the many motivation programs available to us. The conclusion was that the motivation-hygiene theory developed by Dr. Frederick Herzberg offered the greatest possibility. The timing of this decision was fortunate, for Dr. Herzberg had just recently moved from Case Western Reserve University in Ohio to accept the

position of Distinguished Professor of Management at the University of Utah, at nearby Salt Lake City. Dr. Herzberg and his associates have been of enormous help in establishing the program.

Essentially, the motivation-hygiene theory suggests that productivity is a function of technology and motivation, or $P = f(T,M)$. We require the technology to be efficient, the motivation to be human.

Dr. Herzberg believes that workers have two sets of needs, both of which must be satisfied if high production and quality are to be achieved. The worker has hygiene needs—needs that relate to the conditions under which he does his job. Deficiencies in this area influence job dissatisfaction.

The worker also has another set of needs which, if they are fulfilled, will bring about a high degree of job satisfaction. These Dr. Herzberg refers to as the motivators. They relate to the job itself rather than to the circumstances surrounding it. The accompanying chart displays the various dimensions that influence both aspects of the nature of man at work.

He refers to Orthodox Job Enrichment (OJE) as the application of these factors to a work situation.

Confusing these two sets of needs can

Motivation-Hygiene Theory

Job Dissatisfaction
Environment
(hygiene)

command policies and administration
supervision
working conditions
interpersonal relations
money, status, security

Job Satisfaction
Job itself
(motivation)

achievement
recognition for achievement
advancement
work itself
responsibility
professional growth

get us into trouble. We cannot, for instance, achieve lasting motivation by simply improving working conditions which, at best, would only eliminate whatever dissatisfaction that existed regarding working conditions and be relatively short-lived.

OJE is a common sense approach to people at work because it gets down to the touch labor level, the direct worker, and puts management focus on his needs—on the factors in and around those jobs that dissatisfy him. But more important, it focuses on those elements that motivate him.

We worked hard to redesign jobs in order to create more elements of motivation. We had to be sincere and credible

with the worker, yet operate within the management and supervisory structure.

One of the essential elements of our program is the ability of our OJE keymen. They were selected on the basis of current managerial skills, broad knowledge of their organization, and a past experience of succeeding. They had to be able to learn, assimilate, and teach. The keymen received comprehensive training in theory, dynamics, skills, and the OJE implementing processes; the training totaled about 120 classroom hours, equivalent to eight credit hours in the University of Utah graduate school. However, the training does not stand alone. The development process continues for an additional eight months before

Hill Air Force Base, Utah, home of Ogden Air Logistics Center



the keyman is considered to be fully proficient.

Following initial training efforts, the 16 keymen selected 11 pilot projects. Each of these projects followed a similar pattern for enrichment. The first step in the process of job enrichment was the formulation of the implementing and coordinating committees. The implementing committee is a group, usually of four to eight members, made up of the supervisor of the area to be enriched, specialists, and other first- and second-level supervisors who can be of assistance in developing the strategy for implementation of job enrichment principles. The coordinating committee is of similar size and comprised of middle- and upper-level managers over the unit under consideration. The coordinating committee is charged with expediting changes proposed by the implementing committee and with removing roadblocks to implementation. The keyman served as advisor and trainer for both groups.

After instructing them in motivation-hygiene theory, the keyman directed the implementing committee in brainstorming techniques as a means to generate ideas for installing motivators into the jobs under evaluation. This process was called greenlighting. The next step was to evaluate the "greenlight" list to come up with viable items. The evaluation process was called redlighting. If we found that an area had excessive hygiene problems, we had to clean them up to acceptable levels before trying to enrich the jobs.

A diversity of test projects was necessary to enable an evaluation of commandwide application, but, more important, we needed to know if OJE would solve production problems in a cost-effective manner.

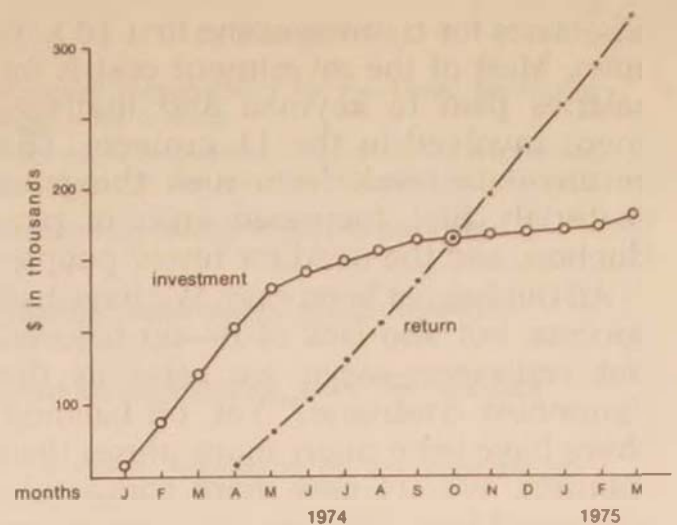


Figure 1. Ogden Air Logistics Center Orthodox Job Enrichment Program (pilot study)

Measures were critical to the initial evaluation. Soft data were encouraging in terms of reduced turnover, reduced sick leave, and improved attitude, but hard data in terms of units produced and reduced man-hours required are also impressive.

Investment was high in the beginning because of the time required for training of keymen and supervisors. (See Figure 1.) Return lagged investment by three to five months. The pilot study chart shows returned investment for the 11 pilot projects through their first 15 months of operation.

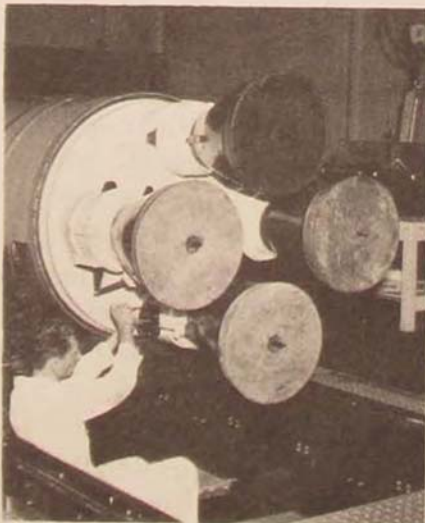
Projects were not initiated until March 1974, and the first job changes came in April. Figures aggregated through March 1975 for the 11 original projects reflect an investment of about \$173,000 compared to a return rounded out to nearly \$325,000. Included in the investment figures are fewer than 13,000 out-of-pocket dollars for contract and training materials. This expenditure resulted from an agreement with Herzberg and

associates for training of the first 16 keymen. Most of the investment cost is for salaries paid to keymen and management involved in the 11 projects. The return data result from such things as materials, fuel, increased units of production, and the need for fewer people.

All this has not been easy. We have had success, but also lack of it—no failures, but resistance—what we refer as the “sameness syndrome.” Yet, on balance, there have been many more pluses than minuses. We are now more competent and confident that we can overcome areas of resistance, maintain our momentum, and continue our flow and expansion downstream. We have not agonized over the lack of measurable progress in specific projects, but we have highlighted and reinforced our successes.

One project that was a particular

source of satisfaction involved the installation of a wing strap on the bottom of an F-4E aircraft wing. From 1 April 1974 to 31 November 1975, we showed a potential savings of \$166,000, quality defect reduction of more than 30%, and a significant reduction in absenteeism. These results were obtained through the implementation process previously described. The keyman provided the coordinating and implementing committees with 20 hours of training on the motivation-hygiene theory. The implementing committee then analyzed the work flow in the project, and after applying job enrichment principles to the job, they came up with a plan to increase motivational aspects of the job. The following list shows some of the changes that were made to the job and their accompanying motivator:



Changes Made

- Eliminated 100% inspection by foreman of all work.
- Allowed production-type self-inspection by qualified mechanics.
- Allowed all mechanics to work directly with Quality Assurance inspectors.
- Allowed qualified mechanics to fix their own mistakes.
- Made mechanics responsible for the technical aspects of shift turnover.
- Established integral crews and paired them between shifts.
- Provided the foreman and mechanic with workload visibility.

Likewise, the following list gives a sample of ideas that were generated in the "greenlight" session but eliminated during the "redlight" phase. This project was closed in November 1975 when the workload was completed.

BASED on these and other results, reinforced by the enthusiasm of top

Representative Sample of Ideas Not Used

- Eliminate aircraft division.
- Free beer in hangar.
- Turn aircraft upside down.
- Better restrooms.
- Fancy covers.
- Free telephones.
- Give birthday off.
- Best crew of month rewarded with party. Worst crew of month given day off without pay.
- Lunchroom near work areas.
- Restrooms nearer work areas.
- Hangar too cold.
- Noise level too high.
- More official business telephones.
- Jack aircraft up/down.
- Mechanized eddy current instrument. Refine DART as applied to slat mod.

Motivator

- Increased responsibility for mechanic, facilitating hygiene for foreman.
- Progressive responsibility for qualified mechanics, logical end to the job—"work itself," achievement.
- Performance feedback, growth potential.
- Personnel responsibility, growth potential.
- Personnel responsibility, work flow feedback.
- Achievement. Allowed to do the complete job—"work itself."
- Responsibility for advance work planning, feedback.

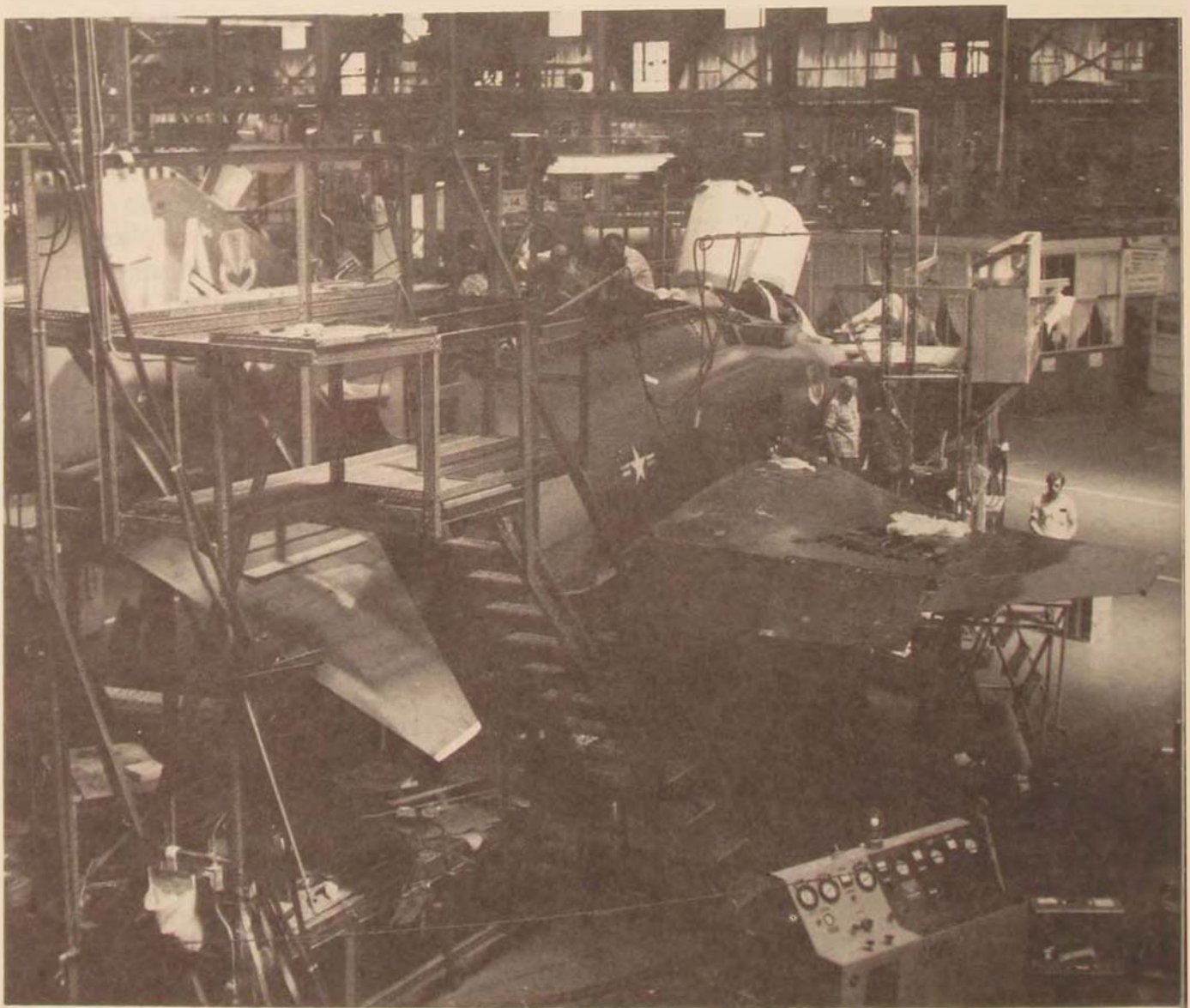
management people and my own personal conviction that we can continue to progress, we have established an organization designed to accelerate the expansion of success.

Twenty-five full-time keyman positions have been created. These folks now have the background, experience, and the technical ability required to train and develop new keymen.

Reason for Nonuse

- Not specific enough—discard.
- Idea jogger from "greenlight" session—discard.
- Impossible idea under current conditions; save this type of item for future consideration.
- Consummatory hygiene ideas.
- Dollars spent on items that do not motivate people and/or create additional management problems.
- Not normally given serious consideration.
- Facilitating hygiene ideas.
- Frequently reflect management's failure to provide acceptable working conditions or policies. Solutions, if warranted, have little or no effect on worker motivation. No idea of this type was judged critical to the success of the project.
- Technically oriented improvements. These and many others were handled by engineering people. Not normally considered motivators.

An F-4 Phantom jet (right) awaits its turn in the repair lines of the Maintenance Directorate at Hill AFB. Another F-4 (below) undergoes programmed depot maintenance in the Aircraft Division. Maintenance for the USAF fleet of F-4s is a major responsibility at Hill.



Fifteen of these positions will be used on a one-year rotational basis. We will select and train new keymen two to three times a year to provide an orderly but controlled progression. This cycle provides an additive channel for expansion as the old keymen return to their former positions or to positions of increased responsibility. We will continue our relationship with Herzberg and associates for the time being in order to reinforce the skill development and proficiency of all our keymen.

The job enrichment program has matured beyond the test phase. As of 31 December 1975, we had 48 projects with more than 1867 workers directly involved. Projects include functions from across the ALC; we have had successful ones involving line workers in maintenance as well as office workers in many of the base organizations.* The accompanying chart shows how our costs and returns have run for all projects through calendar year 1975.

We need better measurement tools to differentiate among the many productivity programs we have on-going. We also need to be able to judge better how each of our efforts contributes to defense readiness. The OJE staff office has developed guidelines and policies that will help provide that kind of visibility. Currently our projects impact mostly at the microlevel. As our efforts expand, we will begin to influence the gross or macromeasures.

Our experience has shown that to increase productivity we must create a work environment in which each individual is first allowed, and then encouraged, to achieve his full work potential. It is that latent, unused, in-

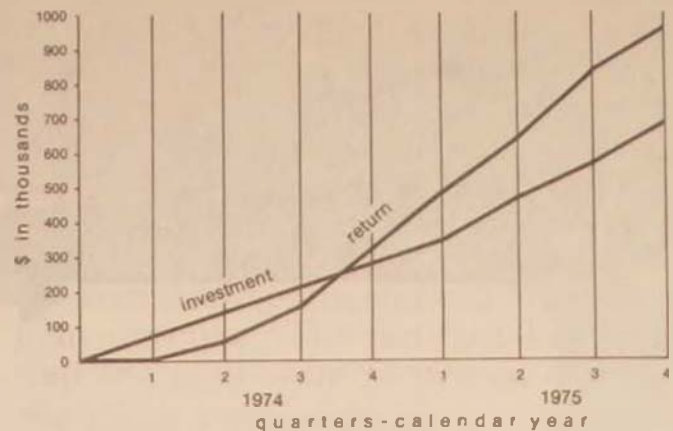


Figure 2. Ogden Air Logistics Center Orthodox Job Enrichment Program

dividual talent multiplied by the thousands of people we employ that can give us major productivity increases. Apparently, we have applied a theory that will help create such an environment. We have adopted a management strategy that will reinforce job motivators. We have established an organization that will systematically review how we do what we must do. We must move closer to our primary objective of increased support to our combat forces at reduced costs. By now OJE is an absolutely essential part of that "common sense approach to people at work."

Progress to date suggests that we expand the investment and sustain and enlarge the application. This we have done. We are currently in the process of expanding our enrichment efforts vertically to improve the job of our supervisors and managers as well as the jobs of the line workers.

We intend to watch closely, determine and use better measures as we assess the full potential of our people performing meaningful work.

So, there it is: Orthodox Job Enrichment—Ogden Style. We have studied it, applied it, and it is working!

Ogden Air Logistics Center, Utah

*Headquarters Air Force Logistics Command is formulating plans to implement the concept of job enrichment commandwide, according to General F. Michael Rogers, AFLC commander.



THE TAC ROLE IN SPECIAL OPERATIONS

BRIGADIER GENERAL WILLIAM J. HOLTON, USAF (RET)

AN AURA of glamour seemed to surround many of the air activities of World War II. One so appealed to the public imagination, in fact, that it continued for some time to be the subject matter of one of the most popular comic strips of the day, Milton Caniff's "Terry and the Pirates." Colonel Philip G. Cochran, first commander of the Air Commandos, was the model for "Flip Corkin" of that famous cartoon series, and through Corkin and his covert adventures in Southeast Asia, the activities of the Air Commandos, undoubtedly much fictionalized, had a popular following.

The adventures of today's Air Commandos are not so widely glamourized and publicized, but the tradition of the Air Commandos continues in the Tactical Air Command's Special Operations Forces (SOF). Those airmen now assigned to special operations are part of the 1st Special Operations Wing (SOW), whose headquarters is at Hurlburt Field, Florida.

