AIR UNIVERSITY review

SEPTEMBER-OCTOBER 1977

from the editor's aerie

Thirty years ago, the United States Army Air Forces published the first issue of the *Air University Quarterly Review*. The original charter for the *Review* was Major General Muir S. Fairchild's memorandum of 27 February 1947, which read in part: "This journal of Air Power will not be just another news-magazine, nor is it intended as a periodical of interest only to the Air University. Rather, it will be a professional publication in the highest sense of the word and will reflect not only the high scholastic standards and educational accomplishments of the Air University, but also—and more important, perhaps—the best professional thought concerning global concepts and doctrines of air strategy and tactics."

The first editorial presented a statement of policy: "The Editor and the Editorial Board wish to encourage new thinking. Consequently, if the appearance here of articles which may not agree with accepted policy, or even with majority opinion, will stimulate discussion and provoke controversy, an important part of this journal's mission will have been accomplished: to induce airmen to have original thoughts on these matters and to give these thoughts expression."

Thirty years later, our editorial policy is essentially unchanged. (See statement at the bottom of next page.) That our pages have not completely achieved the announced editorial goals is perhaps more painfully evident to the *Review* staff than to the casual reader. But we remain fully committed to the encouragement of original thinking and will actively seek to eliminate whatever restraints inhibit the free exchange of ideas.

The lead article by Dr. Paul J. Nahin contrasts the capability of our long-range antiaircraft missiles with the lagging ability to identify enemy aircraft positively. Our cover depicts reliance on the human eye as "the only truly positive technique available today for distinguishing between friend and foe. . . ."

General F. Michael Rogers enunciates the logistician's view of readiness in our Air Force Review department, reminding the operational specialists that " . . . without a responsive logistical support capability, our first line weapon systems would become little more than static displays."

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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.

IFFN

a technological challenge for the '80s

DR PAUL J. NAHIN

MANY modern weapon systems have a large mismatch between their maximum performance capability and the performance they are actually allowed to achieve. Because current rules of combat engagement normally call for visual identification of a target as hostile before weapon firing can be initiated, many weapon systems do not operate at anything approaching their design capability. A particular and dramatic case in point is a currently operational long-range missile and control system. With multiple target acquisition and tracking and engagement capability at stand-off ranges of up to one hundred miles, this is a potentially potent weapon system.

Under the visual rule, however, where it is difficult to see even large aircraft at more than two miles in good weather (identification can probably occur at no more than half this range),[1] there is a serious question as to how the user will realistically capitalize on this capability.

A solution to this and related weapon utilization problems is through the development of automated IFFN (Identification, Friend, Foe, Neutral) systems. Indeed, with sensors in satellites, aircraft, ships, and on land and sea floors combining to form a single network of enormous connectivity, the military services of the United States are moving toward a total real-time command, control, and communication capability on a planet-wide basis. The reason for this is that the services have come to realize that it is becoming increasingly difficult, due to weapon proliferation, to answer their most basic question: Where is the enemy?

Korea was probably the last war in which there was anything that might be called a forward edge of the battle area (FEBA), a reasonably well-defined line between opposing forces. With a FEBA, your friends are those on the same side of the line as you, and your foes are those on the other side. Neutrals or noncombatants can occur on either side. If a FEBA exists, IFFN of unknown targets can be made on the basis of geographic location or point of origin. However, the experiences of the United States in Southeast Asia and observations of the recurring Arab-Israeli Middle East conflicts have driven home a reality of modern warfare. It is no longer a set piece, move/countermove, majestic sequence of operations. It is a swirling, lightning-fast, explosive mixture of friends and foes alike, each trying to sort the other out.[2] The side that does so first will have the advantage, possibly a decisive one.

Even small advantages can be extremely important, as Possony and Pournelle point out with their example of two fighter aircraft, each equipped with "long" range acquisition radars and "long" range air-to-air missiles.[3] If "long" means 50 miles to one side but 52 miles to the other, this four percent advantage could mean that one fighter will be detected, acquired, and destroyed before its pilot is aware that he is not alone in the sky. Of course, this is overly dramatic because a 52-mile missile launch would not be performed on the mere basis of a radar track (presumably both sides have the same IFFN problem). An example of this "detection but no identification" problem resulted from the similar appearance on a radar display of the F-4 and the French-British Concorde Supersonic Transport. On test runs between London and Bahrein, Iraq sent up fighter interceptors to visually identify the Concorde because only Israel flies the F-4 in that part of the world.[4]

We can understand, then, the necessity for the visual rule. The *only truly positive technique available today* for distinguishing between friend and foe (and maybe neutrals, too) is to look at them. To do otherwise is to risk fratricide.[5] This is not to say there are no alternatives to visual identification. One can use the correlation of the location of an unknown target with the known locations of all friends. The lack of a match *might* be taken as an indication of foe. Not only is this concept relatively slow, with its implication of the existence of a high-level command and control system that "knows all," but it is not really a *positive* identification of a foe. There are, however, plans for more responsive identification systems using sophisticated versions of this concept; they go under the generic name of time division multiple access (TDMA). These systems will require large expenditures of money and significant changes in procedural operations, however, and do not easily allow autonomous operation of individual weapon systems.[6]

Another alternative to visual identification relies on explicit procedural methods, e.g.,

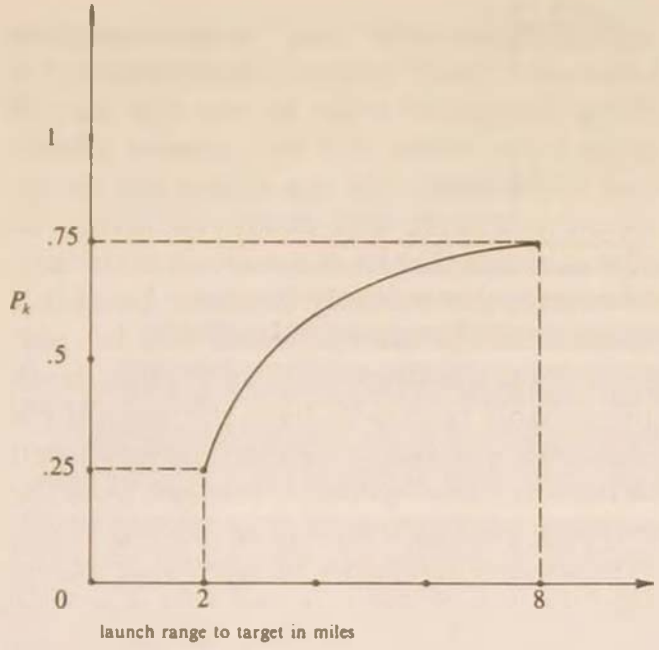


Figure 1. Typical probability of kill (P_k) vs. launch range for an air-to-air missile

aircraft flying in safe passage corridors specified in time, speed, and altitude. The major objection to this is the obvious inflexibility and the opportunity for the enemy to learn the procedures by observation. (If procedures are changed frequently to defeat such learning, then the problem occurs of ensuring that all friends and neutrals are always informed in a timely way, while still denying this information to the enemy.)

The problem of identifying friends and foes in war is not new. The use of uniforms, flags, and other visual insignias has a long history. Certain special categories of participants in a combat or potential combat area have also developed visual cues to announce their identity or intent, e.g., the red cross for unarmed medical personnel, the white flag for soldiers wishing either to negotiate or surrender, and blue helmets for the troops in a United Nations Emergency Force (UNEF). To ignore or violate the spirit of these insignias has been to invite condemnation by world public opinion or, in the case of using an adversary's uniform, to risk execution as a spy.[7] Passwords have served as an acoustic Identification, Friend or Foe technique for centuries.

What *is* new is the need to develop the capability to engage the enemy at long range. It is not desirable to continue to follow Israel Putnam's two-hundred-year-old exhortation at Bunker Hill of "Don't fire until you see the whites of their eyes." Missile weapons, for example, typically have their largest probability of kill (P_k) at near their maximum range, with a plot of P_k vs. launch range to target appearing something like Figure 1. Not to launch such a weapon at long range is not only to accept a degraded P_k but also to increase the vulnerability of the missile weapon platform to counterattack and lose the element of surprise. Long-range identification also provides two valuable threat assessment capabilities: (1) if the identified threat is too potent to handle, the engagement might either be aborted or postponed, if possible, until a friend capable of engagement arrives; (2) if the decision to engage is made, long-range identification may provide sufficient time to set up the optimal attack geometry for the particular friend-foe combination. These comments are not limited to air-to-air combat. The restrictions of the limited visual rules of engagement carry over to air-to-ground (e.g., air strikes against land and sea logistic and combat forces), ground-to-ground (e.g., tank vs. tank battles), and ground-to-air (e.g., surface-to-air missile [SAM] defense sites). The IFFN question drives the engagement decision process in literally all forms of combat.

The visual restriction has, up to now, been imposed because of the disastrous consequences, in our own eyes, of a mistake. To engage and destroy a friend or neutral are viewed as nonjustifiable.[8] On the other hand, to some the continued adherence to this policy is an unrealistic application of the judicial philosophy that a target is a friend until visu-

ally proved to be a foe. Much work in the past has been devoted to the study of the potential for eyeball detection and identification of targets (both with and without artificial aids).[9] More recently, interest in nonvisual techniques for the *noncooperative* identification of targets has developed. Some extended comments are in order on what is meant by *cooperative* and *noncooperative* IFFN.

cooperative and noncooperative IFFN

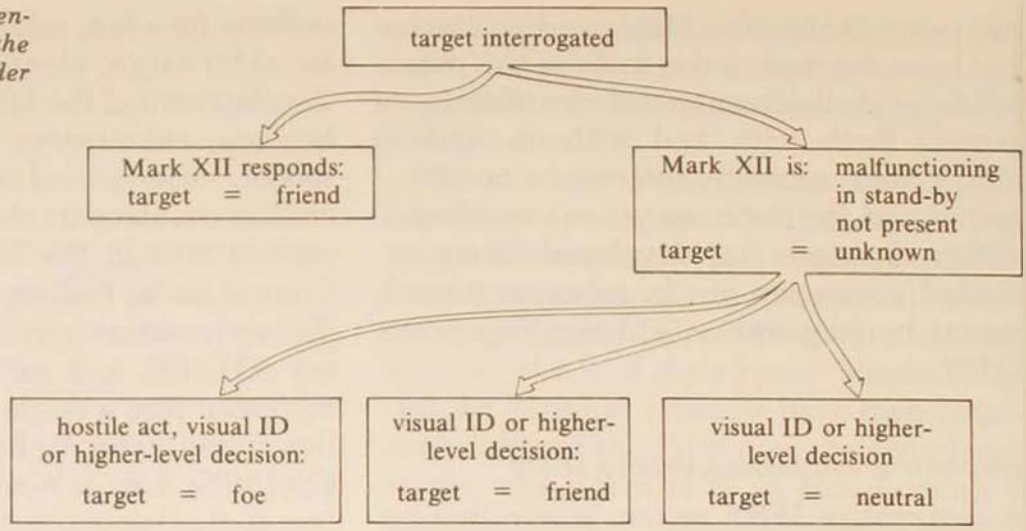
A cooperative IFFN system is one that requires targets either to play a responsive role in their identification, upon request from remote observers, or to continuously enhance one or more of their observable characteristics that aid in the identification process. Ground troops that wear uniforms, ships that fly flags, and aircraft with insignia painted on their frames are examples of the latter. These are examples of *passive* cooperative techniques. The modern radio beacon transponder that broadcasts either clear or coded signals *upon interrogation* exemplifies an *active* cooperative technique. The terms "passive" and "active" describe the role of the target *observer*. A noncooperative IFFN technique, which can be either passive or active, requires no participation by the target in the identification process. Passive noncooperative techniques have the virtue of not emitting and thus of not giving away the observer's position.