Today's SOF must be capable of rapid worldwide deployment and employment throughout the full spectrum of conflict. Using assigned resources with augmentation from other active or reserve forces as required, SOF must be ready to conduct both conventional and unconventional warfare as well as perform other activities.¹ It is important to realize that while these forces constitute only a small portion of the U.S. military, they can provide flexible options to our Commander in Chief. In fact, timely employment of SOF may well prevent the escalation of conflict or commitment of large-scale conventional forces.

In some areas of the world or under certain circumstances, it may not prove feasible or even possible to commit conventional forces; the threat may dictate employment with unconventional or special tactics. The remote location of the operation as well as its international implications may also require that activities be rapidly conducted under austere or low-visibility conditions. Proper employment of SOF can produce savings in human life, prevent political entanglements, and reduce expense. As an example, strained relations between the United States and another country could deteriorate to the point of international crisis without an early American response. In such an event, swift, short-term action involving small numbers of personnel would reduce exposure to hostile fire and provide flexibility, especially during rapidly changing conditions. SOF units, which by design consist of a minimum of personnel and equipment, could well be the ideal solution. On the other hand, SOF is not an answer to long-term engagements. In fact, SOF participation should be terminated if the desired results are not attained in a relatively short period of time.

The recovery of the beleaguered United States merchant ship *Mayaguez* from the Gulf of Siam in May 1975 illustrates SOF responsiveness. Although the *Mayaguez* was recovered by a mixture of forces, that mixture included fast-reaction SOF personnel, equipment, and tactics augmenting conventional forces in a joint operation. The fact that both the ship and crew were recovered demonstrated to potential adversaries that the United States is determined to respond rapidly to suppress efforts at intimidation.

background

The special employment of air power has a considerable history. During World War II, special operations forces were developed under the air commando concept, and participants became known as "Air Commandos." These men first saw action in the China-Burma-India (CBI) theater, providing mobility for the forces fighting against the Japanese. Their roles included airlifting troops over nearly impassable terrain, resupplying guerrilla forces, and giving fighter support; Colonel Philip Cochran, of course, was one of these CBI "Commandos." Specially trained units, such as Doolittle's Tokyo Raiders, functioned within the special operations context during World War II, and the concept was operative in the Korean conflict as well.

During the fifties, our national defense posture focused primarily on the Eisenhower-Dulles doctrine of massive (nuclear) retaliation. Therefore, military emphasis was directed toward developing the necessary strategic capability, and it required most of our defense dollars. This philosophy prevented retaining special units as well as many regular tactical forces. Thus, we witnessed the

demise of Special Operations Forces because of a major shift in national policy.

During the early sixties, however, a significant event occurred that led to the gradual reincarnation of special operations: Nikita Khrushchev announced the Soviet intention of dominating world affairs. The Soviets, aware of the U.S. potential for nuclear destruction, were not willing to risk general war. As their means to world domination, Soviet leadership chose to capitalize on wars of national liberation. The Soviets believed that supporting such wars was both justifiable and inevitable and would circumvent nuclear retaliation.

President Kennedy recognized that our military forces were neither organized nor equipped to cope with this type of warfare. He ordered the Department of Defense to strengthen our ability to meet the threat of smaller wars and guerrilla movements posed by our cold war enemies.² In response to these tactics the services began to study the threat, develop contingency plans, establish schools for educating personnel in this brush-fire warfare, and form units specifically tailored to combat insurgency. Thus, special operations forces in all services re-emerged.

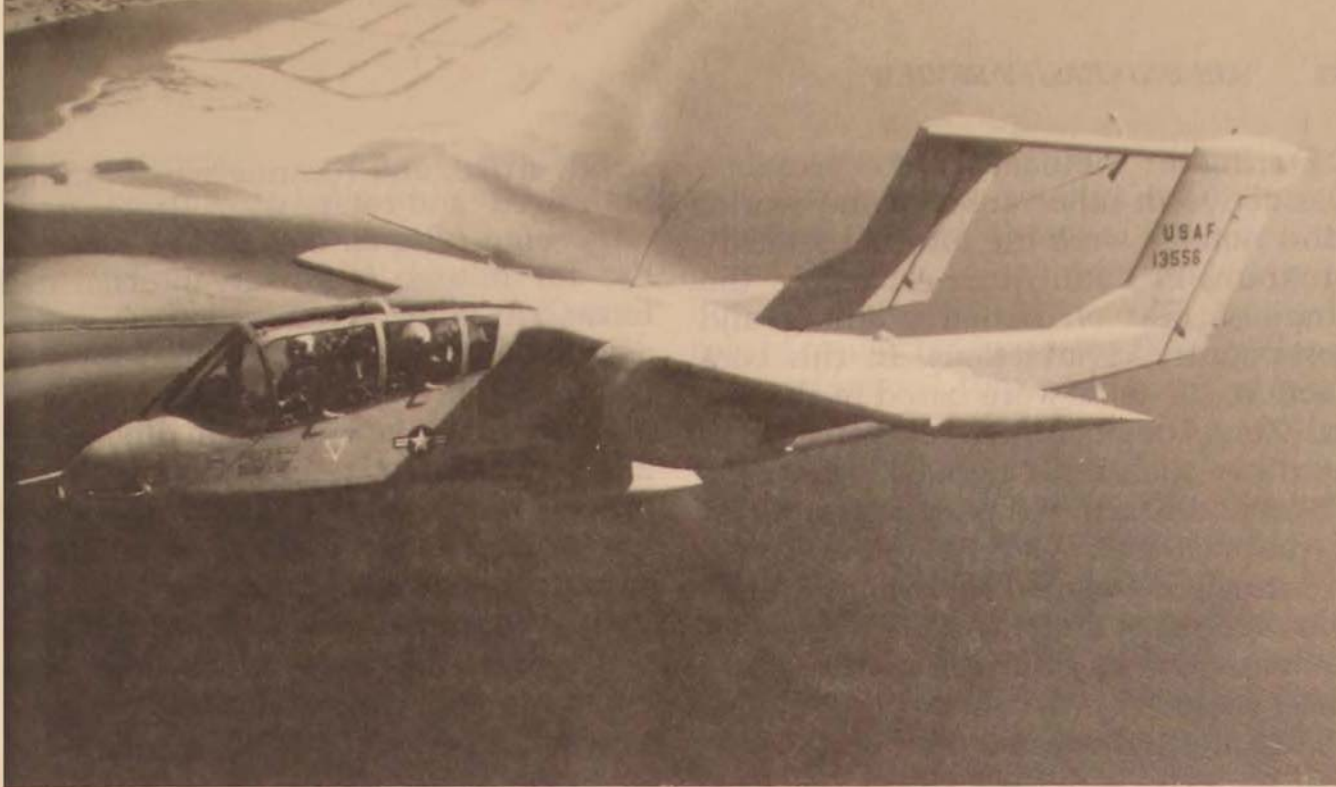
The first positive Air Force action was to establish a special air warfare capability, nicknamed "Jungle Jim." The original Jungle Jim concept was to develop a low-profile force designed to operate in limited-involvement, low-intensity conflicts under austere conditions.³

Much of the equipment used by SOF then was of World War II vintage. This equipment was suitable for the level of expertise and sophistication found in countries that were to be targets for so-called wars of national liberation; it was selected on the basis of simplicity, ruggedness, and compatibility with the

air forces of other countries. Generally, it either was in use or retrieved from storage to reduce cost—e.g., the A-1, AT-28, C-46, C-47, C-123, and A-26. The Jungle Jim personnel were highly trained, flexible, and resourceful, with a detailed knowledge of the areas of the world in which they could be expected to serve. Their key requirements were to understand the cultural, military, and political complexities of certain key areas; to be able to serve in those areas under austere conditions; and, when needed, to develop proficiency in the language of the host country. The personnel were all volunteers and were selected on the basis of technical qualifications, motivation, and resourcefulness. Emphasis, therefore, was on people and training, not just equipment.

The Jungle Jim organization initially sought to develop and test Air Force Special Operations tactics and to select and train personnel who could make them work. Formed in 1961 as a composite squadron, it developed light air strike, airlift, as well as photoreconnaissance capabilities. Jungle Jim originated as the 4400th Combat Crew Training Squadron but later became a group. Under the Special Air Warfare Center, it evolved into the 1st Air Commando Group and more recently became the 1st Special Operations Wing, as it is known today.⁴

Shortly after Jungle Jim was formed, training teams were deployed to Southeast Asia to aid the Vietnamese, Laotians, and Thai in improving the capability of their air forces against the growing North Vietnamese threat. It was during this period that we saw the initial introduction of aircrew and aircraft maintenance instructors for such aircraft as the C-47, T-28, and A-1.⁵ Those early efforts may well have been responsible for preventing the quick demise of the



OV-10 "Bronco"

UH-1N "Huey"



South Vietnamese government. Similarly, in 1964, a team was deployed to Thailand to train Royal Laotian Air Force pilots in tactical operations. At the time of deployment, the Laotian Air Force consisted of only a few T-6s, L-19s, and C-47s and thus had almost no combat capability. But over the years, as a result of this project, the Laotians achieved the ability to mount up to 3000 strike sorties per month. During the mid-60s, as the conflict progressed, general purpose forces were introduced into Vietnam, and as this occurred, the theater SOF elements were integrated into the larger effort.⁶

Undoubtedly the most notable SOF-oriented mission in Vietnam was the Son Tay prisoner of war (POW) camp raid. Staged in the closing days of the Vietnam conflict, this operation was an excellent example of special operations employment of air power. While the mission was supported by conventional forces, U.S.

Air Force and U.S. Army special operations units were its mainstay because of the nature of the operation and the need for tight security. Although the POW's had been moved from the camp, the operation was worth the effort in terms of the improved morale and treatment of the POW's.

During the Vietnam era, SOF presence was active in other areas of the world. Most notable were the internal security programs in Latin America, where the emphasis was on nation building and host-country civic actions. In this connection, SOF units were based in the Canal Zone, deploying training teams to countries such as Guatemala, Colombia, Chile, and Brazil.⁷ Of particular interest is the fact that Colombia and Brazil eventually developed their own indigenous special operations units. However, SOF activities in this area of the world have ceased for the most part, due to realignment of mission priorities.

mission

All U.S. military forces derive their basic mission from a variety of documents published by the Joint Chiefs of Staff. The JCS guidance is further expanded by the respective services as a key part of the chain describing the specific mission and functions of their forces. The forces tasked for special operations are instruments of national policy to be used as directed by the national command authorities. All Air Force commands are prepared to support special operations; the Tactical Air Command, however, has been singled out as the focal point for Air Force special operations.⁸

As Air Force Manual 1-1 states:

Aerospace special operations forces conduct counterinsurgency [foreign internal defense], psychological operations, unconventional warfare, and functions which may be considered adjuncts to or in support of various other operations. Aerospace special operations forces are organized, trained, and equipped to conduct special operations at all levels of warfare . . . particularly suited to subtheater and localized conflicts.

The gamut of special operations includes

airlift, strike, and reconnaissance, using both fixed- and rotary-wing assets.

Foreign Internal Defense. A focus of the SOF mission is foreign internal defense. FID is the term used to describe assistance provided to selected foreign governments in a wide range of programs, including political and diplomatic activity, economic and military assistance, military civic actions, public works, and other specialized activities such as psychological and counterinsurgency operations.⁹ FID operations are conducted on request from the host country and are intended to enhance the internal security of the nation. The role of SOF in these operations is to encourage, advise, and train indigenous personnel in nation building and internal security activities. The fundamental principle of FID is that indigenous effort must dominate the defensive effort. To guide indigenous efforts requires area-oriented, specially trained personnel whose activities are closely coordinated with other U.S. civil and military programs to ensure continuity and efficiency.

FID is an extension of the Security Assistance Program. In response to national command authorities, the Air Force prepares and implements tailored security assistance training programs.¹⁰ These programs are tied to the foreign military sales or grant-aid programs, and our interest in these areas is continuing. When properly applied, they are an effective method of assisting allied nations to attain a level of military self-reliance. A prime example of special operations in this role is the mobile training team (MTT) which may be composed of Air Force personnel sent temporarily to a foreign nation for instructional purposes. The idea is to help people to help themselves. Under this concept, one or more persons are deployed to instruct the host coun-

try's instructors in subjects that vary from academic to technical.

Since the termination of U.S. involvement in Vietnam, SOF has deployed three C-123 MTT's: one each to Thailand, Korea, and the Philippines. The deployment of these teams illustrates the ability to tailor special operations MTT's to the equipment possessed by the host country: the three MTT's were deployed after all C-123s were deleted from special operations and reassigned from the active forces to the reserves. Active-duty personnel with previous C-123 expertise were identified, temporarily assigned to the reserves to regain C-123 currency, then deployed as an MTT. An OV-10 MTT has been deployed to Venezuela, and similar training was recently completed stateside for Indonesian OV-10 pilots and ground crew personnel.

Another example of training assistance is the fact that SOF provides area orientation for personnel who have been assigned to support a recent development known as the Technical Assistance Field Team (TAFT). This training is offered through the USAF Special Operations School at Hurlburt Field. Selected civilian and military personnel are schooled in the mission of a TAFT and the cultural aspects of their area of assignment. Presently a TAFT course for Iran and Saudi Arabia is in progress.

Psychological Operations. A second aspect of the Special Operations Forces mission is psychological operations (PSYOP). In basic terms, PSYOP consists of actions (active or passive) taken to influence or change the opinions, behavior, or emotions of the target audience. This audience is always foreign and may be friendly, neutral, or hostile. When PSYOP programs are directed exclusively against a hostile foreign audience, the term is "psychological warfare."¹¹

The primary function of PSYOP is to gain sympathy or support for national objectives or to deceive, confuse, or break the enemy's will to resist. PSYOP is not a recent concept, having played a role in conflict for centuries. Sun Tzu long ago understood the importance of psychological operations when he wrote, "... for to win one hundred victories in one hundred battles is not the acme of skill. To subdue the enemy without fighting is the acme of skill."¹²

The Air Force has a number of ways to exploit PSYOP. Programs can be carried out either unilaterally or with the assistance of the indigenous population. Methods include a show of force on the low end of the conflict spectrum, activities to reduce enemy effectiveness, humanitarian assistance to gain support, and information programs or propaganda to gain support or psychological advantage.

On occasion, actions can be more effective than words. General Jimmy Doolittle's epic raid on the Japanese mainland is an excellent example of a single action causing repercussions far beyond those anticipated. On 18 April 1942, sixteen American B-25s launched from the aircraft carrier *Hornet* to effect the first Allied strike against the Japanese homeland.

The destruction wrought by the bombs dropped from the sixteen planes was relatively small, but the psychological effect upon the Japanese was devastating. Their war leaders boasted that they would reach the western shore of the United States, march to the east and dictate terms of surrender in the White House. Intelligent exploitation of the initial assault on Pearl Harbor and subsequent early success in island warfare had convinced the people of Japan of the complete invincibility of their armed forces. What quickly became known as the Doolittle Raid destroyed

that myth; it showed them the awful power of the country which lay four thousand miles across the Pacific.¹³

Tangible consequences resulting from the psychological pressure exerted by the raid were soon realized: it proved the vulnerability of the imperial capital, and the Japanese High Command subsequently dedicated four badly needed fighter groups to the protection of the national territory from future raids. Moreover, the Battle of Midway was an indirect result because the Japanese believed that the capture of Midway Island and key points in the western Aleutians would preclude similar attacks in the future.¹⁴

Another interesting example of the effective use of PSYOP occurred in Vietnam and centered on the North Vietnamese belief in astrology. The United States secured the cooperation of certain North Vietnamese astrologers who, in turn, published erroneous astrological information for general consumption. As a result, many echelons in the North Vietnamese hierarchy believed certain times of the year would not be propitious for launching major offensives. The United States created this deception to avoid attack during the monsoon season, when the flying weather was particularly poor. At such times, air cover for the American and South Vietnamese forces would have been minimal.

The Air Force PSYOP programs mainly support the U.S. Army and are usually planned and directed by unified commands. SOF emphasis in PSYOP during Vietnam was limited primarily to leaflet delivery and loudspeaker broadcasts. However, the widespread use of civic-action teams in Vietnam and other areas had inherent psychological effects, particularly in gaining sympathy and support for our national objectives.

The Air Force is expanding its knowledge of PSYOP by conducting formal academic training to expose personnel to the strategic and tactical value of such operations. This training, incorporated in a relatively new course conducted at the USAF Special Operations School, enhances the ability of our personnel to influence others through the use of PSYOP. Finally, USAF special operations personnel participate regularly in joint training exercises in which practical experience in PSYOP can be gained and operating procedures can be tested and improved. Principles learned and techniques developed can thus be retained for future use.

An AC-130H "Spectre" gunship of 1st Special Operations Wing, Hurlburt Field, Florida



Unconventional Warfare. The third major feature of the SOF mission involves support of the unconventional warfare (UW) forces of the Army and Navy. UW covers a broad spectrum of military and paramilitary operations conducted in enemy, enemy held, enemy controlled, or politically sensitive territory. UW in-

cludes, but is not limited to, the interrelated fields of guerrilla warfare, evasion and escape, subversion, sabotage, direct action missions, and other low-visibility operations. UW most often is a function of supporting or assisting friendly military, irregular, or guerrilla forces against enemy conventional, police, or paramilitary targets.¹⁵

The interrelated fields of UW are rarely a unilateral service function; they are almost always conducted with our sister services or allies. SOF provides the necessary airlift, resupply, radio relay, communications, navigation, surveillance, and firepower in areas where the pres-

ence of conventional air power may not be feasible or expedient. In this context, special operations assets such as the C-130E(C) "Combat Talon," AC-130 "Spectre" gunships, and helicopters can be made available to support theater commanders.