The beginning of active (electronic) cooperative IFFN can be said to have occurred during the Second World War in a parallel (if less dramatic) development with radar. The initial euphoria over the ability of radar to look through darkness, weather, and distance to provide target range, bearing, and speed was soon tempered with the realization that without target identification little could be done but track until visual identification could be performed. This need in the military for a fast, reliable, long-range means for radar target identification triggered the development of the Mark series of IFF radio beacons, culminating in today's Mark XII model,[10] widely used in military aircraft. The civilian counterpart plays an enormously important role in the nationwide Air Traffic Control Radar Beacon System (ATCRBS) radio interrogation network.[11] In fact, the civilian ATCRBS and military Mark XII have coalesced into a single entity in the form of the United States Air Force 407L Tactical Air Control System in Western Europe. This system is also known as AIMS, an acronym for ATCRBS IFF Mark XII System, which is itself a sequence of acronyms. Acronyms cubed!

The Mark XII active cooperative IFF is generally considered to be a very reliable system—it is also cryptosecure—but it has some significant drawbacks. Foremost among these is that it is really a misnomer to call Mark XII an "IFFN" system. It certainly has no neutral[12] identification capability, and its identification of a target as a foe is by elimination, i.e., it is a positive identification system only for friends possessing a working Mark XII. It cannot discriminate a hostile target from those friendly targets which, for a variety of reasons, fail to respond to an interrogation. Mark XII itself does not designate targets that do not answer interrogations as foes but rather as unknowns. Other considerations are required to complete the identification task. Figure 2 shows the nature of this process.

The process shown in Figure 2 is satisfactory in situations similar to the one the United States had in the air war in the northern part of South Vietnam. In the region of the central highlands around the base at Pleiku, north through Da Nang and Hue to the Demilitarized Zone that separated what used to be South and North Vietnam, the American forces enjoyed complete air superiority. This was combined with the pres-

Figure 2. The target identification process for the Mark II beacon transponder



ence of forward air controllers (FACs), who provided accurate position and identification information for close-air-support missions against ground targets. However, this total, absolute control of the air would probably not be a reality, for either side, in the potential "conventional" confrontation between NATO and Warsaw Treaty Organization (WTO) forces in Europe.

From the point of view of the United States, several factors combine to make the AIMS Mark XII/visual identification combination an unsatisfactory answer to the total IFFN problem in Europe, in the context of war. The presence of large numbers of the MiG-21 and variable-geometry MiG-23 Flogger will probably deny total air superiority to NATO, even when equipped with the F-16. The recent decision to deploy a wing of F-15 Eagles in West Germany and to add a second wing of F-111s in Britain may alter this evaluation, however. The long-term survivability of FACs in Europe is doubtful in the face of the heavy radar-directed air defenses they would most surely meet. The visibility in Central Europe is generally poor (e.g., less than two miles 20 percent of the time in winter). And finally, there seems little doubt that the Warsaw Pact forces are trained and equipped to maneuver and fight at night.[13]

Because of these considerations, interest in noncooperative IFFN techniques has grown during the past several years. In 1974, a panel of experts reported to the Army on their survey of the state of the art. More recently, Dr. Malcolm R. Currie, then Director, Defense Research and Engineering, requested that a Defense Science Board (DSB) Task Force be established to study the IFFN problem and make recommendations.[14] In a parallel effort with the DSB Task Force, which was established in early 1974 with members from both government and industry, the Institute for Defense Analyses (a Federal Contract Research Center, primarily funded through the Office of the Secretary of Defense)[15] performed an IFFN technology study for Defense Advanced Research Projects Agency (DARPA). These technologies cover the entire electromagnetic spectrum, from UHF to infrared. Table I lists just a few of the techniques that have been discussed in the unclassified literature.[16]

But problems still exist. The techniques listed in Table I and other noncooperative IFFN technologies are in danger of being

NAME	Active/ Passive	Comments
TRISAT and DMR	Active	analyzes aircraft engine modulation on pulse radar echoes
TISEO	Passive	electro-optical system (vidicon TV camera and zoom lens) that extends pilot's visual range
LATAR	Active	augmented TISEO, using a laser to obtain range information and to designate targets
HR^3	Active	high range resolution, wideband radar that resolves individual scattering sites on a complex target
J-TIDS	Passive/ Active	positive correlation system concept, using a time division multiple access subscriber technique with spread spectrum, frequency hopping signal processing to achieve very high antijam capability for digital communications, relative navigation within a net, and identification
mini-RPV	Passive	unmanned air vehicle with remote guidance and on-board television for data-linked, real-time imagery providing behind the lines command and control
Wide-Band Doppler	Active	produces images related to geometrical form of target using echo signals from a pulse doppler radar
Harmonic Radar	Active	detects and possibly images metal targets via scattered third harmonic radiation from nonlinear metal oxide-metal junctions

TRISAT: Target Recognition by Integral Spectral Analysis Techniques
DMR: Dual Mode Recognizer
TISEO: Target Identification System, Electro-Optical
LATAR: Laser Augmented Target Recognizer
HR^3: High Range Resolution Radar
J-TIDS: Joint Tactical Information Distribution System
mini-RPV: Remotely Piloted Vehicle (miniaturized)

Table I. Some noncooperative IFFN technologies

compromised by the realities of the extraordinary acceleration over the past two decades of the world arms trade. The possession of a particular type of military hardware is not necessarily an indication of nationality. This proliferation of weaponry, due primarily to the willingness of the United States and Soviet Union[17] to sell even their most advanced developments (short of nuclear weapons) to Third World countries, has reduced most noncooperative techniques to the level of target classifiers,* as opposed to friend-foe identifiers. In the Pakistani-Indian War of 1965, U.S. weapons appeared on both sides. The 1974 invasion by Turkey of the island of Cyprus, under Greek control, is a more recent example of the IFFN problem caused by the widening distribution of weapons. Greece and Turkey, both members of NlATO, used U.S.-made weapons against each other, and weapon type implied nothing about the nationality of the possessor. A similar situation would face the United States if it should engage in a war with the Organization of Petroleum Exporting Countries (OPEC) oil cartel, since the Middle East, particularly Iran, has purchased enormous quantities of American weapons.[18] Some appreciation of just how large this weapon proliferation problem has become can be gained from Table II,which shows the distribution, in fixed 1970 U.S. dollars, of total world military expenditures in 1964 and 1974.[19] While the U.S., England, and France all experienced almost insignificant increases over this ten-year period, the Third World actually gained on the United States and Soviet Union in total dollars spent and surpassed all others in growth by more than doubling.

The increasing spread of weapons around the world certainly bodes potential ill for humanity in general, and it seems almost inappropriate, by comparison, to observe the difficulties this spread causes for IFFN. The late Walt Kelly's famous line from the comic strip Pogo comes to mind when trying to express the proliferation problem: "We have met the Enemy and He is Us." Certainly Kelly wrote this in a different context, but the statement has new relevancy in view of the far-flung distribution of weapons.

	1964	1974
Total Expenditure	**162.2**	**210.3**
Distribution:		
U. S.	64.2	66.2
U.S.S.R.	46.7	61.8
England	6.3	6.7
France	5.5	5.9
Third World	16.1	35.8
Other	23.4	33.9

Table II. Distribution of world military expenditures (constant 1970 U.S. billions of dollars)

noncooperative target IFFN signatures

Each separate technology for noncooperative IFFN takes advantage of the individual and special characteristics of the target signal (called the "signature") available to a remote observer. These special nuances constitute, in many cases, classified information. However, the nature of many of these signatures and the general limitations inherent in them that reduce their usefulness, because of the spread of weapons or because of the complex signal processing they require, can be found in HR³, a signature listed in Table I and discussed in the open literature. HR³, high range resolution radar, is an *active* noncooperative technique because the target must be illuminated by an observer's wideband pulse radar. Large bandwidth (on the order of hundreds of megahertz) is required to achieve a range resolution on the order of feet. This allows the radar receiver to distinguish the

*The definitions used are as follows: Classification—determination of equipment model and type; General Identification—determination of the nationality of the armed force operating the equipment; Specific Identification—determination of the particular military unit, item or vehicle (by tail number, serial number, etc.) being observed.

echoes of the individual locally dominant scattering sites on a complex target.

Viewed on an A-scope display (echo signal amplitude vs. time or, equivalently, range), the HR³ signature is a "range profile" signature consisting of a sequence of peaks, corresponding to the significant scattering sites on the target. Figure 3 shows a typical display of the HR³ signature. An important characteristic of this signature is that azimuth information is lost,[20] with the signature peaks appearing in positions corresponding to the projections of the dominant scatterers onto the radar line of sight (RLOS). Since the information in an HR³ signature is in the relative strengths and positions of the peaks (these "geometrical" features are different for different target types), there is clearly a viewing aspect dependency inherent in this signature. Such a signature is able to provide only general identification, even when the national ownership of the target type is limited. If there is a wide distribution of the target type around the world, then the capability of the signature is reduced to providing only classification.

Because of this reduction in the capability of a signature like HR³ to perform IFFN, there is interest in searching for "fine structure" in signatures. Success in this search might lead to the ability literally to "fingerprint" each copy of a weapon system at the time of manufacture. Fingerprinting can be thought of as having two distinct origins: fine structure in the noncooperative signature due to either (1) intrinsic variations among copies of the same weapon system or (2) intentionally introduced variations, i.e., a built-in "serial number" in the signature.

The concept of "signature fingerprinting" introduces considerations of military intelligence in a direct and immediate way. To use a catalog or library of fingerprinted signatures effectively, the geographical deployment of particular copies of a weapon system becomes essential information. This information must be kept timely to be useful and can be degraded by such occurrences as secondary arms sales by the original purchaser, attrition from accidents, wartime loss and wear-out retirement, and redeployment to new locations. This kind of intelligence information may be very difficult to obtain.

Another serious problem with fingerprinting is that it allows the weapon system owner to possess the signature fingerprinting mechanism, even if unknowingly. If the fingerprinting mechanism details are at all

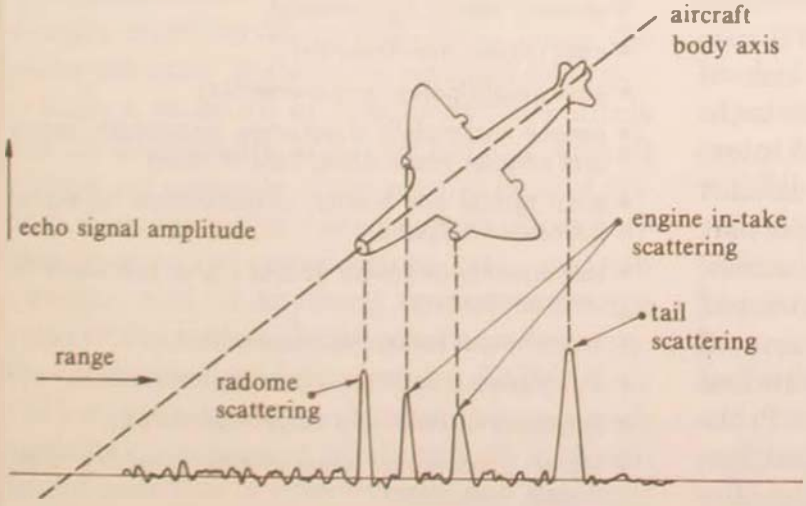


Figure 3. The HR³ range profile signature

compromised (i.e., stolen or "leaked"), a fingerprint could possibly be obliterated, reduced in visibility, or, worst of all, altered to appear as a friendly fingerprint. Fingerprinted signatures may prove to be highly perishable and a double-edged sword.

The problems in creating a useful noncooperative target signature library do not really disappear even in the case of nonfingerprinted weapons. For other than U.S.-made weapons, noncooperative target signatures obviously have to be obtained by the method of looking, on a "target of opportunity" basis, at a representative member of the target class of interest. This can be risky for active noncooperative target signatures. For example, radar illumination of high performance potential adversary fighters to obtain their HR[3] signatures conceivably are provocative acts (depending on when and where) and have clear potential for political exploitation.[21]

integrating an IFFN technology with a weapon system

Noncooperative target IFFN technologies have an existence of their own, quite apart from any particular weapon system. However, in responding to the question, "Will the use of Technology X result in a significant increase in the effectiveness of System Y?" the IFFN technology and the system cannot be decoupled. This unfortunate reality greatly complicates the already difficult task of evaluating the capabilities of just the technology without worrying about how to interface it with a system. It is not at all difficult to construct a fairly long list of important considerations in an IFFN technology assessment, including the sensor and associated signal processor. (Table III shows some of these issue areas.) Adding the additional items of "Weapon System Interface Problems" and "Determination of Enhanced System Effectiveness" requires that the specifics of the weapon system and its operational environment be considered, too.