The principal application of the Combat Talon involves specialized equipment for terrain-following navigation to and from landing and drop zones, high-speed, low-level resupply, and the Fulton recovery system. With the Fulton Surface to Air Recovery System, nicknamed "skyhook," the Combat Talon can snatch up to 500 pounds of cargo or two

The Fulton recovery system, fitted to the HC-130E, drops a personnel kit containing a harnessed suit attached to a helium-filled balloon, resulting in live pick-up from both land and water.



personnel from the ground. This is accomplished with a helium-filled balloon, associated life lines, harnesses, and special aircraft equipment. A typical mission might involve the recovery of a downed pilot in an area inaccessible to conventional aircraft or helicopters. During such a recovery, gunships can provide protective air cover.

The AC-130 "Spectre" was originally designed to attack close-air-support and interdiction targets. Throughout its evolution, however, gunships have proven suitable in the UW environment. In addition to close air support and interdiction, gunship applications extend into roles such as base defense, real-time armed reconnaissance, strike control, and armed escort, particularly for SOF helicopters.

SOF helicopters provide a vertical air-lift capability. Their applications include infiltration, exfiltration (recovery), resupply, and support of psychological operations. Many remote areas are not suitable for landing the Combat Talon. When more than two personnel are to be exfiltrated, a helicopter is best suited to perform the mission. This can be accomplished by either vertical landing, low hover, or hoist operations.

It is important to reiterate that SOF assets can operate unilaterally, but most often they support the special operations elements of the other services or conventional forces.¹⁶ Moreover, a given situation may progress to the point at which interface between UW and conventional forces becomes necessary. For this reason, SOF planners include both unilateral and joint operations as part of worldwide contingency plans.

The interface of SOF unconventional forces with conventional forces may be illustrated by Project BONUS PRIZE, the nickname for the JCS-sponsored, U.S.

Readiness Command-directed effort to improve mutual support between tactical aircraft/missile forces and unconventional warfare forces.¹⁷ All unified commands participate in the project, which uses joint training exercises as the vehicle to develop new methods for using existing hardware.

The distinguishing characteristics of the SOF mission are the variety of responsibilities to FID, PSYOP, and UW operations, as well as to supporting functions. SOF provides numerous capabilities to unified commands upon direction from the JCS. Since almost all special operations are conducted in support of the other U.S. services or other nations, a wide range of direct communication is required with other major commands, unified commands, and other services, and TAC has provided this latitude to SOF. To understand the necessity of this latitude, however, one must also have an understanding of the 1st Special Operations Wing organization.

organization

The 1st Special Operations Wing of the Ninth Air Force is not a standard Air Force wing. Since the peak of activities in Vietnam, Air Force Special Operations has been reduced from a numbered Air Force level of command with subordinate wings, groups, and squadrons to the 1 SOW and two theater C-130E(C) "Combat Talon" squadrons reporting to other commanders.

Since the 1 SOW is the focal point for Air Force special operations matters and the planning and employment agent for unconventional warfare, variations from the standard wing organization are understandable. One example is in the structure of the wing staff, where both the wing Plans and Intelligence Direc-

torates report directly to the wing commander. It is here that much of the activity concerning unified and major air commands or the other services is concentrated. Operations Plans, a separate division, reports to the Deputy Commander for Operations as in other wings. The wing also has responsibilities to wartime gained Air Force Reserve special operations units as some SOF contingencies involve the Reserve. Unlike other Regular Air Force wings, the 1 sow acts not only as their parent advisory assistance unit but also as their intermediate gaining command during mobilization.

The 1 sow is the only wing-level command in TAC to gain reserve units directly upon mobilization, and it therefore has two concurrent responsibilities: normal day-to-day wing operations and mobilization responsibilities as a gaining command. Presently, two Reserve units are gained—the 302d Special Operations Squadron, equipped with CH-3E helicopters, and the 919th Special Operations Group, equipped with AC-130A gunships.

To form the total force nucleus required for special operations, Reserve and regular personnel are trained through large-scale participation in joint exercises and through formal academic courses conducted by the Special Operations School (USAFSOS) and the Air Ground Operations School (USAFAGOS). Both schools provide the wing an unusual capability to maintain conceptual expertise and operational ability in their respective specialties. The USAFSOS provides specialized courses in FID, PSYOP, and UW, thereby emphasizing awareness of needed expertise in the SOF arena. The purpose is to provide the basic framework of understanding in special operations so that personnel are capable of carrying out their assigned specialties in

any situation, anywhere in the world. The USAFAGOS, on the other hand, provides formal training to all services in tactical air operations with ground forces during joint or combined operations. Assigned to the 1 sow, but not a SOF asset per se, it trains individuals in functions and operation of the USAF tactical air control system and the Army air ground system. This expertise is tied to the formal aircrew training conducted by the 1 sow in the O-2 and OV-10 forward air control aircraft and other USAF/USA tactical units.

Three unique assets are also assigned to the wing. They include the special operations deployable photo processing cell; the special operations combat control team; and the special operations combat weather team, which is provided by the Military Airlift Command. All are trained for and regularly participate in SOF roles as needed.

It is obvious that the 1 sow organization varies from the norm due to its unusual assets and mission. Latitude for direct communication is provided, both vertically and laterally. With this arrangement, the 1 sow functions effectively, helping TAC fulfill both present and future responsibilities to the Air Force.

SOF WILL continue to be a highly specialized force. Active duty special operations day-to-day resources need not be large. In the interest of economy, we need retain only a small nucleus of special operations personnel which can be rapidly augmented by conventional and Reserve units with a repository of special operations expertise, updated to current requirements.

For the short term, SOF will probably continue much as it is today. Although a small force, Air Force special operations



Leaflet Warfare

Leaflets stream from an O-2 Skymaster flown by psychological warfare pilots of the 9th Air Commando Squadron at Da Nang Air Base, Vietnam. . . . During World War II German-language tabloid Frontpost was dropped daily behind enemy lines. It was carried in modified practice bombs that opened on trigger release and delivered the news.

units have contingency commitments to theater and unified commanders, particularly in the area of unconventional warfare. SOF will continue to maintain expertise through exercises with these commanders and through training and deploying our special teams.

Joint training exercises permit individuals to maintain proficiency in their assigned specialties. These exercises also provide the stage to test new techniques and develop requirements for follow-on equipment and tactics. In addition to maintaining contingency capability, the 15th AF will continue to provide a training base for special operations units located worldwide.

Over the long term, the emphasis of Air Force special operations will probably fall in two broad areas: continuing support of security assistance and improved direct-action capabilities. Thus special operations will be strengthened without a proportionate increase in the size of the force.

In support of security assistance for selected nations, as directed by national command authorities, SOF may be committed to engage in low-intensity conflicts. The orientation will be toward a joint capability with our sister services' special operations units in countering brush-fire type warfare in the inter-related fields of FID, UW, or PSYOP. The indigenous effort must be predominant, assisted by USAF SOF units, U.S. Army Special Forces, and U.S. Navy SEALs. Direct-action missions conducted exclusively by U.S. forces probably will be the last resort. Joint special operations forces may be the first committed to hostilities and withdraw or augment conventional forces if required.

Training will represent the bulk of SOF support of security assistance. SOF assets can be used to instruct employment

techniques in weapon systems procured under this program. The concept is a logical follow-on to the various successful training programs conducted in A-1, T-28, A-37, C-47, and C-123 aircraft during years past, whereby aircrews were instructed in employment procedures and tactical air operations.

To accomplish these missions, SOF will need a limited variety of equipment other than that on hand. Equipment determination must be based on the projected requirements of those countries considered as foreign military sales or grant-aid candidates and the training missions required to support security assistance. To accommodate the scope of activities in low-intensity conflicts, aircraft such as the OV-10, A-37, F-5, and C-130 are logical but not exclusive choices.

The fundamental principle underlying special operations is the joint effort. Increased joint training across the board with our sister services' special operations units seems to be the best means of improving capability. Emphasis in this area will improve interservice liaison and enhance the uniformity of procedures, particularly if all units can be collocated. Joint contingency plans may be expanded and more tightly integrated.

Beyond FID, UW, and PSYOP, new missions could be developed to include sea surveillance and countering international terrorism. For the former, SOF assets such as the Combat Talon and gunship could augment ongoing activities by providing additional "eyes and ears" with our airborne sensors and monitoring devices. Selective use of these assets could add significantly to our nighttime surveillance and early warning capability. For the latter, a joint force could be trained and dedicated to recover U.S. citizens abroad who are held in captivity by terrorist groups.

We will also have the continuing need to update current equipment with improved capabilities as they become available. All SOF aircraft will require state-of-the-art electronic defensive systems. The Combat Talon will need updated engines and sensors. The gunships will require improved sensors and monitoring devices as they become available; and the effectiveness of our helicopters would be enhanced by an air-to-air refueling capability and off-the-shelf all-weather navigation equipment.

In the next decade, replacements will be needed for the SOF Combat Talons, gunships, and helicopters. The focus will be primarily on aircraft with performance proven superior to existing platforms, combined with follow-on electronic defensive and sensor systems.

SOF capabilities should also be enhanced with short-field utility aircraft and reconnaissance aircraft. Equipment selection will be based upon ruggedness and the capability of effectively operating in remote locations under austere conditions. In all cases, versatility is the key to multipurpose capabilities. With these assets, SOF will continue to provide commanders with a wide variety of employment options.

SPECIAL OPERATIONS FORCES play a significant role in the support of our national policy and objectives. A well-trained nucleus of SOF personnel should remain intact, as time may not permit their formation after the need becomes apparent and valuable expertise has been lost.

The relatively short history of special operations has clearly demonstrated the recurring need for flexible and versatile forces dedicated to applying specialized techniques throughout the entire spectrum of conflict. Although the interna-



Combat Talon

With HC-130E "Combat Talon," showing the Fulton recovery system arresting device, special operations forces can perform a variety of missions. A combat control team (opposite above) is launched into an alien environment. The individual combat controller, spread eagle (middle), is equipped for high-altitude, low-opening (HALO) operation. The team is trained to operate in all environments (bottom).



tional position of the United States has undergone continuing reassessment, the value of SOF capabilities has remained evident to high-level planners and decision makers. The predominant emphasis will continue to be that of maintaining a

deterrent posture while at the same time retaining the capability to respond rapidly when required, fulfilling the motto of the 1st Special Operations Wing: "Anytime, anyplace."

Hurlburt Field, Florida

Notes

1. For SOF capability, see AFM 3-5 (draft), e.g., humanitarian actions, pp. 1-1-1-4.
2. *Air Force Special Operations Force Objective Study Guide-1975*, Eglin AFB, Florida: Headquarters, USAF Special Operations Force (TAC), p. 4.
3. Letter, CSAF/AFOOB, subject: Final Operational Concept "Jungle Jim," 27 April 1961.
4. *Special Air Warfare Center and 1st Special Operations Wing, Unit History, 1963-1972*.
5. *Ibid.*
6. *Ibid.*
7. *United States Southern Command History, 1964-1970*.
8. *USAF War and Mobilization Plan*, Vol. I, p. H-1-4, June 1973, Change 1, May 1974.

9. AFM 3-5 (draft), p. 3-1.
10. *Ibid.*, p. 3-2.
11. *Ibid.*, pp. 4-1-4-23.
12. Sun Tzu, *The Art of War*, translated by Samuel B. Griffith (New York: Oxford University Press, 1963), p. 77.
13. Quentin Reynolds, *The Amazing Mr. Doolittle* (New York: Appleton-Century-Croft, 1953), p. 169.
14. Carroll V. Glines, *Doolittle's Tokyo Raiders* (Princeton, New Jersey: D. Van Nostrand Company, Inc., 1964), pp. 393-96.
15. AFM 3-5 (draft), p. 5-1.
16. Organization and Mission—Field, 834 Tactical Composite Wing, TACR 23-42, 22 July 1974 (redesignation to 1SOW effective 1 July 1975).
17. Message, USCINCREC/RCJ5-PO, subject: Improvement in Mutual Support between Tactical Aircraft/Missile Forces and Unconventional Warfare Forces, 31 October 1973.

... there is the virtually untouched issue of war-prevention. This is one of the few sectors of international politics where the social scientists have produced potentially usable insights and techniques, virtually none of which are yet taken seriously by governmental or UN decision-makers. In a world where early warning of incipient conflicts can easily be monitored by modern data systems—in which the lessons of past disasters and present irrationalities are plainly written for all to read—there is no longer any reason why the frantic midnight reinvention of peacekeeping has to be viewed as the outside limit of man's political ingenuity.

LINCOLN P. BLOOMFIELD

THERE IS an old Chinese curse which states, "I curse you—may you live in an important age." Indeed, we do live in an important age, saturated with many forms and intensities of conflict. While conflicts of value are slow to erupt between individuals and institutions in a stable society, they are prevalent in times of rapid change. In our age of dynamic change it is imperative that the manager understand the source of, and various strategies for dealing with, conflict which inevitably occurs in organizations. Typical of this conflict is the breakdown of communication between management and labor; between a commander and his troops; or between a secretary and her supervisor. Even more common, perhaps, is the overt and often hostile dysfunctional competition that erupts between work centers, peers, or social groups vying for scarce resources or attention.

CONFLICT IN ORGANIZATIONS

good or bad?

LIEUTENANT COLONEL RUSSELL PIERRE, JR., USA
JEROME G. PEPPERS, JR.



In our discovery of conflict, it is possible to become obsessed and preoccupied with its prevalence in society. This concern may veil the much more important acts of cooperation and harmony that characterize normal organizational and society life; like that which we expect and usually find, for example, between maintenance and operations in an Air Force wing. However, as a basis for our discussion, we must agree that conflict is a major organizational reality. As managers it is essential that we become capable of managing conflict in an environment of individual and group differences.

So, what do we mean by "conflict"? The term is widely used to describe important differences between individual humans or groups of humans. In its major sense it applies to warfare between nations. If existing differences are not somehow adequately handled, the involved individuals or groups are unable to come together in understanding and cooperation. However, not all conflict is bad. *Differences which result in initiative and creativity are stimulating for those involved, and such conflict is essential for progress.*

conflict causes

Nations, organizations, and groups are made up of individual human beings. Each human has through life experiences developed a set of values and evolved a set of behavioral rules. These values and rules are sufficiently alike in a given society (more so in a given segment of a society) to allow justice, morals, and ethics to exist and create general agreement about what is right and what is wrong. But, the value-rule set for each individual is a unique set not fully shared by other humans. These differences in

value-rule sets are most likely the basic causes of conflict. An airman, for instance, might be incensed over what he considers a wrong since the base commander has denied him and his family BX check-cashing privileges because a bad check resulted from a pay record error. However, the base commander, bothered by numerous bad check experiences through the BX, may feel it wrong *not* to punish such occurrences.

Another major conflict cause is the motivation of the separate individuals. Each is motivated by a peculiarly unique degree of satisfactions in a set of needs. It is quite likely that in a given group situation the individuals concerned will be aiming their personal efforts at slightly different objectives; such objectives may be similar enough to permit cooperative effort but sufficiently different to create some conflict. A common example might be the "hot line," employed by many commanders as a means of staying in touch with the troops. This opportunity to short-circuit supervisory channels often antagonizes intermediate managers, who may learn of a problem only when the commander confronts them with it. Then, too, it is possible for all to be motivated to behave toward the same goal accomplishment but to feel that that goal, when attained, will not be great enough for all to share adequately in the reward. Conflict may then exist as each strives to attain his place in the sun.

A third major cause of conflict—and one more obvious to us—is the differing ideologic and philosophic bases we possess. These relate to a great extent to the value-rule set but are sufficiently different to warrant recognition as possible conflict causes. What we use as a base for our ideals and our concepts becomes of great importance to us, and we do not want that base challenged or questioned

by others. An example is the old-timer's reluctance to change from a thus-far successful technique even though evidence indicates that a change would be beneficial. When we perceive attack on our ideals from another, we respond with energy and, often, heat. Note the actions of some militant minority groups and you observe ideologic/philosophic conflict reactions at work.

effects of conflict

Conflict has both positive and negative effects. It can be positive when it encourages creativity, new looks at old conditions, the clarification of points of view, and the development of human capabilities to handle interpersonal differences. All of us have experienced a surge of creativity when we permit the ideas of others to trigger our imagination, as for example in a brainstorming session. Conflict can be negative when it creates resistance to change, establishes turmoil in organization or interpersonal relations, fosters distrust, builds a feeling of defeat, or widens the chasm of misunderstanding. Such might be the situation today in American society relative to school bus-

ing. Unfortunately, the term "conflict" has only the connotation of "bad" for many people; so much so that they think principally in terms of suppression, giving little or no attention to its more positive side. One author emphasizes this by stating: "It seems entirely likely that many, if not most, organizations need more conflict, not less."¹ Another states: "The absence of conflict may indicate autocracy, uniformity, stagnation, and mental fixity; the presence of conflict may be indicative of democracy, diversity, growth, and self-actualization."² Some social critics relate the military to the former by

their references to the military mind in which they equate absolute and unquestioning obedience with normal military functioning.

Conflict should be considered, conceptually, as neither bad nor good, wrong nor right. The meaning of conflict is established by its participants since it is people who attach value definition to it. The ultimate results of a conflict situation are determined by the feelings, beliefs, and values of those persons involved. People are the real determinants of the meaning of conflict. If we forget this and treat conflict as though it had some natural quality (good/bad, right/wrong), we overlook the roles of the participants and probably lose the ultimate capability of stimulating conflict.

We are human, though, and it is almost impossible for us to divorce ourselves of feelings, beliefs, and values. We create, or get involved in, conflict, and we possess predispositions as to how it ought to be addressed or handled. We tend to have a strong behavioral leaning, a set pattern, for our participation, and this emerges as a major factor in setting the nature of conflict. We can note this predisposition for a set pattern of behavior in our tendency to want to apply equal penalties or identical punishment regardless of the cause of an infraction of rules.