More will be said about the second of these two items, and the interface problem is dismissed with a brief platitude that admittedly offers no immediate help: "When the horse has been stolen, the fool shuts the stable." By analogy, in the interfacing of IFFN technology with an operational weapon system (in all probability designed with IFFN as a low-priority consideration, if considered at all), the resulting required "fixes" may actually change the character of the system. Interface control and data paths to and from a candidate IFFN technology and the system may not be readily accessible or even exist. Extensive and costly modifications may be required to build the interface. For existing weapon systems, this situation can only be lived with; but for new systems still in the conceptual stage, the time to think about IFFN is *right now,* i.e., lock the barn door while the horse is still in the stable munching hay. In its most extreme form, this viewpoint is best expressed by those who would require the preparation of an "IFFN Impact State-

Table III. Some important IFFN technology issues

- signature description
- viewing aspect dependency
- cost (initial, maintenance)
- size/weight/power requirement(s)
- sensor parameters (frequency, bandwidth, range and angular resolutions, field of view)
- error rate(s) and level(s) of confidence for signal processor output(s)
- vulnerability of sensor and/or signal processor to countermeasures
- sensor input (antenna) requirement
- simultaneous multiple signature capability
- feasibility of obtaining target signatures
- signal processing requirements (memory size, timing, data rates)

ment" by the advocates and designers of any proposed new weapon system. With this requirement, no new weapon system would be allowed to proceed beyond the basic research and development stages until it had been demonstrated how the IFFN problem would be addressed.

A natural result of such an impact study would be answers to the question of what the payoff due to the inclusion of IFFN is (i.e., the determination of enhanced system effectiveness) as compared to the system effectiveness without the proposed IFFN technology. To carry out this kind of analysis requires some *measure* of system effectiveness that *quantitatively* evaluates system performance. Unfortunately, a single effectiveness measure does not exist that applies to all systems; also these many measures are all functions of such widely variable considerations as system cost and mission requirements.

For example, if we consider two systems, one "tactical, low cost" and the other "strategic, high cost," distinctly different measures of effectiveness are appropriate. For the first kind of system, an example of which might be a light tank, an economic exchange ratio is a reasonable measure. Tanks can be made on a mass production basis, and even if their survivability in war is not particularly good, that may be permissible if during their lifetime they cost the enemy more than our cost to replace them. The larger the ratio of adversary cost[22] to our replacement costs, the more effective is the tank weapon system.

Such a measure of effectiveness is surely not an appropriate one for a nuclear aircraft carrier, an example of the second kind of system. Nuclear carriers are enormously expensive, very low production rate weapon systems, and, if anything, a cost exchange ratio works to the advantage of an adversary. (Several missiles delivered by KOMAR or OSA class boats are far cheaper than a carrier with its complement of aircraft.)[23] A meaningful measure of effectiveness for this kind of system would include not only the capability of the system to damage the enemy but also the probability the system survives a complete mission with the ability to undertake a new one.

The value of a noncooperative IFFN aid to a weapon system is directly related to how much it improves the system effectiveness measure. The manner in which such aids will influence these measures is by increasing the range (beyond the visual) at which target identification can be achieved. The first step in performing an IFFN enhancement analysis, then, is that of answering the question, "How much sooner can the system identify a target with an IFFN capability than without it?" Even this first-step analysis, in its most elementary form, must consider various complications introduced by the interaction of the mission situation of the system and the particular nature of the target signature. For example, in his scholarly analysis W. D. White states that if one compares aircraft combat loss rates (usually given as the number of aircraft lost per 1000 sorties) over the long historical period from World War II to the Yom Kippur War, no evidence exists that suggests a decline in the survivability of tactical warplanes over a modern, conventional battlefield.[24] A new U.S. Army weapon that might change this evaluation is Stinger. Stinger is a small (21 pound) shoulder-launched SAM. Using passive infrared guidance with proportional navigation, it is intended to give the mobile ground soldier the capability to engage low flying, high speed (up to Mach 2) targets.[25] Stinger is equipped with an IFF aircraft interrogator.

In discussing how a noncooperative IFFN technology aid might be used with a Stinger-like weapon, one must keep in mind that there has to be a balance between the aid and weapon in such aspects as mobility, size, and cost. For a long-range area defense weapon like the Hawk missile, it makes sense to think of using an aid that incorporates a

sophisticated acquisition radar. For Stinger, something else less ambitious is more reasonable; for example, a low cost, binocular-size visual aid.[26] More specifically, a reasonable scenario for a small, portable Stinger-like SAM integrated with a noncooperative IFFN visual aid might correspond to Figure 4.

The battlefield SAM is located some distance from a hill, behind which it is known or suspected that potential hostile aircraft will appear. The SAM soldier searches the airspace above and beyond the hill with his IFFN visual aid. The aircraft is assumed to be in level, constant-speed flight, radially inbound toward the SAM. With this battlefield geometry or, in fact, with alternative geometries, one could write formal equations (but not here!) relating the variables of Figure 4, defined as follows:

Symbol	Definition
l	height of the hill
d	distance of SAM site from a point directly beneath the peak of the hill
h	target altitude
s	target speed
R(o)	LOS (line of sight) detection range
t	time interval from detection to identification
R(t)	LOS identification range