We can say, then, that conflict is a state of unresolved difference between two individuals, an individual and a group, or two groups. The difference can be real or imaginary. Regardless, it is a difference and will cause some form of conflict if the involved parties are in contact with each other. The conflict exists until the difference is resolved. The important aspect is how the individual accepts and responds to it; how he seeks to control or stimulate the dynamic conflict situation. In this age

of specialization and sophisticated technology, we can readily find power imbalances in organizations. This often results in conflict. In technically oriented organizations (e.g., military aviation, major communicative networks, and science-based units), the managers rarely are able to be experts in all the disciplines or specialties they control. These managers find themselves greatly dependent on technical experts who work for them. Differences arise because of differing knowledge bases and perceptions. Note the hard feelings and accompanying resentment we often experience when a boss, removed from the situation, nit-picks a piece of correspondence we have prepared. Unmanaged, these differences can have negative results. But this need not be if we carefully select mature and adaptable managers who can understand the high degree of informal (expert) authority held by subordinates who have technical competence.

the need to manage conflict

We must expect conflict to occur in our organizations. We should be disappointed if it does not because conflict exists only within the context of interdependence. There can be no conflict when there is no awareness of another meaning, role, or value than our own. Thus, conflict is a relationship between segments of an interrelated system: persons, a group, an organization, a community, a nation. There can be no conflict if those involved sense no differences. However, in the environment of interpersonal relationship there will always be difference, and conflict will be the norm not the exception.

We need to manage conflict in order to obtain profitable return from it. Managing conflict requires that we consider not

only the required guidance and control to keep conflict at an acceptable—yet not too high—level but also the activity to encourage proper conflict when the level is too low. Who would want to lead an organization without the energy and force accompanying the conflict of creativity and initiative?

Stephen Robbins makes a strong case for the need for a more realistic approach to conflict with his “interactionist approach.”³ He states that there are three basic managerial attitudes toward conflict which he identifies as traditional, behavioral, and interactionist. The *traditionalist*, following our social teaching, believes that *all* conflicts are destructive and management’s role is to get them out of the organization. The traditionalist, therefore, believes conflict should be eliminated. The *behavioralist* seeks to rationalize the existence of conflict and accurately perceives conflict as inevitable in complex organizations or relationships. Thus, the behavioralist “accepts” it. The *interactionist* views conflict as absolutely necessary, encourages opposition, defines management of conflict to include stimulation as well as resolution, and considers the management of conflict as a major responsibility of all administrators. The interactionist view is to accept and encourage conflict. This article uses the interactionist approach.

the person and the organization

Conflicts occur when the needs and goals of the individual are not in harmony with the needs and goals of the organization. Chris Argyris, in his discussion of man versus the organization, indicates it is highly conceivable that the traditional goals and structure of organizations may be in conflict with the needs and goals of a developing personality.⁴ This may be

readily seen in the efficient and omnipotent bureaucracy that places emphasis on hierarchy, specialization of work, established norms of conduct, and explicit rules, often forgetting or overlooking the individual and his unique qualities. Traditionally, personal values tend to be hostile toward organizations, big government, big business, bureaucracy, and, in spite of its purely defensive posture in our country, the military. Again, conflict can arise when interdependency exists. Employees become dependent on organizations to give their lives direction and meaning. Such dependency allows them to escape the burdens of personal responsibility. Whereas we praise individualism in workers, the organization often requires that the individual be treated impersonally. We see this in "distant" management, in which the people sense an absence of concern for their individuality and personal needs. Efficiency requirements of the organization also act as sources of conflict because they regularly demand that the goals and needs of the organization be given higher priority than the rights of the individual. We, therefore, yield to the proposition that conflict between the organization and personal values is normal and a fact of life. We strongly recommend that Argyris's book be high on the manager's list of developmental study because managers seem always to be torn between the two competing desires of doing what is best for the organization or what is best for the individual. It is a rough decision spot to be in.

Managing this inherent conflict between individual needs and organizational needs demands a high degree of self-awareness on the part of the manager. What am I willing to do in the balancing of these needs? How much can I accommodate comfortably to the need

satisfaction of other humans in my organization? How much faith do I really have in the motivational drives of my subordinates? What really is my role in this unit? What can I do, or what will I allow myself to do, to integrate the needs of the individual with the needs of the organization? In this circumstance that now faces me, which is more important: the individual or the group? No one can preanswer these questions, nor can anyone answer them effectively for another person. Yet the active manager has to answer them as he strives to control conflict.

A major influence on the manager's actions or decisions will be his basic concept or philosophy about the nature of man. Douglas McGregor presents a famous dissertation on this subject in his consideration of Theory "X" and Theory "Y."⁵ Argyris develops, too, a number of managerial considerations.⁶ Abraham Maslow also offers a number of assumptions for the manager to adopt for an enlightened approach to the individual-organization situation.⁷ Our evaluation of the research and literature leads us to reflect that potential individual-organization conflict is heightened as management acts to reduce or constrain the individual's opportunity to decide. This has been the trend in the USAF's strong centralized control of so many details of the base maintenance and supply operations. The goal to make mistakes unlikely is commendable, but perhaps in solving one problem a number of others were created. The person needs a growing control over his work environment, more opportunity to make decisions, more autonomy in order to become self-responsible. Yet, in our sophisticated society, the organizational trend is quite the opposite, and many people feel management has decided, without notable

exception, that the organization in all instances has precedence and priority.

Never is the functioning organization free of problems. The unresolved problem is a source of conflict because individuals are expected to solve the problem, but the organization (management?) often does not permit mistake, or error, or the organization often gives the individual a problem so huge it overwhelms him. Frustration and conflict naturally result. Unless the organization is supportive to the individual's problem-solving efforts, such conflict continues and likely worsens. What is needed, as Harry Levinson indicates, is a supportive environment that gives the individual room to maneuver, freedom to make mistakes, set limits, and define expectations, plus respectful treatment of his ideas.⁸ In many of today's organizations such a supportive environment is contrary to developed functional relationship patterns. In far too many organizations, for example, mistakes are anathema, and more effort is expended in protective posterior armor than in productive and progressive activity. Fear is prevalent, and the feeling of individual versus the organization is magnified. Many people in military organizations experience this as they find they must guard against inspection visits, staff visits, and the like, at the expense of a ready solution to an immediate problem. In some instances they follow the book, even knowing it to be in error in a given situation, because they cannot anticipate support for an innovative action.

Argyris mentions that this disturbance created by the incongruity of the man and organization needs tends to increase as the individual and the organization mature and/or as dependence, subordination, and passivity increase.⁹ This increase occurs as management controls

are increased, as directive leadership increases, as one goes down the chain of command, as human relations programs are undertaken but improperly implemented, as jobs become more specialized, or as the exactness with which the traditional formal principles are used increases. "The Air Force way," while it cannot be totally removed, stands as a ready reference response (which may be too often used) to the magnified man and organization need difference. Each of these items has significance for the manager's action choices as he strives to control conflict. How far can he go? How far will he permit himself to go? Can he restrain himself from the imposition of more controls, for example, as he observes his organization at work and notes its results? The challenge exists. The manager must choose to face it or retreat.

An additional source of individual versus organization conflict is generated by the "new man" versus the "old man." The innovator is always in a less supportive environment than the entrenched old hand. Interpersonal conflicts of the old and new vary in intensity in relation to the ability of the manager to deal with such conflict and his personal desire to benefit from innovative ideas. But the new is not always right, and we must rationally evaluate these old versus new arguments. Frederick Herzberg speaks to this point in his recommendations for management's referral use of "the wise old Turk,"¹⁰ a valuable source of information already on the payroll.

sources of conflict

If a manager is to manage conflict, he must understand its source. We can establish three basic sources as *semantic*, *role*, and *values*.

Semantic sources are those stemming from some failure in communication. Traditionally, semantics has to do with the meaning of words, but here that is just one phase of its role. We use *semantics* to point out a major source of conflict as the failure of two individuals to share fully the meaning of a communicative attempt. The causes for the failure may be technical problems in the communication process (static, filters, barriers, and the like), or they may be actual differences in perception and understanding. The result is an absence of agreement: conflict.

Role sources are those that rise out of the varying perceptions of people about the expected behaviors of themselves and others. Many of these come from the status and position levels in organizations. Others come from the structures and processes devised by management to organize work, channel effort, and coordinate activity. Role conflicts are probably no more frequent or more rare than semantic or value conflicts. They might, indeed, be so closely related as to be absorbed in those two sources. Role sources may be evidenced in those situations in which boss and subordinate seem to be butting heads because each perceives the role of the other in a reference frame different from observable behavior.

Value sources have their foundations in the individualistic value sets of people. These value sets readily contribute to differences between people because *they are different*. They cause each of us at times to respond or behave in an unexpected manner because we are behaving as dictated by a value set not fully shared by our associates; hence, a sense on their part of a difference between us. An example may be the conflicting values held by Air Force people as to what consti-

tutes acceptable hair length. One side demands compliance with a published standard while the other demands to know why longer hair must mean degraded performance. Managing value conflicts requires a psychological awareness and a capacity for adaptivity which permits situationally based activity of the manager. What is effective in one value conflict situation may not be in the next.

Three basic sources of conflict have been mentioned, but we must admit that such separation is probably valid only for the meticulous person in research or academe or for the person attempting a serious study of the phenomena. In the reality of the manager's world, source separation is of little immediate value although it should be of significant help to control conflict. Most conflict is really a combination of elements from more than one of the sources. Many people cite their belief that *the* prime cause of conflict is communicative inadequacy. How, though, can we establish that a communicative failure does not truly evolve from the differing value sets involved or from the varying vantage points of those performing in different roles? The much-discussed generation gap, in the military as well as in general society, most likely is a reflection of both communicative failure and differing value sets. We cannot, with comfort, say that the three sources are independent. Each affects the others to some degree.

individual reactions to conflict

Since conflict may be positively or negatively evaluated, there may be a range of reactions to it. These reactions might go from high expectation and pleasure to absolute rejection. In a very broad sense, the individual in a conflict situation has only two options open: sign up or ship

out. But the choice is too dramatic, and it is rare when the situational factors permit only this form of response. Usually, there is a pad of acceptance which insulates the individual from absolute or harsh decisions. Massie and Douglas identify this as the zone of indifference.¹¹ As a normal event, the individual constantly checks to see whether his personal goals are consistent with the goals of social groups to which he belongs. He continues to function in groups which generally support his goals even though there might be day-to-day conflicts between them. This, then, is the zone of indifference, and the means of accommodation which we all use in our normal functioning in society. The incongruity of the individual's and the group's goals is not sufficient to cause his voluntary severing of the relationship. A high zone of indifference permits loyalty to a group in spite of many differences between personal and group goals. This is our norm because it is rare when we agree fully with our group; even in the family group, perhaps our closest association, we have frequent even though minor disagreements as to goals. A narrow or low zone of indifference offers little such tolerance. In conflict events, the person with a low zone of indifference may opt to ship out.

Rejection of the conflict situation may result in shipping out, resignation which may be temporary or permanent. The response might be as mild as taking a few days of respite, thus the therapeutic value of leave, vacation, and recreation. Perhaps, in certain organizations, it would be a sabbatical or volunteering for special duty in a new environment. Then, too, it can be total severance with the goal of a fresh start in a different organization. Or, it might be using the personnel system to find a clean start

through internal transfer to another subelement of the organization.

Acceptance of the conflict situation might be manifested in a surge of initiative, a flow of creativity, or a push for productivity. These efforts might result from stimulation of perceived differences, or they might be the observable behavior representing a strong desire for promotion and, thus, escape from the conflict. The net effect may well be good for both the organization and the person.

There is also the individual who reacts to conflict by avoidance. He may choose to be a lamb who hides his needs and saves them for an opportune time when he has a definite advantage over his opponent. He may choose the silent treatment with the idea that it takes two to fight. The opposite is the individual who chooses to meet conflict head on. The lamb-like approach is thought to be the more dangerous. All too often, in the final analysis, the lamb becomes the lion. As soon as the opponent falls or is in critical need of help, he gets pounced on and destroyed by the tension and aggression building up so long within the lamb. Thus, the lamb-like approach may in reality be the dangerous hidden bomb for the group.

A host of other forms of reaction might be described. One is resignation on the job in which the individual comes to work but with apathy, reduced loyalty, and decreased involvement. We probably all know such a person. We refer to them as retired on active duty (ROAD) and find them in the civilian as well as the government worlds. Another might be rationalization or the creation of a wall of reasons for his situation, none of which assigns any responsibility to him. Scapegoating, projection of his feeling on others, is also common. This is seen in the blaming of others as justification for his

own failures or inadequacies. This is experienced in the base level activities, for instance, when we sometimes hear the work group say, "We could have . . . if only . . . had done its job!" Yet another might be fantasizing with escape through daydreaming or mind wandering. Other forms might be aggressiveness, regression to less mature forms of behavior, or on-the-job indifference in which he literally says, "To hell with this outfit!" How many people are there, we wonder, who feel that work is just something you get paid for, not something in which you find pleasure and fulfillment? Could this be a result of conflict management?

means to resolve or reduce conflict

Basic to other considerations in dealing with conflict, it is well to note that conflict resolution requires that the parties in conflict *trust* each other and that the parties in conflict are capable of and willing to locate the source of the conflict. Second, a man convinced against his will is not convinced;¹² thus, we can generally eliminate the archaic, although often-used, hammer on the head method. Putting the lid on conflict does nothing about eliminating its source.

We might, in a conflict situation, do nothing about it. What would be the results if we decided to take no action to deal with conflict that has been discovered to be bad for the organization (with deference to the proposition that not all conflict is *bad*)? If an individual or group remains in conflict, there will be increased tension that sooner or later will result in one striving to win and drive the loser out of the situation. Or, even worse, the losing element will become increasingly more aggressive or hostile and counterattack the element frustrating it.

At any rate, the result is likely to be dysfunctional. So, as a normal thing, the decision to do nothing is probably not the best. However, the manager on the scene must make this determination. He must understand that there are times when the decision to do nothing may be best. This can only be a decision function of the contingencies of the situation, a decision which can only be made by someone in the situation evaluating the forces and strengths involved.

An often-used method for resolving conflict is the use of superordinate goals. For example, the entire work force, taken as a whole, is something of a superordinate goal uniting conflicting groups beneath that umbrella. The manager gets the groups to see how the conflict serves to reduce productivity, thus reducing the smaller group's stake in the benefits of the major organization's success. Even though the source of conflict is not thus treated, it is an important first step because it sets the stage for compromise. This approach is similar to the common enemy approach, wherein groups in competition find unity viewing an outside group as a common enemy. This unity can hide, or make less important, conflicts within the group.

A unique method to resolve conflict is to increase interaction between conflicting groups by physically exchanging persons between conflicting groups. For example, if the gizmo unit is having difficulty dealing with the gadget unit, a temporary shifting of people between these groups could help the conflicting elements learn the other's problems and frames of reference. The result should be better communications, greater understanding, and less future conflict.

The quickest resolution is a confrontation meeting. The manager should be warned, however, that confrontation re-

quires complete preparedness on his part. He must have the facts of the conflict situation and confidence in his self-control and his ability to use diplomacy, tact, and problem solving. Even then, he must also accept the possibility that a confrontation may worsen, not better, the situation. Basic to his efforts to resolve or reduce the conflict is the idea of avoiding win-lose situations. Sports and other recreational activities often acquire their flavor by win-lose situations, but the same win-lose options are not always desirable in organizational functions. Far too often, in organizations, this results in suboptimization. A subelement may become so involved in winning that it loses sight of the overall mission of the larger unit it serves, and its efforts become counterproductive. Most complex organizations have reward systems based upon collaborative effort. The organization that depends upon coordinative, cooperative work may be mortally wounded if its subelements acquire win-lose attitudes which cause these suboptimizing activities. Once the stage is set by the manager, he may initiate negotiation by representatives of the conflicting groups. During this negotiation, the manager may wish to use an impartial judge or arbitrator to listen to arguments from both sides and seek to find points of possible agreement or compromise. Of course, we recognize this as the usual last resort in management-labor difficulties and severe conflict situations.

There are situations in which the manager must seek to repress conflict. This is especially true when the differences between the conflicting elements are not relevant to the organizational task. This occurs when two participating people have off-the-job differences which they permit to enter the world of work. Normally, this type of conflict is

bad for the organization. Often these differences are petty and self-serving, thereby causing activity in which the participants try to win to preserve the sanctity of their original stand. A significant aid to the manager in this form of conflict is a well-developed understanding of the human process of perception, the process by which we handle stimuli in accordance with our values, rules, wishes, and fears. With this understanding, the manager might be able to explain to the conflicting parties how they are misreading the situational data. He might then obtain agreement of a sort that causes the conflict to be repressed.

means to stimulate conflict

All conflict is not bad. Therefore, there will be times when a manager would want conflict (of the right type), and it would be advantageous for him to know some means of stimulation. In a number of instances, he could strive to create the situations he earlier worked to eliminate. For example, he might create win-lose situations in which a form of competitiveness might be engendered. This often works in such areas as selling an idea, recognizing the creation of new approaches to organizational success, etc. A means to do this is to de-emphasize the need for everyone to contribute to overall organizational success. That is, the manager begins to emphasize the accomplishments or performance of individual people, or separate units, in lieu of stressing the performance of the whole. He must be cautious, though, to avoid creating a monster that becomes an even greater problem than the absence of productive conflict.

Individuals are the creative segments of society. True, the synergism of two or more individuals often makes us think of

organizational creativity, but it really is the individual who creates. Therefore, stimulation of creative conflict can be obtained by increasing the autonomy of individuals on their jobs. A less demanding imposed structure, granting more freedom for the individual to choose and decide for himself, usually creates an environment in which the creative nature is fanned to flame. Similarly, a decrease in supervisory overhead (a widening of the organization) can accomplish this result. Again, though, the manager must be cautious and remain in control of the situation lest it get out of hand. It is sometimes easy to forget the real goals of the organization as we get enmeshed in the thrill of innovation.

Another means of stimulation is to *de*-clarify goals. That is, redefine them in such a manner as to create questions and discussion. The cautions already stated apply, but this device can serve many useful purposes. A principal gain can be the encouragement of challenge and question for all operating segments, policies, and procedures of the organization. When people begin to question what they are doing, how they are doing it, or why they are doing it, new ideas and approaches begin to surface. So encourage questioning and challenge the existing as a method of stimulating desired differ-

ences of thought. The "rebel," the individual who does not blindly accept what already exists, can be such a stimulant. He or she can be discomforting, but energizing, as each asks those questions that the old hands and the managers cannot readily answer with convincing logic. A planted rebel can be a stimulating device if the organizational element in which he is placed is strong enough to handle the turbulence likely to follow.

Conflict is a state of unresolved difference between two entities, human or organization. Sometimes the difference is functionally productive, as with creativity; but sometimes it is dysfunctional, as with war or sabotage or less drastic results. Conflict should not, therefore, be naturally considered either bad or good. It will be bad or good depending upon the value base of the interpreter. But conflict of some form is inevitable whenever two or more humans are in some interdependent relationship. The important aspect of conflict is how the human participants relate and respond to it. Managers must control conflict. That is, they must keep dysfunctional conflict at an acceptable level, but, also, they must learn to stimulate functionally productive conflict when it is at too low level.

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Notes

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12. For an interesting account see Paul B. Ryan, Captain, USN (Retired), "USS *Constellation* Flare-up: Was It Mutiny?" *United States Naval Institute Proceedings*, January 1976, pp. 46-53.

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Your Lebanon is a political riddle which time attempts to solve, but my Lebanon is the hills which rise majestically toward the blue of the sky.

Kahlil Gibran

ALL social systems are “open systems” to the extent that they engage in exchanges and interactions with the international system.¹ Some societies, however, have such high exchange rates with their immediate sociopolitical environment that the exchanges and interactions create a *fused* linkage relationship with their neighbors.² Lebanon is such a society. The Christian/non-Christian balance, which structures the principal political processes in Lebanon, is fused to the broader Muslim environment within which Lebanon must exist.



LINKAGE POLITICS AND COERCIVE DIPLOMACY

*a comparative
analysis of two
lebanese crises*

DR. PAUL H. B. GODWIN
DR. LEWIS B. WARE

The significance of this linkage to Lebanese politics was demonstrated by the rise of postwar revolutionary Arab nationalism, which destabilized the Middle East in the process of decolonization. When Lebanon gained its independence from France in 1943, the dominant Lebanese oligarchy sought immediate isolation from the currents of Arab revolutionary nationalism. Nevertheless, the Lebanese oligarchy found itself linked by its Arab heritage both to these profound political changes and to the state of confrontation between the Arab world and the new state of Israel.

Lebanon and the United States

The United States entered this linkage structure in the postwar era as the major power seeking regional stability while at the same time becoming Israel's major patron in the international system. In its desire to undermine growing American influence, the Soviet Union entered the linkage structure as the major competitor of the United States. Thus, the Middle East became a major focus for Cold War conflict.

Inasmuch as the survival of the Lebanese oligarchy depended in large part on the insulation of Lebanon from radical Arab nationalism, the linkage between Lebanon and the internal and external politics of her Arab neighbors became increasingly problematic. In order to resist the destabilizing impact of Arab nationalism, the oligarchy sought the support of the United States. This resulted in a de facto abrogation of the 1943 National Pact upon which the internal stability of the Lebanese political system rested.³ The Lebanese oligarchy, especially its dominant Christian component, was bound into an insoluble dilemma, for

it was impossible to insulate Lebanon from the dynamics of regional international and domestic politics.

The United States was also caught in a dilemma. Although not committed to the traditional regimes that had gained independence from the Imperial Powers, it found itself alienated from an emergent Arab nationalism that based much of its appeal on anticolonialism to which the United States was linked by virtue of its association with Britain and France. Furthermore, the United States perceived the socialist tendencies of the radical Arab nationalists as an invitation to an increased Soviet influence, a fear enhanced by Syria's early association with the U.S.S.R. in 1954 and Nasser's move toward the Soviet Union in 1956. Further, the U.S. commitment to Israel compounded its dilemma.

Thus, both Lebanon and the United States were seeking stability in an unstable environment. But, whereas the United States could adjust to the changes in the Middle Eastern political environment, the Lebanese oligarchy could not.

In addition to the political components, there was an important economic dimension to the Lebanese crisis of 1958. The postwar economic boom resulted in an inflation rate of 36 percent in 1950-51, which between 1955 and 1957 had risen to 75 percent.⁴ Lebanon had become a bifurcated society of the extremely wealthy and the extremely poor. This condition was made politically significant by the migration of the rural poor into the cities. At the same time the situation of the peasant was deteriorating. Economic deprivation cut across sectarian lines and provided a fertile ground for civil conflict.

The Christian element of the oligarchy was faced with a dilemma: Arab nationalism, personified by Nasser, was calling

for a new Pan-Arab movement which was, in essence, secularized Pan-Islamism. But for Lebanon to accept this concept meant that the Christian elite would lose its predominant sociopolitical position. Moreover, the socialist course of Arab nationalism threatened the laissez-faire economic base of the Christian and non-Christian elements of the oligarchy. The oligarchy could not sever the linkage between Lebanon and the Arab world, but this linkage threatened to disrupt the Lebanese political system and draw it into the confrontation with Israel.

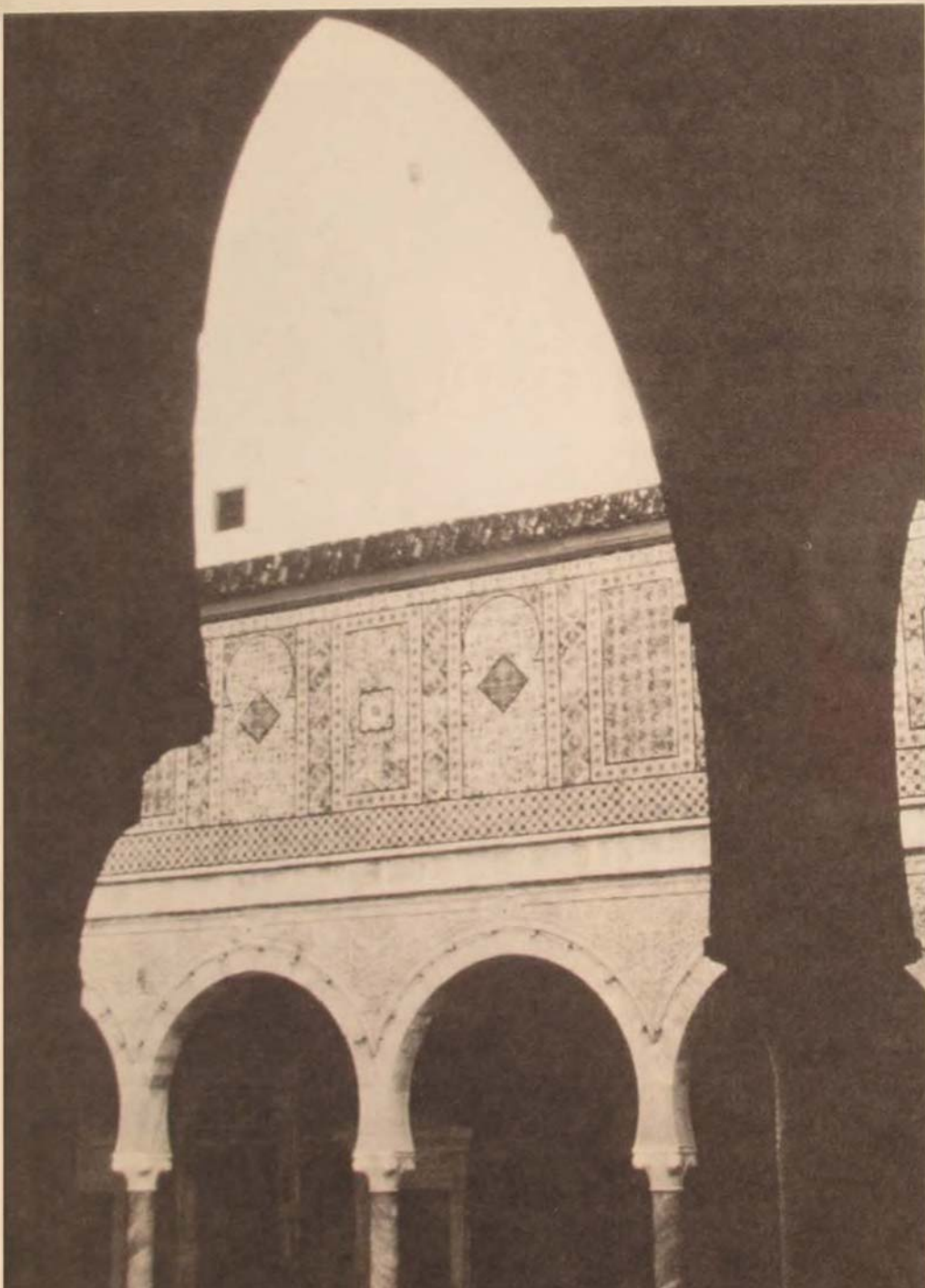
Coercive Diplomacy

The Suez debacle of 1956 put Lebanon's relationship with the Arab nationalists to the first real test. At the November 1956 Arab summit in Beirut, the Christian president of Lebanon, Camille Chamoun, aligned his country with the Hashemite kingdoms of Jordan and Iraq in opposition to Nasser, who demanded a rupture of diplomatic relations with Britain and France. Internally, the Nasserite faction among Lebanese non-Christians saw this move as hostile to the cause of Pan-Arab nationalism with the result that the Sunni Muslim premier and his cabinet resigned.⁵

In response to increasing civil strife in Lebanon, Chamoun accepted the Eisenhower Doctrine in March 1957.⁶ Thus, Chamoun violated the National Pact and forged a direct link between Lebanon and Soviet-American rivalry in the Middle East. Chamoun's immediate goal was to preserve both his personal power and the power of the Christian element of the oligarchy, but the path he took enmeshed Lebanon even deeper in the conflict structure of Middle Eastern politics.

Within Lebanon the United National Front (UNF) was formed to oppose the pro-Western policies of the government. Composed of a wide spectrum of Lebanese interests, it was soundly defeated in the June (1957) elections, securing only 8 out of 66 parliamentary seats.⁷ The split between the government and its parliamentary opposition was so wide that another group of leaders formed a Third Force designed to bridge the gap, but they failed.⁸ Their failure was underscored by Chamoun's decision to form a pro-Western foreign policy with Saudi Arabia and Iran while he simultaneously promulgated emergency laws to permit press censorship and arbitrary arrest.⁹ Chamoun's decisions defined Lebanon as pro-Western and in opposition to the expansion of Arab nationalism.

The formation of the United Arab Republic (U.A.R.) in February 1958 served to increase Lebanese factionalism and raised tension between Beirut and Damascus. Leading members of the oligarchy defected from Chamoun's party because they saw the president growing too powerful, and, even though they were not necessarily supporters of Nasserism, some, like the Maronite Patriarch, used the concept of Arab unity to oppose the president.¹⁰ The internal conflict was now dangerously close to a religious war with the Christian Phalange Party supporting Chamoun and the paramilitary Muslim Najjadah Party forming an alliance with the UNF against him. But the pattern of alliances had divided the sects as well. By April 1958 violence had spread across the country.¹¹ The catalyst that touched off civil war was the assassination of Nasib Matni, the editor of an anti-Chamounist newspaper. Matni's murder on 8 May led the opposition to call for a general strike and armed insurrection against the government. Civil



turmoil soon degenerated into internal war.

Nasser's anti-Western predisposition had been reinforced by the Suez crisis of 1956, and Egypt began to move closer to the U.S.S.R. Encouraged by Soviet military and economic aid, Nasser pressed forward with his plans for a political union with Syria. The U.S.S.R. responded with caution to the formation of the U.A.R. since all parties in opposition to Nasser's Liberation Rally were banned. Nonetheless, the Soviet Union promised its support.¹²

The U.A.R. and all that it symbolized for a new Arab unity dealt the final blow to the delicate balance of political forces in Lebanon. Non-Christian groups, in defiance of the decree banning demonstrations, closed schools and organized public demonstrations in support of the union.

As civil war erupted across Lebanon, the United States saw revolutionary Arab nationalism as not only creating governments unfavorable to the United States but also destabilizing what it perceived as the last remaining democratic pro-Western Arab state.

In May 1958, the U.S. stepped up military assistance to the government of Lebanon and agreed to coordinate its future actions with the United Kingdom (U.K.), which was concerned about the fate of Jordan. In June the Lebanese cabinet authorized Chamoun to ask for foreign assistance in preserving order, and on the 17th of that month Secretary of State John Foster Dulles announced that the U.S. was willing to dispatch military forces to aid the Lebanese government. In fact, U. S. Marines attached to the Sixth Fleet had already been reinforced in preparation for such a decision.¹³ For the United States the decision point came almost one month later when

a military coup overthrew the Hashemite Kingdom of Iraq, declared a republic, and immediately recognized the U.A.R. Chamoun asked for military assistance, and on 15 July the Marines landed. King Hussein, fearful that the overthrow of his Hashemite neighbor would spark a coup in Jordan, requested aid from the U.K., and on 17 July two British paratroop regiments landed in Amman.¹⁴



The United States saw Arab nationalism as a threat to the stability of the Middle East and the pro-Soviet stance and socialist direction of the new Arab nationalists as a serious challenge to U.S. regional interests. Fearful that the U.S.S.R. would gain influence at U.S. expense, Eisenhower and Dulles sought both congressional and public support for military intervention in Lebanon to stem the spread of Communism.¹⁵ Con-

sensus was easily obtained, for the Cold War cause was still widely supported in Congress and among the people. The second Lebanese crisis would face a different climate of public opinion and a different perception of the politics of the Middle East and its Cold War implications.

Limitation on Coercive Diplomacy

The post-1958 adjustment in Lebanon did not include a redistribution of political influence. By the middle 1960s the old cliques were back in their dominant position while little had been done to integrate the expanding educated class into the political process.¹⁶ Equally significant was the failure of the oligarchy to represent the interests and demands of the newly urbanized rural population forced out of South Lebanon by an aggressive Israeli policy designed to root out Palestinian guerrillas. Most of those displaced were Muslims oriented toward their traditional leaders; thus an internal and external refugee problem was created, whereby the cities struggled to absorb the peasants fleeing the countryside while life in the refugee camps was slowly radicalizing the Palestinians.¹⁷

In the cities the displaced peasants confronted an alien environment that gradually separated them from their attachment to the traditional elites which dominated their rural culture. Such a mass was susceptible to Arab nationalist propaganda disseminated by competing non-Christian groups. Similarly, the growing urban middle class was amenable to the appeal that they should have more political influence. This was compounded by the fact that Christian demographic preponderance was being actively questioned. Thus, both the



growing mass of urban poor, which was predominately Muslim, and the emerging middle classes were coming under the influence of Arab nationalism at a time when the basic demographic principle that structured the Lebanese political process was under attack.

The radicalization of the Palestinian refugees created the critical component of the second Lebanese crisis. Israel's action against the Palestine Liberation Organization (PLO) in Jordan in 1966 was climaxed by Hussein's destruction of the PLO in his kingdom in 1970. But in 1969 the Lebanese government had agreed in Cairo to permit the Palestinians freedom of movement in South Lebanon as long as they did not interfere in Lebanese in-

ternal politics. The defeat of Arafat in Jordan shifted the focus of Palestinian activities against Israel to Lebanon, for the Lebanese army, emasculated by the National Pact and traditionally neutral in internal religious conflict, could not be expected to react as had Hussein.¹⁸

At the conclusion of the October War of 1973, Egypt appeared compromised in the eyes of many Arab leaders, and the Palestinians looked more to Damascus for support of their cause. The Syrian Baath party, which had consolidated its position after the failure of the union with Egypt, responded with aid for the radical Palestinian groups in early 1974. Moreover, recognition of the Palestinian movement as a legitimate political force



by the majority of the actors in the international system made it a potent element in the emerging political crisis in Lebanon.

THE spark that ignited the current crisis was the murder in April 1975 of a group of Palestinian Muslims by Phalange militiamen who fired on their bus as it was traveling toward Tripoli.¹⁹ Within a few days clashes had occurred across Lebanon, and the Phalange threatened to withdraw its support from the government if the 1969 Cairo agreement were not rescinded.²⁰ In May the government's refusal to comply set in motion a political crisis as Muslim members of the government sought to change the ratio of Christian officers in the army from 60:40 to 50:50 and to demand the extension of the franchise to more non-Christians. When these demands met with failure, the prime minister resigned.²¹ When internal war erupted and took on a religious character, no cabinet was able to bring the crisis under control.

Attempts to negotiate a settlement dragged on for most of 1975 amidst sporadic fighting. Egypt, initially thought to be the most influential external force, lost its credibility with the Palestinians as an arbitrator when in September it signed a second disengagement agreement with Israel. Syria then stepped in as the dominant external voice in the negotiations, initially pursuing a policy favorable to the non-Christian elements in the conflict. By January 1976 disorder had reached intolerable levels, and Syria decided upon an imposed peace through the use of Syrian-based Palestine Liberation Army (PLA) and the Baathist-supported Palestinian commando group al-Saiqa.

The complexities of Lebanese politics combined with the factionalism of the various Palestinian commando groups to create a condition whereby Syria was unable to proceed with its original pro-Muslim stance. The more radical Palestinian groups began to fear that a peace imposed by Syria would bind them to a pledge of nonbelligerency toward Israel which Syria and Jordan would agree to in return for Israeli adjustments on the



status of the West Bank and the Golan Heights. Within the Lebanese political spectrum, Kamal Jumblat's Progressive Socialist Party (PSP) found common cause with commandos as Jumblat saw himself being moved away from the center of the negotiations. Syria responded to the growing split within the Palestinian groups and their emerging coalition with the PSP by moving toward the rightist Christian Phalange Party. By the end of March a coalition of Palestinian commandos and the PSP had formed in opposition to the Syrian based and supported PLA and al-Saiqa commandos. Unable to defeat this coalition, Syria covertly crossed the Lebanese border with its regular army disguised as al-Saiqa partisans. Later, large units of the army were to follow undisguised and in force. By the summer of 1976 the Syrian army was linked to the Lebanese Christian militia and was fighting both Palestinian commandos and Lebanese Muslims as they attempted to quell opposition to a Syrian imposed peace.