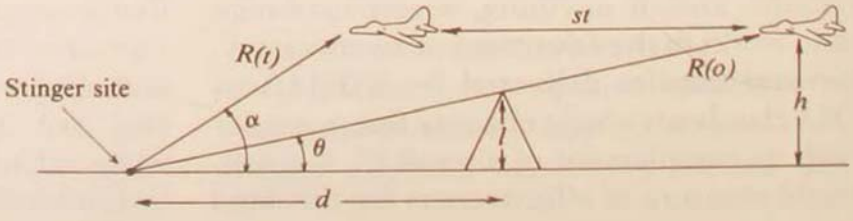
Finally, by making some plausible assumptions of the *unaided* visual IFFN capability of the SAM soldier and knowing the maximum LOS detection range of the candidate technology, one can calculate a quantitative statement of the improvement a particular technology brings to a weapon system. If the Army has not done this for Stinger, it should.

signal processing and multisensor integration for IFFN

Some think that the best way to advance the state of the art is by continually seeking new sensor phenomena that avoid most of the faults of their predecessors while introducing no new major difficulties. An alternative path takes the point of view that there presently exist a substantial number of distinct sensors, together covering an enormous spectral width but with little knowledge to guide their effective cooperative interaction. This second path is the theme here, the message being that some of the dollars currently being spent on searches for new phenomena might be better spent on the effective integration of sensors already available.

However, before examining the integration question, one should consider the computational aspects of the signal processing load implied by the IFFN technology. This is because the sensor signal processor is the next level of sophistication beyond the sensor, with a multisensor architecture coming after that, as shown in Figure 5. Whatever the physical nature of a sensor, the information provided by it (the "signature") is useful only after at least some minimal processing. A significant (possibly a major) fraction of the cost of an IFFN system will not be represent-

Figure 4. Battlefield geometry for Stinger



ed by the sensor but by the electronic signal processing that will back up the sensor.[27] A critical factor in the credibility of present and future IFFN systems will be the signal processing package (e.g., reliability, size, maintainability, power requirements, and speed). Recent electronic device advances need to be explored in depth for their potential impact on the total IFFN system package. The level of risk and feasibility for "shrinkage" of cost, speed, size, input power, etc., via new device technology needs assessing for the various current IFFN sensors. There is little question to the belief that we are, today, not even close to the fundamental quantum limitations on the speed and size of electronic signal processing devices.[28]

The next level of sophistication beyond the signal processing logic and hardware that interface directly with a sensor is that of multisensor integration. This is a big step and, until recently, one with a dismal record. Multisensor integration is an immediately convincing systems approach to getting more performance out of a collection of sensors than any single one of them can provide. This is the so-called "synergistic" effect achieved when the multiple sensors feed into some kind of high-level "parallel" processor. And that is the troublesome part of this systems approach, in that parallel systems are so poorly understood. The following quotation from the introduction of Minsky and Papert's elegant book is appropriate:

> Neither the outsider nor the computation specialist seems to recognize how primitive and how empirical is our present state of understanding of such matters. We do not know how much the speed of computations can be increased, in general, by using "parallel" as opposed to "serial" or "analog" as opposed to "digital" machines. We have no theory of the situations in which "associative" memories will justify their higher cost as compared to "addressed" memories. There is a great deal of