The constraints upon a U.S. president in 1975 and 1976 seriously limited his ability to gain congressional and public approval for the use of military force abroad as he had in 1958. The ultimate failure of U.S. policy in Vietnam, combined with what was perceived by significant elements of the Congress as an abuse of executive power in Indochina, led to the War Powers Act and a general predisposition not to use U.S. military capabilities overseas. The congressional reaction to U.S. support for a faction in the Angolan civil war is indicative of what a president could expect if he were to request authorization for a U.S. troop deployment in Lebanon. In addition, the presence of Soviet naval power in the Mediterranean raised the level of uncertainty about possible Soviet reactions.

With Iraq and Syria functioning to a limited extent as client states of the U.S.S.R., military intervention in Lebanon raised the possibility of a strong Soviet response.

Despite these constraints, U.S. perceptions of the current crisis are distinctly different from those of 1957-58. The United States now recognizes that revolutionary Arab nationalism does not necessarily create Arab clients of the U.S.S.R. Egypt, the most strategically located Arab state, has successfully avoided being tied to the U.S.S.R., and the United States has assisted President Sadat in maintaining his margin of maneuver. Whereas Dulles and Eisenhower were convinced that Arab nationalism would open the door to Soviet domination, U.S. presidents since Kennedy have recognized that the U.S. can, and must, compete for influence with the U.S.S.R. in an unstable environment. Thus, radical Arab nationalism may be destabilizing, but it is a political force to be accepted as a working constraint rather than a political force to be suppressed.²²

Within Lebanon the U.S. now understands that even though the instability of the Lebanese political system provides an opportunity for conflict based upon confessional politics and socioeconomic grievances, the current crisis is an outgrowth of the October War as it affects the Lebanese dilemma. Whereas in 1958 demands from radical non-Christian groups that Lebanon become a confrontation state were a component of the crisis, by 1975 both Palestinians and non-Christian Lebanese had been politically mobilized, armed, and aided by Palestinian liberation forces based outside the country. Thus, the new coalition of politically radicalized Palestinians and Lebanese Druzes and Muslims fuses the 1975 crisis to the Arab confrontation

with Israel. To support the Christian element of the Lebanese oligarchy with direct military assistance would undermine the structure of a settlement to the Arab-Israeli conflict negotiated by Secretary Kissinger. If the United States were to deploy troops in support of the ruling Christian faction as it did in 1958, this would be interpreted as an act hostile to the Arab world. Syrian involvement, both as a base area for Palestinian armed forces and as the primary external negotiator, further complicates U.S. choices, for Syria must be swayed if Kissinger is to be successful in avoiding a fifth Arab-Israeli war.²³

The Lebanese crisis of 1975 includes

the critical new dimension of radicalized Palestinian refugees aided by a Palestinian armed force which adds an additional linkage to the political environment within which Lebanon must exist. In 1958 the link to the Arab-Israeli conflict was present as a secondary political issue, but by 1975 the link had become fused, and it is impossible to settle the Lebanese crisis without negotiating the linkage. More than any other, it is this linkage that deters the introduction of U.S. military force on the side of the ruling Christian oligarchy. To do otherwise would destroy any chance for future progress in resolving the Arab-Israeli impasse.

Air University

Notes

1. For a discussion of system-environment exchanges, see Leo A. Hazlewood, "Externalizing Systemic Stresses," in Jonathan Wilkenfeld, editor, *Conflict Behavior and Linkage Politics* (New York: David McKay Company, Inc., 1973), pp. 150-62.

2. James N. Rosenau, editor, *Linkage Politics: Essays on the Convergence of National and International Systems* (New York: Free Press, 1969), pp. 14-63.

3. M. S. Agwani, editor, *The Crisis in Lebanon* (New York: Asia Publishing House, 1965), p. 1.

4. Michael Hudson, *The Precarious Republic* (New York: Random House, 1968), p. 248.

5. Agwani, p. 2.

6. *Ibid.*, p. 3.

7. Labib Zawiyya-Yamak, "Party Politics in the Lebanese Political System," in Leonard Binder, editor, *Politics in Lebanon* (New York: John Wiley and Sons, 1966), and Agwani, p. 3.

8. R. Hrair Dekmejian, *Patterns of Political Leadership* (Albany: State University of New York Press, 1975), pp. 49-51.

9. Agwani, p. 55.

10. *Ibid.*, p. 4.

11. *Ibid.*, p. 55.

12. Joint communiqué published on 15 May 1958, the day before Nasser

returned to the U.A.R. from the U.S.S.R. Reproduced in *Documents on International Affairs* (London: Oxford University Press, 1958), pp. 265-69.

13. Yaacov Ro'i, editor, *From Encroachment to Involvement* (New York: John Wiley and Sons, 1974), p. 254.

14. Agwani, p. 228.

15. President Eisenhower's Radio-TV address, 15 July 1958, in Agwani, pp. 231-34, esp. p. 232.

16. Hudson, pp. 146-47, 160-61.

17. On pages 59 and 60 Hudson discusses the urbanization of the Lebanese population that occurred independently of Israeli military actions. Newspaper reports since the crushing of the PLO by King Hussein indicate that internal migration to cities from South Lebanon was accelerated by Israeli military actions. See for example Jonathan C. Randal's report in the *Manchester Guardian* on 30 November 1975 and Eric Rouleau on 11 October.

18. Dekmejian, p. 59.

19. Eric Rouleau, *Manchester Guardian*, 19 October 1975.

20. *New York Times*, 16 April 1975.

21. *New York Times*, 15 May 1975.

22. See James M. Markham's analysis of Secretary Kissinger's letter of 6 November 1975 to Rashid Karami, *New York Times*, 28 November 1975.

23. *Ibid.*

Editor's Note

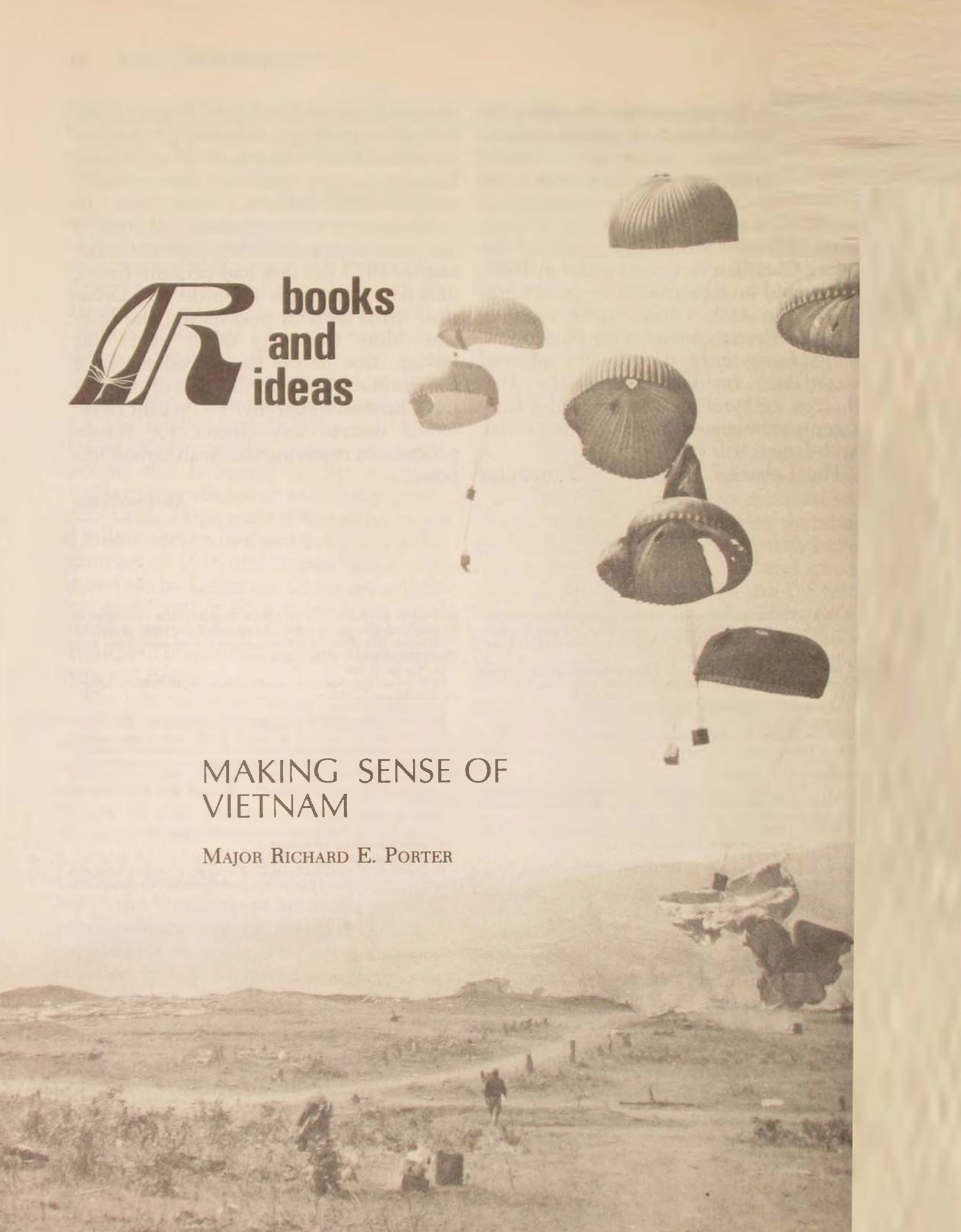
The accompanying photographs of the Middle East were taken by one of our authors, Dr. Lewis B. Ware.




**books
and
ideas**

MAKING SENSE OF
VIETNAM

MAJOR RICHARD E. PORTER





GENERAL WESTMORELAND has stated that American arms suffered no defeat in Vietnam, but what of American political goals, the ultimate objective of all military action? Whether we classify Vietnam as a victory or a defeat, we cannot ignore it. The strategic fallout—Watergate, détente, recession, and American retrenchment abroad—has been too great. Our military policy is no longer “second to none” but “equal to any.”

For our opponents the lesson is clear; irregular warfare is America’s Achilles’ heel. The giant struggled with Lilliputians and then stumbled home. He was not out-fought as much as he was out-thought. He had found that warfare in the back alley was not the same as in the great arena.

It is imperative that we make sense of Vietnam and our role in it if we are to meet today’s military challenges. We cannot assume that we have seen the end of irregular warfare. We must counter the Communist challenge throughout the spectrum of war; no longer can we concentrate on part of the spectrum and ignore the other.

To understand Vietnam, we must explore the historical development of irregular warfare and tie the recent tempest to the historical currents from which it emerged. Only then will we be able to sift through controversial rubble and identify those meaningful artifacts that correctly portray what happened and where we went wrong.

Khe Sanh airdrop

Robert Asprey, in *War in the Shadows*, promised just such an analysis. He first sought to explain the historical development of irregular warfare and then to link it to its recent manifestation in Vietnam. Unfortunately, Asprey was not up to either task. What emerges from the 95 chapters of this work is a useful minencyclopedia of irregular warfare which purposely leads into a very emotional and opinionated account of the American role in Vietnam.

His scope is far too broad, and his quotations are too many and too long. One soon discovers that the author is hopelessly attempting to explain what he himself only partially understands. There is no overall scheme. The reader is not told why certain guerrilla wars are included and why others are left out. The unfamiliar reader may wonder if any were left out. The whole endeavor looks like a disorganized greenhouse where each potted insurgency is diligently labeled by date rather than by type and family. Once the reader overcomes his initial bewilderment, he will find much that has nothing to do with guerrilla war and should not be in the greenhouse at all.

Although some chapters are well done, Asprey's work in general suffers from an incautious use of the traditional sources, many of which are little more than campaign summaries of regulars fighting irregulars. They concentrate more on how the regular applies his art than how the irregular applies his. They explore little into the motivations of the irregular or the tactics he employs.

Asprey correctly understands that before he can link irregular warfare to Vietnam he must first link it to Lenin and Mao. His sources tell him where he has to

go, but they give him few clues on how to get there.

Thus, in Part I of this work, entitled "Lenin's Heritage," we find little that would have interested or even concerned Lenin. In Part II, "Mao and Revolutionary Warfare," we find a very superficial analysis of Chinese revolutionary warfare and a very extensive treatment of World War II resistance movements which are more easily labeled reactionary warfare than revolutionary warfare.

Where Asprey puts himself adrift is in his inability to perceive the major distinctions among irregular forms of war. The traditional military histories tend to see modern revolutionary warfare as guerrilla war with a capital "G." Such a perspective conveniently places revolutionary warfare within the purview of a too-narrow form of military history.

This common misperception is readily seen in Asprey's definition of guerrilla warfare as:

irregular forces fighting small-scale, limited actions, generally in conjunction with a larger political-military strategy, against orthodox military forces. (p. xi)

Here he incorrectly lumps all forms of irregular warfare together, with no appreciation of either their differences or their relationship to each other. He conveys the impression that the soul of this form of struggle is military rather than political. What Lenin and Mao practiced in their respective revolutions was not a hybrid form of guerrilla warfare but political revolution. In each case, guerrilla warfare was only one of the several different types of violence employed.

We in the West traditionally have read too much into the term "guerrilla war-

†Robert B. Asprey, *War in the Shadows* (Garden City, New York: Doubleday & Company, Inc., 1975, \$35.00), 1548 pages.

fare." It is a tactical way of fighting and nothing more. Whatever strategic significance it takes on reflects only the overriding political struggle which it humbly supports.

Both reactionary war and revolutionary war, the modern strategic forms of irregular war, are political struggles supported by appropriate violence. Reactionary wars seek to re-establish old orders, while revolutionary wars seek to create new ones. In tracing the origins of these wars, Asprey should have directed his attention to the political upheavals associated with the French Revolution and to the socialist movements of the nineteenth century.

A proper link between guerrilla warfare and political struggle could result from a careful analysis of the peasant uprisings against Napoleon in either Spain or Russia. Unfortunately, in dealing with these topics, Asprey is content with a traditional campaign summary and misses the significance of both of these two great conflicts in the historical development of irregular war.

As a result, *War in the Shadows*, despite its extensive treatment, contributes little to our understanding of irregular war. Certainly the author does not (as he promised to do) historically link this type of war to Vietnam. The work has utility as a bibliographical source and a quick summary of guerrilla wars, but the conscientious reader should look elsewhere for serious analysis.

THE motivating force behind *War in the Shadows* apparently is to give historical credence to the author's own opinionated perception of American policy in Vietnam. The lengthy historical treatment of irregular warfare seeks to prove the first part of the author's thesis:

American involvement and policy in Vietnam are a result of our ignorance of this type of war. Arrogance, the second part of the thesis, is thus founded on our already established ignorance. American military leaders who understood little of irregular war arrogantly thought they could suppress it with massive firepower.

Like his treatment of irregular warfare, Asprey's treatment of Vietnam is extensive yet superficial. It is very much a standard antiwar account. According to Asprey, Maxwell Taylor's recommendation to send American military forces to Vietnam in 1961 unknowingly opened the door to our eventual massive commitment. His proposal showed a lack of understanding of the political nature of this war and its indigenous, nonconspiratorial origins. General Westmoreland's strategy of "search and destroy" was also unsuited to the task at hand and fully demonstrated our arrogant belief in large units and massive firepower. The bombing of North Vietnam was an exercise in futility and strengthened rather than weakened the enemy's effort. The author calls strategic bombing a fallacious doctrine which in the nuclear age is little more than premeditated genocide.

As members of a professional officer corps trying to make sense of Vietnam, we might have hoped for a more objective account. But Asprey is so passionately against the American conduct of the war that many of his assertions border on the absurd. For example, he states:

Almost nothing good can be said about the American military performance in Vietnam. . . . Herein lies the anomaly. The American military establishment in 1974 occupies a more powerful position in the American Government than equivalent military plants in either China or the U.S.S.R. In fighting authoritative govern-

ments founded on force, the American Government is gradually succumbing to that form of government itself. (pp. 1532 and 1534)

To substantiate such generalizations, the author does not hesitate to research and interpret selectively. He relies heavily on the antiwar literature of his journalist colleagues. His last four chapters are little more than a running commentary on Vietnam articles carried by *The* (London) *Times*.

To balance Asprey's account, the reader should look at Robert Thompson's *Peace Is Not at Hand*; General Westmoreland's *A Soldier Reports*; General Taylor's *Swords and Plowshares*; Frances Fitzgerald's *Fire in the Lake*; and Bernard Fall's *Last Reflections on a War*. These books offer further opinions, not definitive conclusions, but at least they show that Taylor's recommendation to introduce American soldiers was not without some logic. If "search and destroy" was unsuited to the task at hand, there were few alternatives. Air power, despite its early misuse in the graduated bombing of North Vietnam, probably vindicated itself at Khe Sanh and in Linebacker II.

Subsequent events both in the United States and Vietnam have dated much of what Asprey has written. Certainly the American military is not the threat to world order that he perceived it to be during the Vietnam conflict.

Like all perceptions of Vietnam, each has its measure of truth, and for this reason we cannot cast Asprey's work totally aside. Some of his criticisms enjoy a measure of validity and are well worth contemplating and remembering. For example, his basic thesis that American policy in Vietnam reflected ignorance and arrogance is partially true. Vietnam did show that we really had not done our

homework concerning this type of war. Can we deny that we were a little smug in believing that good old American know-how and firepower would overcome many of the perceived difficulties of our involvement?

Of Asprey's criticisms of the military role in Vietnam, three seem particularly useful for the future. First, we need a greater awareness of the political nature of this type of war, especially as it relates to military action. Second, we have to achieve a more discriminating and austere use of our firepower. Finally, we require a much deeper study of the nature of war by our officer corps. In essence, we have to come to grips with the intellectual challenge of irregular warfare, to take the weapons we already have and employ them with new imagination.

Asprey's major criticism of our military policy in Vietnam was that it showed little appreciation for the long-term political goals upon which success depended. This criticism was essentially true, but there was a constitutional question that the author failed to acknowledge. The military does not make political policy; it carries it out. In this context our military strategy was very responsive to the immediate political goals projected. When we consider the shortsightedness of our political policy, it is not surprising that our military strategy stumbled.

For example, our political policy of gradualism may have been well suited to resolving the Cuban missile crisis, but diplomacy is not war, and making gradualism the foundation of our bombing policy defied all historical experience. The large American build-up in Vietnam was necessary to meet the immediacy of the battlefield, but it made the draft a major political issue and in the end undermined the entire war effort. Such ex-

amples clearly reflect that a much greater understanding of irregular warfare, politics, and their relationship was required of the country's leadership.

Questions of political policy rest constitutionally with our political leadership, but the strategic costs of Vietnam were too high for military leaders today to return simply to an apolitical approach. They must wait to be asked; but when asked, military men must take the long-term view in identifying those aspects of political policy that are not suited to military action and those that are. We, as military men, cannot challenge the political policies of our civilian leadership as Asprey suggests, but we can prepare ourselves to make better use in the future of opportunities afforded us to help shape such policies when we are asked to comment about their military implications.

Asprey's use of arrogance in describing our military role in Vietnam relates to our massive use of firepower. The implication is that it was totally inappropriate and a "quick-fix" of our doctrinal deficiencies. Certainly our use of massive firepower was not always suited to our long-term goals in Vietnam, but was it totally inappropriate? We are a technological people; bringing massive firepower to the battlefield is what we do best in war. It is a strength we should not have ignored, and it served us well against the large North Vietnamese units which infiltrated the South.

What hurt us in Vietnam was that we were not always able to use our firepower properly in the other war, the war against the guerrillas. As war moves down the spectrum from high to low intensity, the demand for discrimination and austerity of firepower becomes increasingly crucial to success. Nothing can destroy months of pacification effort

faster than a few stray artillery rounds or a mistargeted bomb. The problem is a complex one and only partially solvable by technology.

In irregular warfare, the combatant plays a much more decisive role as an individual than he does in conventional war. The historical experience is clear: In this type of war the careless use of firepower by individuals will ensure the failure of the most astute political or military strategies. This was a challenge which we did not "arrogantly" ignore, but it was also one we did not sufficiently meet. Better sensors, smart bombs, and sensitive targeting systems are not enough; the demands are more intellectual. Each combatant must be disciplined in the use of his weapon. The revolutionary leader achieves this by political indoctrination; we must achieve it by education.

We can partially relieve the combatant of the pressure to employ his weapon on "some" target with sound command policies, recoverable ordnance, and less emphasis on such arbitrary measures as body count, structures destroyed, and sorties flown. True discrimination and austerity, however, can be achieved only when each individual combatant is capable of seeing beyond simply stated command policies into the real political nature of the struggle. He must be able to fathom the adverse impact in *political terms* of an improper use of his weapon. It is not so much a question of "arrogance," as Asprey contends, but of awareness and understanding, particularly among our junior officer corps.

While the major challenge of irregular warfare is intellectual, Vietnam is proof that we have to study war in all its diverse forms. In Vietnam we found ourselves embroiled in a conflict which was part conventional, part irregular. The



Routing out the Viet Cong

Patrolling the Vietnam countryside for the elusive Viet Cong, Vietnamese military police and USAF air policemen (above) join forces on a section of jungle road near Bien Hoa. . . . Forced from hiding by flood waters, the Viet Cong are apprehended by U.S. river patrols.

demands of each are often incompatible with the other and in turn require their own unique approaches.

Asprey asserts that we should offer more courses in the humanities at the service academies and encourage our career officers to do more nonmilitary reading. While there is merit to these proposals, our problem already seems to be one of too much nonmilitary reading. We in the military spend considerable time, for example, studying tech orders and regulations, but is such reading really military? Does it develop the professional or the technician?

Technicians can adapt more easily to the challenge of conventional war, but irregular war demands the broader understanding of a professional. Our current task thus should be to raise the general understanding of all types of war among all our officers. Such an increase in study and understanding hopefully will bring forth innovative approaches suited to the diverse challenge of war as well as novel uses for already existing weapons.

Such a task need not be fulfilled by pressure from outside the military, as Asprey contends. We do not have to reorient our thinking, but to do more of it.

Tactical Air Command offers three excellent courses entitled, "Foreign Internal Defense," "Psychological Operations," and "Unconventional Warfare," which not only address the problems of irregular warfare but the possible uses of air power to solve these problems. These courses, combined with a more general study of war as offered by our professional service schools, could do much to increase the career officer's general understanding of war and politics.

We should never expect irregular warfare to be our forte, but neither should it be our Achilles' heel. To make sense of Vietnam and benefit from it, we are going to have to do our own study of war. We cannot expect historians like Robert Asprey, who write for other ends, to do it for us. War is our profession, and at the heart of any profession is the quality of knowledge upon which it is founded. In today's world, the study of war is beyond the purview of just the senior leadership; it must be pursued by the entire officer corps. If not, then Asprey's thesis of ignorance and arrogance will be more a premonition about our future than an epitaph on our recent past.

United States Air Force Academy

Most of our so-called reasoning consists of finding arguments for going on believing as we already do.

James Harvey Robinson

WESTMORELAND UNVEILED

COLONEL DON CLELLAND USAF (Ret)

AT a ceremony unveiling my official superintendent's portrait at West Point, the master of ceremonies asked [Mrs. Westmoreland] to say a few words. 'This is the second time I have seen Westy unveiled,' said Kitsy. 'The first time was on our wedding night.'” As a reader you may conclude that Mrs. Westmoreland is one up on you.

Certainly anyone trying to uncover what drove the man will find little help in *A Soldier Reports*. † The book tells a lot about the war—particularly the Army side of it—but only by indirection does it vaguely outline the man. It says little about his great passions (or his peccadilloes), or his highs, his lows, who his friends are, what he reads for pleasure (or *if* he does), if he goes to the movies, or has ever gotten drunk at a party, or knelt in prayer. In short, you feel unsatisfied, you wanted him to tell you more about himself.

His wife Kitsy comes across as a person of great warmth, full of joie de vivre. But the image left of General Westmoreland is a disturbing one. It appears that little else of substance could crowd with him into the stiff mold of “Duty, Honor, Country.”

The book begins with the briefest of references to the General's pre-Vietnam

career and ends with a valedictory entitled “Looking Back.” Between are twenty-one neat chapters that average about twenty pages each. Though the reader occasionally has to leaf through the pages to pin down the exact year of a particular discussion, the chronologica



†General William C. Westmoreland, *A Soldier Reports* (Garden City, New York: Doubleday, 1976, \$12.95), x and 446 pages.

layout generally permits easy following. Unfortunately, the book is almost without documentation. Therefore, it is impossible to determine the source materials General Westmoreland used. This shortcoming would be regrettable in a book about any war. It is particularly unfortunate in a book about a war as divisive and contentious as the one in Vietnam.

The pomposity of the writing style of *A Soldier Reports* will tickle "M.A.S.H." enthusiasts, but just as surely it will disappoint anyone who expects a general's prose to be simple and clear—if not euphonious. (Surely, there is a less-complicated way, for example, to say the following: "As I had noted when escorting other civilian visitors, it was hard for the casual observer to comprehend the primitive countenance of insurgency warfare.")

And like many another toiler in the literary vineyard, the General is not above getting so entangled in what he is saying as to reveal more than he realizes: "Having directed my Deputy for air, General Momyer, to plan a two-part SLAM operation coordinating all available firepower, I gave it the code name NIAGARA to invoke an image of cascading shells and bombs." Later in the book the reader may find himself wondering just how closely General Westmoreland did actually work with his Deputy for Air, particularly when the General makes this observation: "Unlike the American Air Force, the South Vietnamese Air Force had responsibility for helicopters. . . ." (The rescue heroes of the USAF may take umbrage at this.)

Although *A Soldier Reports* takes considerable pains to underline how politics and the public undercut the overall impact of U.S. military strategy in Vietnam, the author is uncomfortable enough at

leading the "nonwinners" to cavil about the success of his North Vietnamese counterpart, General Giap. He particularly likes to dismiss as strategically unpraiseworthy those enemy successes he felt were owed largely to the failures of the French and the American bodies politic.

Time tends to obscure the fact that a tactical defeat for the French was turned into a strategic victory for the Vietminh not so much by what happened on the battlefield as by a lack of support in Paris for a seemingly interminable war . . . and also . . . following seven and half years of controversial war, cracks developed in the American will.

Somehow, though, it seems unfair to thrust the entire blame for the unfortunate outcome of Vietnam upon shoulders other than military shoulders. A portion of it, yes, but not all. For it is quite likely that the American will would not have developed cracks had American military actions been more successful than they were. Possibly some of the war's limitations foredoomed any tactics and strategy. But, as with all possibilities, the other considerations do exist. And just a hint of mea culpa on the part of any of our commanders would be refreshing. There is no arguing the fact that both the French and the American populace supported their armies in Vietnam for the better part of a decade. As a footnote, it is difficult to read the promises and the requests for more troops and a few more years without idly wondering if a point is reached in wars where challenges become more personal than national.

Immured in Vietnam from 1964 to 1968, involved in the countless obligations inherent in commanding there, General Westmoreland probably had neither the time nor the inclination to understand the reasons behind the

deteriorating support of the public. That he had little sympathy for anything other than a hawk's position seems apparent from his comments about some of those who did change their attitudes during the war:

"The cut and run people had apparently gotten to McNamara."

"Clark Clifford had turned dove and defeatist."

"The will of American politicians was faltering."

But at least his hawkishness has a constancy about it which a reader may balance by simply mixing in his own prejudices. The lack of constancy in other parts of the book often does not offer the reader this option, and they may leave him puzzled as to the author's real feelings. The following comments, for example, appear in different parts of *A Soldier Reports*:

"I appreciated the President's desire to keep the American people informed."

"As large numbers of American troops were committed, I seriously considered recommending press censorship."

"After dinner that evening . . . [President] Johnson remarked that early in the war he should have imposed press censorship."

" . . . the North Vietnamese . . . agreed to come to a conference table . . . Having failed in an all-out effort to overthrow South Vietnam, the North Vietnamese needed time to recoup their losses."

"[some people] . . . overlooked the fact that the Communists never negotiate from a position of weakness."

"Despite the threat of VC shelling [Vietnamese] National Day parades were impressive, and it was always a thrill to hear the spontaneous applause that greeted American troops parading in combat dress."

"The fewer Americans in close contact with the people also meant that much less provocation of the xenophobia of the Vietnamese. . . ."

One cannot read this book—or look at its many pictures of General Westmoreland parachute jumping, or riding in cars with presidents, or looking down pensively at Vietnam from a helicopter—without being reminded that often the squeaking wheel really does get the grease, and that most important men are very capable publicists. Acknowledging that, what is the flaw that makes them commit gaffes such as Romney's, concerning his brainwashing in Vietnam, or the following by General Westmoreland as he explains his main reason for locating a 2000-man Filipino civic action group near the Cambodian border? "Knowing that the Cambodian commander across the border had a Filipino mother, I positioned the Filipinos near the border in the hope that some meaningful contacts might develop with the Cambodians." (Those who think we should not add militarization to the already commercialized honoring of the materfamilias can heave a sigh of relief: the tactic didn't work.)

And should poet/politician Eugene McCarthy ever read this book, he will doubtless be amused and slightly puzzled at the author's interpretation of the significance of the 1968 New Hampshire primary. General Westmoreland opines that it was ". . . erroneously interpreted by political pundits as it turned out, for time showed that most of those who voted against the President wanted to do more in Vietnam, not less."

Concerning the barely concealed disdain in which President Eisenhower held Richard Nixon, General Westmoreland says:

"The political campaign of 1968 was in full swing with President Eisenhower pulling for his former Vice-President, Richard Nixon. Knowing of the former President's close relationship with Nixon . . . etc." The

slight feeling of distress aroused by this is not laid to rest when the General comments on his prescience: "Early in 1969 I developed an intuitive feeling that racial tensions were building throughout the army."

IN TOTO the varied impressions left by these disparate extracts from *A Soldier Reports* may create some doubt as to how well prepared General Westmoreland was to deal with the non-military aspects of the problems that appeared on his desk. This doubt is not dispelled, moreover, by his occasional sojourns into the history of the country where he was the major U.S. military figure for four years.

For instance, concerning the two cynosures Ho Chi Minh and Vietnamese nationalism, the General has far too little to say. He writes that Vietnamese hatred of the French "... enabled Ho Chi Minh to rise at the conclusion of World War II and forge a military arm called the Viet Minh." Later he notes that "... a framework on which to hang an insurgency was present when in 1956 the South Vietnamese Government—which had refused to accede to the Geneva Accords—declined to go along with a proviso of the accords for nationwide elections."

Before proceeding, one must admit that in some circumstances a commander's knowledge of the history of his area of operations falls into the "nice to have but hardly essential" category. Considering the volatility of Vietnam, however, with religious, political, and military groups all homing-in on nationalism as a rallying point for their particular interests, it would appear to have been prudent to arm General Westmoreland better than he apparently was concerning what actually had occurred in Viet-

nam during the critical post-World War II years.

To use an example, when the General briefly refers to the emergence of Ho Chi Minh, he makes it "... at the conclusion of World War II. ..." In reality, as Jean Lacouture has noted, "Ho Chi Minh ... was one of the founders of the Comintern and even seemed to be the possible leader of Asiatic Communism in the years 1925–1928." Furthermore, General Westmoreland notwithstanding, the Vietminh was principally a political not a military grouping; and it was hatred of the *Japanese* occupation, not the French, that "... became the focal point for nationalist resistance."

A Soldier Reports refers to the aborted 1956 national elections in a single paragraph, then offers no explanation as to *why* South Vietnam refused to participate. By sidestepping this, the author obscures one of the most critical phases of recent Vietnamese history. He also adds, unintentionally, to the divisive imagery of good guys and bad guys.

In 1956 the people of South Vietnam and the people of the United States probably had the best chance they ever would have to share in the establishment of a regime friendly to democratic interests. This could not be perceived, however, by a United States that had created its own iron curtain—containment—which separated it from Communism so effectively that it lost sight of the likelihood that Communism would splinter in development just as capitalism had, and that we would be able to accommodate to this. Though Tito would break with the Soviet Union during the same year that the national elections were to be held in Vietnam, the impact of this was not foreseen in the U.S., and the best way our government felt it could influence the growing strength and ambition of

North Vietnam was to cast a proxy vote against the 1956 elections. As President Eisenhower said in his memoirs "... possibly 80 percent of the population would have voted for the Communist Ho Chi Minh as their leader rather than Chief of State Bao Dai." This was equally apparent to the regime in Saigon.

Perhaps because of American hubris or the intransigence of John Foster Dulles's anti-Communism, insufficient importance seems to have been attached to the actual, as opposed to the imagined, positions of the two Vietnamese camps in Geneva in 1954. The South Vietnamese had the French doing much of the speaking for them, while the Vietminh went to Geneva in triumph. They had beaten the French, and though they gave up territory and initiative at the conference, they did so only because they were certain they could achieve their aims through the proposed national election:

... this promise of elections ... constituted an essential condition insisted upon by the Vietminh at Geneva. France was prepared to pay the political price of that condition in order to get the armistice that she so urgently wanted. Her successor would be obliged to abide by that condition or face the certain resumption of hostilities.¹

Ironically, *A Soldier Reports* also makes this last point in referring to the 1973 cease fire, North Vietnamese violations, and U.S. obligations: "... under accepted practices ... when one side violates a treaty, the other is no longer bound by it and can take punitive action

Some may disagree in the comparison

of the 1956 and 1973 instances, since neither South Vietnam nor the U.S. signed the 1954 accords, but this is to quibble. The South Vietnamese government was represented and signed for by its proprietor, France, and the U.S. delegation at Geneva was under tremendous home pressure to avoid giving "... the impression of approving a surrender to communism."² Hence it became an observer rather than a participant. Few lawyers, however, would argue that a contract had not been entered into.

PERHAPS, it may be argued, most of the aforementioned is an overreaction to comments in *A Soldier Reports* that sin only in their brevity. But truth, not brevity, is at the heart of the issue. In a war characterized more by official duplicity than any other in our history, a war in which presidents blatantly lied and generals were reprimanded for falsifying reports, the truth cannot be taken for granted.

In this context the following statement by General Westmoreland unwittingly stresses the need for censoriousness and emphasizes the subtle pervasiveness of deceit in a painful, frustrating war.

To my mind the American people had a right to know forthrightly, within the actual limits of military security, what we were calling on their sons to do, and to presume that it could be concealed despite the open eyes of press and television was folly.

What if the good General had concluded otherwise? What if he had thought it possible to deceive the press?

Hamilton AFB, California

Notes

1. George McTurnan Kahin and John W. Lewis, *The United States in Vietnam* (New York: The Dial Press, 1967), p. 57.

2. Marcus G. Baskin and Bernard B. Fall, editors, *The Viet-Nam Reader* (New York: Random House, 1965).

POTPOURRI

Spandau, the Secret Diaries by Albert Speer. Translated by Richard and Clara Winston. Illustrated. New York: Macmillan, 463 pages, \$13.95.

As the Minister of Armaments and War Production for Hitler's Germany, Albert Speer organized and managed a most efficient wartime industrial machine. With the help of 2,000,000 slave laborers and with prisoners from concentration camps, Speer kept increasing German war production until 1945. At Nuremberg he was found guilty of crimes against humanity and was sentenced to twenty years' imprisonment. Those years of confinement and in particular his effort to come to terms with his guilt are the subject of this engaging book.