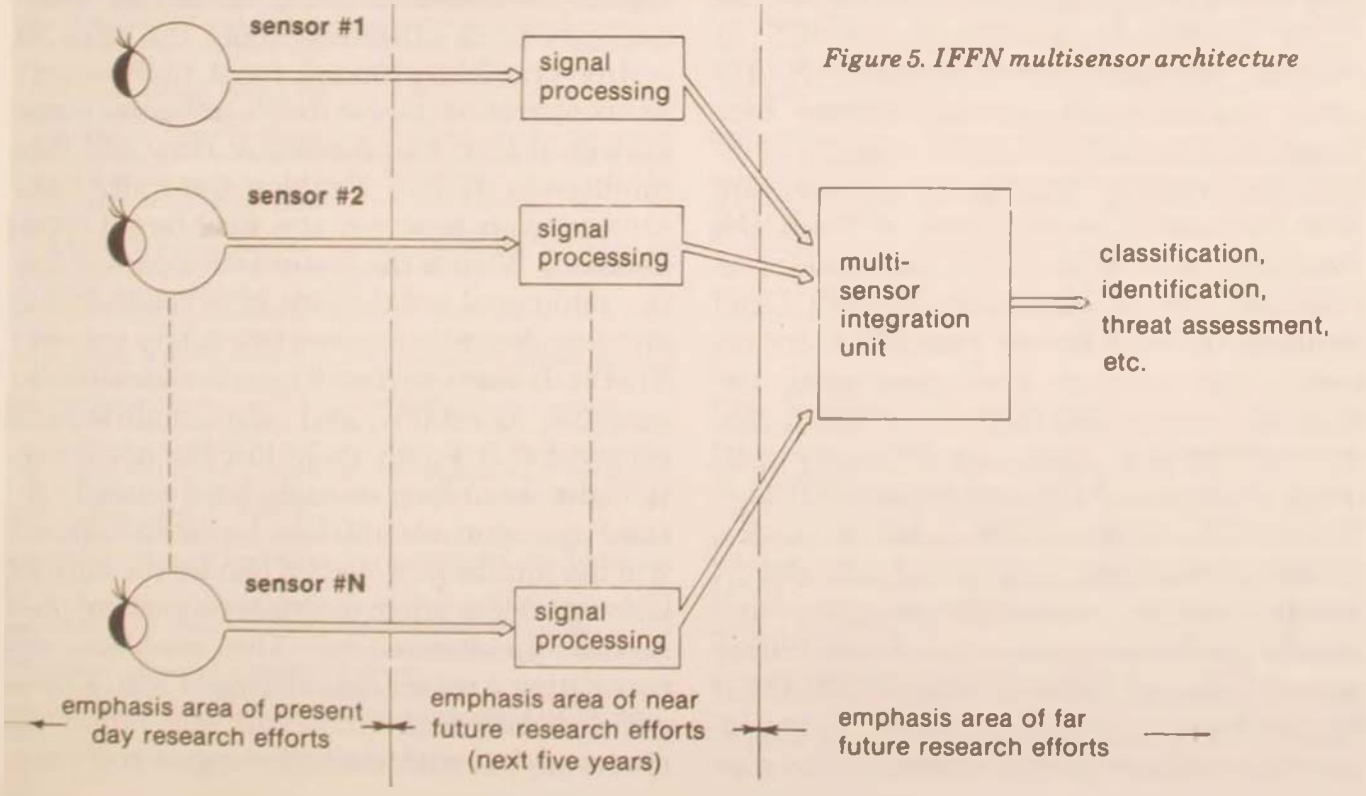


Figure 5. IFFN multisensor architecture

> folklore about this sort of contrast, but much of this folklore is mere superstition; in the cases we have studied carefully, the common beliefs turn out to be not merely "unproved"; they are often drastically wrong.
>
> The immaturity shown by our inability to answer questions of this kind is exhibited even in the language used to formulate the questions. Word pairs such as "parallel" vs. "analog" are used as if they referred to well-defined technical concepts. Even when this is true, the technical meaning varies from user to user and context to context. But usually they are treated so loosely that the species of computing machine defined by them belongs to mythology rather than science.
>
> Now we do not mean to suggest that these are mere pseudo problems that arise from sloppy use of language. This is not a book of "therapeutic semantics!" For there is much content in these intuitive ideas and distinctions. The problem is how to capture it in a clear, sharp theory.[29]

These are not discouraging words but rather signposts that should be recognized as pointing the way to a potentially fruitful area of IFFN research and development. Indeed, there are many military environments, today, rich in distributed, multisensor systems.

The previously mentioned AWACS in Europe, designed to coordinate NATO forces in a confrontation with Warsaw Pact forces, comes immediately to mind. In addition, the Army has long been experimenting with battlefield sensor systems, with the "McNamara Wall" (the U.S. experiment in Vietnam with an electronic Maginot Line) probably the best known example. More recently, the Army is now developing the Remotely Monitored Battlefield Sensor System (REMBASS), made up of widely scattered Unattended Ground Sensors (UGS).[30] These UGS will come from a mix of sensors, including magnetic, seismic/acoustic and infrared detectors. Somewhat along the same lines is the Army interest in a field-artillery acoustic location system. While REMBASS is for use against ground personnel and vehicles, the artillery system is intended to support the rapid development of accurate counterfire against hidden mortar and gun emplacements. This is a technique used in World War I[31] but with new sensors and computer processing, the Army thinks it can defeat the problems of old, such as echoes off nearby hills.

An even more fantastic example of a military multisensor system was dramatically thrust into public view in 1975, with the disclosure of the CIA adventure called "Project Jennifer."[32] In 1968, a Soviet missile submarine suffered an explosion while recharging its batteries on the surface of the Pacific and sank to a depth of 16,000 feet. The noises of its break up were detected by the UGS scattered on the ocean floor by the U.S. Navy. By using time of arrival (TOA) processing techniques, American authorities knew the location of the doomed boat to within ten square miles, while Russian search ships had no real idea of where to look. Once the Russians gave up, the now famous Howard Hughes ship, the *Glomar Explorer,* pulled off what certainly must be admitted to be a technological *pièce de résistance,* no matter what one may think otherwise about the affair.[33]

Any credible proposal for a multisensor noncooperative target IFFN scheme must answer at least two questions: How will the multisensor system combine the individual sensor inputs to arrive at a final target type decision? What is the quantitative pay-off for the additional complexity of a multisensor architecture, as compared to a single sensor? That is, *Is more better?* These are absolutely essential questions, and any multisensor proposal that avoids them just has not been thought about long enough, hard enough. A third question should also be added: How will the multisensor system handle the correlation problem when multiple targets are observed simultaneously? The problem of correlating a sensor measurement with a target does not exist when just one target is observed, but with multiple targets and pas-

sive sensors,[34] it is not clear how the sorting of targets and measurements can be done.

Finally, there is the issue of the psychological interaction between a dispassionate target-classifying machine and a combat soldier in a stressful environment. Should the automatic pattern-recognition signal processing logic always make a positive decision ("friend," "foe," or "neutral"), or should the fourth possibility of "unknown" also be included as an output? And in any case, once a decision is made, should the probability that it is correct (i.e., the "confidence level") also be an output? Does the presentation of uncertainty to a human observer in a situation that is often life or death add to or detract from the overall effectiveness of the IFFN system?

THE IFFN issue is a "sleeper" technological challenge for the 1980s. To be second in this area would be a technological surprise on the United States with enormous repercussions. As Dr. George Heilmeier, Director of the Defense Advanced Research Projects Agency, wrote in "Guarding against Technological Surprise,"[35] to be so surprised is not a matter of coming in second. It is to *lose.*

University of New Hampshire

Notes

1. The author attended a demonstration of the Air Force precision flying group, the Thunderbirds, at Pease AFB, Portsmouth, New Hampshire. Even when flying in a group of six aircraft, in beautiful weather, the team's T-38 Talons were extremely hard to track when more than a mile distant, even though their approximate flight path was known beforehand.

2. See *Aviation Week & Space Technology*, June 30, 1975, p. 12, for example: an Egyptian Air Force gun camera picture taken by a MiG-21 Fishbed (in the October 1973 Yom Kippur War) on the tail of an Israeli Mirage, which in turn is on the tail of another MiG-21. Also, the testimony of Major Steve Ritchie in 1974 before the Tactical Air Power Subcommittee of the Senate Armed Services Committee about combat between the F-4 and the MiG-21 is interesting. As reprinted in James W. Canan, *The Superwarriors: The Fantastic World of Pentagon Superweapons* (New York: Weybright and Talley, 1975), "The MiG-21, compared with the F-4, is about half the size, it leaves very little smoke, it is hard to see . . . " Finally, in *Thud Ridge*, Colonel Jack Broughton, USAF (Ret), describes the concern of F-4C pilots when, in a shootout against MiG-17s over the Red River in North Vietnam, accompanying F-105 Thunderchiefs began launching Sidewinder, infrared seeking missiles. From some angles, the F-4C and the MiG-17 are visually similar, and an accident was a real possibility.

3. Stefan T. Possony and J. E. Pournelle, *The Strategy of Technology: Winning the Decisive War* (New York: Dunellen, 1970), pp. 38–39.