When Speer entered Spandau prison, he had nothing to look forward to but 7000 days of monotony. Obviously, he had to develop a system to fight off the prison psychoses, a method to "persuade myself that the bad isn't so bad at all . . . that the situation offers many advantages." His efforts at maintaining his sanity and a sense of order and continuity in his life are fascinating. Speer organized his prison life on all planes: the moral aspect by accepting guilt, the psychic aspect by rejecting hopes of an early release, and the practical aspect by planning every routine and triviality of everyday life.

"The organization of emptiness" is what Speer called his daily routine. Instead of marching aimlessly around the prison yard, Speer decided to walk around the world. To make the trip more vivid, he obtained maps and guidebooks to familiarize himself with each trek ahead. By the end of his prison sentence, he had completed 31,936 kilometers and was 35 miles south of Guadalajara, Mexico.

Speer totally immersed himself in work in the prison garden, building elaborate terraces, promenades, and even a pond from a discarded bathtub. Although garden work made Speer feel content, healthy, and re-

freshed, by the fifth year in Spandau he began to wonder if the time spent working in the garden had not become an obsession. "If I go in persistently for gardening, I may well become a gardener intellectually and spiritually."

Speer read avidly, and, using paper smuggled in and out by friendly guards, he kept a diary and wrote his memoirs, *Inside the Third Reich*. There was also ample time at Spandau to brood about the past. His recollections of Adolf Hitler are interesting and revealing. He remembered the Führer not as a raging, uncontrollable dictator but as an engaging, charming individual with "a commanding personality who frequently argued on the basis of cogent reasoning."

At Nuremberg, Speer had accepted responsibility for the crimes committed by the Third Reich and felt that the court had acted justly. But as he languished at Spandau, he found the court's verdict increasingly difficult to accept. By the nineteenth year, good and evil to Speer no longer seemed so different from one another, especially when he saw those nations which had judged him guilty committing what he believed were crimes against justice and humanity. His reasoning over the course of twenty years about his own moral culpability is intriguing, to say the least.

Speer's chronicle is certainly more complex and rich than a simple journal of a prisoner's daily routine. *Spandau, the Secret Diaries* is well worth reading.

Captain David Miles, USAF
Department of History
USAF Academy

The Last European War: September 1939–December 1941 by John Lukacs. New York: Anchor Press/Doubleday, 1976, 562 pages, \$15.00.

The Last European War by John Lukacs is an excellent and detailed account of war-torn Europe during the years 1939–1941. The author sees this as the last European war, for on 7 December 1941 the conflict escalated into a worldwide struggle; from

that point on the major events of Europe have been in the hands of the new superpowers, the United States and Russia. The book is organized into two main divisions, The Major Events and the Main Movements. The first of these divisions presents a conventional approach to the diplomatic and military actions of the 1939–1941 period.

The second division is the more interesting of the two as the author attempts to assess the daily lives of the people, the various European political movements, and the “sentiments of nations.” In this latter half of the book the author presents an outstanding analysis of the split of the political right, showing how those with the greatest fear of Communism were drawn to an admiration or alliance with Hitler. Another revealing section is that on the forced movement of people to new homelands—a practice adopted not only by Germany but also by prewar Poland and the Soviet Union.

The greatest weakness of the book is the author’s interruption of the narrative to change topics. He constantly states “we must shift,” “we must return” to an idea at a later time. This detracts from the flow of the narrative, and it occurs with enough frequency to become irritating.

Another weakness occurs when the author discusses the role of “Communications and Intelligence.” He states that “secret intelligence about enemy operations had few decisive effects during the Second World War.” (p. 371) From this it appears he has failed to take into account the latest information about communications intelligence during the war as revealed in *The Ultra Secret* and other sources.

The author provides interesting insight into the character and mind of Adolf Hitler, concluding that Hitler was not mad but that his “cold and almost inhuman detachment” made him a frightening and imposing figure. He also relates that Hitler’s greatest ability was in assessing the weaknesses of his political and military opponents. His greatest weakness, Mr. Lukacs concludes, was his inability to understand the British and their continuation of the struggle.

The most critical diplomatic decision of the war, according to the author, was the signing of the nonaggression pact between Japan and Russia. This meant that Russia would have to fight only a one-front war while the United States and Britain would be forced to bear the burden of fighting against Japan. Curiously, unlike most historians, Mr. Lukacs claims that 7 December 1941 was the turning point of the war. Not only was that the date of Pearl Harbor but also the commencement of the Russian counteroffensive at Moscow.

While presenting a conventional military and diplomatic account of the war, the book should also be interesting to those wanting to know what was happening in war-torn Europe on the homefronts.

Major C. G. Kornegay, USAF
Department of History
USAF Academy

Military Lessons of the Yom Kippur War: Historical Perspectives by Martin van Creveld. Volume III, Number 24, of *The Washington Papers*. Beverly Hills/London: Sage Publications, 1975, 60 pages, \$3.00.

The Yom Kippur War is characterized by the author as particularly notable for the enormous rate of attrition suffered by the participants.

... a single example of the magnitude of the numbers involved, the total count of tanks lost on both sides must have approached 3,000 (75 percent of which were Arab)—and this in a conflict that did not last for quite three weeks. ... it represents fully one-third of all the tanks that the members of NATO—France included—can muster.

A history teacher at the Hebrew University of Jerusalem, Dr. Martin van Creveld, by both proximity and background, is eminently well qualified to assess the implications of the Arab-Israeli war of October 1973. He avers that the fantastic consumption rates in materiel make it questionable whether the NATO Alliance could “... wage anything but

the shortest of conventional wars." He further speculates that the rates of attrition and expenditure of consumables certainly cannot be expected to be any less high in a war in Europe; it would be tragic if NATO, after holding its own tactically, were faced with the choice of surrendering or initiating a nuclear war because of insufficient reserves.

The author proceeds to examine the need for massive resupply in any conventional war and how it will make the character and duration of surrogate wars subject to the same herculean efforts of the logistician.

If events in the Middle East have demonstrated the inability of the superpowers to prevent the outbreak of local wars, they have given even better proof of their ability to regulate not merely the extent and duration but also the intensity of those wars. Taps on, taps off; this, and not the action or inaction of the marionettes down the pipeline, will determine the shape of any future war.

One is forced to muse on the Lebanese war of 1976 in which the participants are served by their patrons as in previous Middle East conflicts. Could these clients, both internal and external to Lebanon, continue with their conflict without the unflagging resupply of their patrons? It is not likely that any high level of intensity in that war could be sustained, as the author would have us think, without massive infusions of ammunition and replacements of combat vehicles to both sides. The conclusion must be that "the taps are on" for this conflict in Lebanon.

Many readers and interpreters of *Military Lessons of the Yom Kippur War* will find their previously formed opinions on the ascendancy of the defense given strong confirmation by Dr. van Creveld. He proceeds from the newfound strength of the defense to reason that success in future wars will depend on making the greatest possible gains in one mighty blow, and this ability turns on the initiative; i.e., being the first to deliver a blow. He leaves the Western reader with more than a vague uneasiness when he turns our technological sophistication into a liability by his assertion that:

The speed and range of modern weapon sys-

tems; the centralization of command made possible by improved means of communication; the difficulties placed in the way of intelligence services that suffer from a deluge of information with which they are unable to cope; all these seem to have made strategic surprise much more effective and easy to achieve.

Short though it is, Dr. van Creveld's book contains much food for thought.

Lieutenant Colonel
Richard E. Hansen, USAF
Air University Review

A Guide to the Sources of United States Military History edited by Robin Higham. Hamden, Connecticut: Archon Books, 1975, 559 pages, \$27.50.

There can be little doubt that *A Guide to the Sources of United States Military History* was long overdue. As Dr. Higham points out in his introduction, the field of military history did not really achieve academic respectability until very recently—after World War II. One consequence was that the tools for research in that field were scarce compared to those developed for the other aspects of the historical discipline. Now that the field is growing, the present work will surely find a ready market. It is compact yet comprehensive enough to be an important research aid. The qualifications of the contributors can hardly be questioned, and the level of the scholarship is impressive.

Professor Higham's introduction constitutes an effective bibliographical essay on military history. Then 19 other authorities contribute more specialized studies. Most of the writers were assigned subjects according to a chronological scheme, but a few chapters are of a topical nature: Dr. James Breedon's "Military and Naval Medicine" and Dr. Russell F. Weigley's "European Background of American Military Affairs" are but two examples.

A number of the essays are of at least indirect interest to the air power historian. For instance, Professor Carroll W. Pursell of Le-

high University supplied one entitled "Science and Technology in the Twentieth Century," and Dr. Robert Coakley of the Center for Military History produced another, "The United States Army in World War II." These and many of the others should be checked at the outset of any historical project having to do with American air power or military history in general.

The chapter of most immediate interest to readers of *Air University Review* is that by Robert Frank Futrell entitled "The U.S. Army Air Corps and the United States Air Force, 1909-1973." It is a definitive piece and one that fills a real need for those interested in the history of air power and that of the USAF. Futrell covered much the same ground in the footnotes of his *Ideas, Concepts, Doctrine: A History of Basic Thinking in the United States Air Force, 1907-1964*, but there it was in a less handy form; nor is that volume as widely available as will be the present work. Futrell divides his chapter into two parts: a bibliographical essay and a listing of books arranged in alphabetical order. The essay devotes separate sections to journals, official works, private papers, general histories, histories of the various wars and inter-war periods, biographies, and "pilots, pictorials, planes, and missiles." (Air power museums are treated separately in the last chapter, which is specifically devoted to military museums of all kinds.) Futrell's chapter is comprehensive; the essay is presented in a competent and even artful way, and he also includes some useful hints for prospective researchers looking for new topics.

A bibliographer's task, of course, is necessarily an eclectic one—he must leave out something. Thus, it would be easy for any reviewer to note things omitted and fault the author on that account. Futrell's judgment, in my opinion, is quite good. He has omitted very little that is significant. Perhaps it would have been good to alert the younger historian to the existence of de Seversky's polemics and to more of the works, like John Hersey's, on the effects of the initial nuclear weapons. Minor points, no doubt. Futrell has made a significant contribution to Air Force history

with his essay, and it will long serve as a fine instrument for scholars interested in that field.

Dr. Higham, who came to the work with extensive experience in military history and editing, is to be commended for his management of a complex task. His contributors are to be complimented for their high level of scholarship, also. *A Guide to the Sources of United States Military History* certainly should become a part of the reference collection of every college library. Though the military history specialist will wince at the price, I nevertheless recommend the book as an important tool of his craft.

Lieutenant Colonel David R. Mets, USAF
Air University Review

Through Russian Eyes: American-Chinese Relations by S. Sergeichuk. Arlington, Virginia: International Library Book Publishers, 1976, 220 pages, \$11.95.

With the Soviet Union's compliance with the International Copyright Convention in 1975, an increased flow of "official" Soviet views is becoming available to American readers. In 1975 two such works appeared, dealing with different legs of the U.S.-P.R.C.-U.S.S.R. triangle. One, *Through Russian Eyes: American-Chinese Relations*, written by S. Sergeichuk in 1972, is the subject of this review. The other was *Soviet-Chinese Relations 1945-1970*, written by O. B. Borisov and B. T. Koloshkov in 1971 and published in the U.S. by Indiana University Press.

Through Russian Eyes describes the development of U.S.-Chinese relations from 1945 until President Nixon's visit to Peking in 1972. Authored by a Soviet expert on the People's Republic using the pseudonym Sergeichuk, the book faithfully presents the party line. While recognizing the "progressive," positive nature of the Chinese revolution, the author asserts that as early as 1945(!) a Soviet-oriented, internationalist faction of the leadership was opposed by the nationalist faction under Mao. Whereas Mao's faction desired continued relations with the United

States in the late 1940s in order to maintain its freedom from Soviet influence, Washington reacted with a strong anti-Communist policy. Only as the U.S. became progressively weaker, the U.S.S.R. progressively stronger, and the P.R.C. increasingly anti-Soviet did Washington-Peking relations improve substantially. For Sergeichuk, and the Soviets, it is obvious that the pursuit by the P.R.C. of its "national interests," especially if they parallel those of the U.S., constitutes an "imperialist, bourgeois" plot against the U.S.S.R. The national interests of the Soviet Union, however, are equivalent to those of the world Socialist movement.

Using U.S. public and press sources almost exclusively, the author demonstrates a wide access to and sophistication in dealing with these materials. He also exhibits a familiarity with the evolution of American policy-making toward the P.R.C. and with the views of prominent Democratic and Republican congressional and administration spokesmen. With much less evidence, however, he postulates a connection between growing Peking antipathy toward Moscow during the 1960s and increasingly close relations between

Washington and Peking. While giving the P.R.C. absolutely no credit for rendering any wartime assistance to Hanoi, Sergeichuk asserts that a tacit agreement evolved between the U.S. and the P.R.C. that allowed Washington an increased military freedom of action in Vietnam that it would not have had had Peking cooperated with the U.S.S.R. and other Socialist states. The author's sophistication in dealing with U.S. sources is also demonstrated by ignoring the entire impact on U.S. policy of Lin Piao's 1965 speech and other such rhetoric emerging from the era of the cultural revolution. Furthermore, except for repeated assertions of Soviet support to the P.R.C. against the U.S. throughout the 1950s, the entire context of developing U.S.-Soviet relations in which the Washington-Peking rapprochement took place is ignored.

Through Russian Eyes is not for the casual reader. The specialist will find little that is new, but he will have his "feel" reinforced for the criticality with which Moscow views the Peking-Washington connection.

Major John A. LeFebvre, USA
Washington, D.C.

Diplomacy without armaments is like music without instruments.

FREDERICK THE GREAT

BOOKS RECEIVED

The books listed herein are those received since the last list was published. Many of them have already been sent to reviewers, and their reports will be printed later.

I. AIR POWER

- Baylis, John, et al. *Contemporary Strategy: Theories and Policies*. New York: Holmes and Meier, 1975. \$16.50 cloth, \$7.50 paper.
- Blumberg, Stanley, and Gwinn Owens. *Energy and Conflict: The Life and Times of Edward Teller*. New York: Putnam's, 1976. \$12.95.
- Crookenden, Napier. *Drop Zone Normandy*. New York: Scribner's, 1976. \$12.50.
- Hochman, Sandra. *Satellite Spies: The Frightening Impact of a New Technology*. Indianapolis: Bobbs-Merrill, 1976. \$8.95.
- Hopkins, J. C., editor. *Development of Strategic Air Command, 1946-76*. Offutt Air Force Base, Nebraska: Strategic Air Command, 1976. \$3.90.
- Joshua, Wynfred. *Nuclear Weapons and the Atlantic Alliance*. New York: National Strategy Information Center, 1973. \$1.00.
- Mason, Herbert Molloy. *The United States Air Force: A Turbulent History*. New York: Mason/Charter, 1976. \$12.95.
- The Military Unbalance: Is the US Becoming a Second-Class Power?* New York, National Strategy Information Center, 1971. \$1.00. Somewhat dated, but a still valid warning of the growing strength of the Soviet strategic forces and of the dangers of neo-isolationism.
- Mrazek, James E. *The Glider War*. London: Robert Hale, 1975. \$12.95.
- Schneider, William, and Francis P. Hoerber. *Arms, Men, and Military Budgets: Issues for Fiscal Year 1977*. New York: Crane, Russak, 1976.
- Williams, Alden, and David W. Tarr, editors. *Modules in Security Studies*. Lawrence: University Press of Kansas, 1974. \$3.50. Handbook for teachers in courses on national security providing short essays covering the main issues in a considerable number of national defense topics along with short bibliographies covering the same subjects.
- York, Herbert F. *The Advisors: Oppenheimer, Teller and the Superbomb*. San Francisco: Freeman, 1976. \$6.95.

II. AVIATION: TALES, TECHNIQUES, AND TECHNOLOGY

- Chamberlain, Peter, and Terry Gander. *Anti-Aircraft Guns*. New York: Arco, 1975. \$3.95.
- Collins, Richard L., editor. *Jeppesen Sanderson Aviation Yearbook*. Denver, Colorado: Jeppesen Sanderson, Inc., 1976. A survey of international aviation from November 1974 through October 1975.
- Dickson, Paul. *The Electronic Battlefield*. Bloomington: Indiana University Press, 1976. \$10.00.
- Flying Magazine. *I Learned about Flying from That*. New York: Dell, 1976. \$9.95.
- Foxworth, Thomas G. *The Speed Seekers*. New York: Doubleday, 1976. \$45.00.
- Kershner, William K. *The Advanced Pilot's Flight Manual*. Ames: Iowa State University, 1976, 4th ed., \$10.95.
- Seitz, Frederick, and Rodney W. Nichols. *Research and Development and the Prospects for International Security*. New York: Crane, Russak, 1973.

III. MILITARY AFFAIRS

- Brennan, Donald G. *Arms Treaties with Moscow: Unequal Terms Unevenly Applied?* New York: National Strategy Information Center, 1975. \$2.00.
- Bryan, C. D. B. *Friendly Fire*. New York: Putnam's, 1976. \$10.95. The story of a family whose son was lost in Vietnam to the fire of South Vietnamese artillery.
- Casey, William J. *Where and How the War was Fought: An Armchair Tour of the American Revolution*. New York: William Morrow, 1976. \$10.95.
- Cox, Arthur M. *The Myths of National Security: The Peril of Secret Government*. Boston: Beacon Press, 1975. \$9.95.
- Danchenka, Colonel A. M., and Colonel I. F. Vydrin, editors. *Military Pedagogy*. Trans. and published under the auspices of the USAF. Washington: Government Printing Office, 1973. \$3.25.
- Dayan, Moshe. *Story of My Life*. New York: William Morrow, 1976. \$15.00.
- Delbruck, Hans. *The History of the Art of War*. Trans. by Walter J. Renfro, Westport, Connecticut: Greenwood, 1975. \$25.00.
- De McLaurin, Ronald, et al., editors. *The Art and Science of Psychological Operations: Case Studies of Military Application*. Vol. I, Washington, D.C.: United States Department of the Army, 1976.

- Dinerstein, Herbert S. *The Making of a Missile Crisis: October 1962*. Baltimore: Johns Hopkins University Press, 1976. \$14.95.
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