4. See *Newsweek*, August 18, 1975, p. 13.

5. For example, as reported in *Newsweek*, November 26, 1973, p. 26, Soviet-built SAM-6 missiles were effective against Israeli aircraft in the Yom Kippur War. Yet, because of poor coordination between Egyptian aircraft and air defenses (i.e., no friend-foe discrimination), 40 of the 120 aircraft lost by Egypt were shot down by the Egyptians themselves.

6. Such a correlation system will be part of the Airborne Warning and Control System (AWACS) for NATO in Europe. The FY76 funding request included $199 million to continue AWACS development, including work on the positive identification correlation system (*Aviation Week & Space Technology*, March 17, 1975, p. 28).

7. These constraints are quite strong. For example, even as they initiated an undeclared war at Pearl Harbor, the Japanese air forces did not fake insignia.

8. The only possible exception to this would occur if a friend mistakenly attacked one of his own. Then the right to self-defense takes priority, and the one attacked, by *military doctrine*, has the right to take any action, including destroying the attacker, to survive.

9. H. H. Bailey, "Target Detection through Visual Recognition: A Quantitative Model" (Santa Monica: Rand Memorandum RM-6158-PR, February 1970).

10. The Mark series evolved sequentially up through the Mark V at the end of World War II. Just before the Korean conflict, the Mark V was modified, but since there had already been an experimental Mark VI in 1945, just before the end of the war, it was not clear what the designation should be. Thus, the mod Mark V was called the Mark x, where x denoted the unknown. Soon, however, it became the Mark X, and subsequent designations started from there. There never was a Mark VII, VIII, or IX!

11. R. C. Renick, "An Improved ATC Radar Beacon System," *Proc. IEEE*, March 1970, pp. 413–22. Special issue on air traffic control.

12. The concept of neutrals in a combat area is one that, at first glance, appears to be ludicrous. But given the highly political nature of recent wars (Korea, Vietnam, the Middle East), the idea of large numbers of neutrals is credible. For example, there was a great deal of civilian air traffic in South Vietnam all during the presence of U.S. air forces there; also the UNEF troops at Sharm el-Sheikh in the Sinai Peninsula, positioned there after the 1956 Suez War until ordered out just before the June 1967 war; most recently, the American contingent of civilian technicians sent to monitor the integrity of the 1975 Sinai accord between Egypt and Israel.

13. The Yom Kippur War can be used to support this statement. Both the Egyptian and Syrian armored forces (Soviet-equipped) possessed active and passive infrared night vision devices, and they used them to great effect against Israel (the Syrian tank drive on the Golan Heights and the Egyptian armor night crossing of the Suez Canal).

14. *The Department of Defense Program of Research, Development, Test and Evaluation, FY1976*, Statement by Dr. M. R. Currie, DDR&E, before the House Armed Services Committee, February 21, 1975.

15. H. Orlans, *The Nonprofit Research Institute* (New York: McGraw-Hill, 1972).

16. The source of information for Table I is *Aviation Week & Space Technology*, January 27, 1975, p. 121, except for HR³ (high range resolution radar), which is from D. Howard, "High Range Resolution Monopulse Tracking Radar," *IEEE Trans-Aerospace and Electronic Systems*, September 1975, pp. 749–55; J-TIDS/TDMA (time division multiple access) which is from C. E. Ellingson, "Performing IFF with ICNI," Mitre Report MTR-1773, July 1970; *Vectors* (Hughes Aircraft Company), Winter 1974–75, pp. 18–21; and *Aviation Week & Space Technology*, January 20, 1975, p. 51; wide-band doppler in "Monostatic Tracking Radar Imaging Theory for Rotating Point Target Models with Various Bandwidth and Coherence Conditions," SURC Report TN75-139, June 1975; and harmonic radar which is from R. O. Harger, "Harmonic Detection and Imaging Radar Systems for Nonlinear, Near-Ground, In-Foliage Scatterers," *IEEE Trans-Aerospace and Electronic Systems*, March 1976, pp. 230–45.

17. England and France are also active arms dealers. See *Time*, March 3, 1975, pp. 34–44. A major factor in the spiraling increase in the arms trade is the rapid rise in the costs of weapon research, development, and production. To enable an economic number of copies to be produced, the weapon

market has been expanded from internal consumption to sales abroad. Indeed, it is not uncommon for new weapons to show up in the arms inventories of the buying countries before they do in those of the selling countries! The U.S. antitank Tube-launched, Optically-tracked, Wire-guided (TOW) missile is a recent example.

18. For example, Iran has large numbers of the F-4 Phantom and F-14 Tomcat, and Saudi Arabia has the F-5 Freedom Fighter and, as does Kuwait, the Hawk Air Defense Missile System.

19. See *Disarmament or Destruction? Armaments and Disarmament*, Stockholm International Peace Research Institute, May 1975, the source for Table II.

20. HR^3 signatures obtained with monopulse radars can do better by placing the scatterers on one side or the other of the radar line of sight (RLOS) by using the polarity and amplitude of the available angle video signal. See D. Howard, "High Range Resolution Monopulse Tracking Radar," and D. R. Rhodes, *Introduction to Monopulse* (New York: McGraw-Hill, 1959). The result is a crude, distorted two-dimensional "image" of the target.

21. See *Khrushchev Remembers*, commentary by E. Crankshaw and translation by S. Talbott, Little-Brown, 1970 (volume 1) and 1974 (volume 2) for Nikita Khrushchev's description of Soviet psychology after the 1960 U-2 incident, in what might be a modern classic example of an information gathering mission "gone wrong" and the resulting intense political repercussions.

22. The total adversary cost is the sum of two costs: the damage cost caused by the tank and the cost actually to destroy the tank.

23. The KOMAR is a Soviet 75-ton, 40-knot coastal defense PT boat with two Styx missile launchers. The Styx is subsonic, surface-to-surface with a boat-launched range of about 13 miles; it carries a 1000-pound high-explosive warhead. The OSA is a 160-ton boat with four Styx launchers. See R. D. Colvin, "Aftermath of the Elath," United States Naval Institute *Proceedings*, October 1969, pp. 60–67, for a vivid description of the cost exchange ratio experienced by the Israeli Navy when KOMAR boats in Port Said sank the 1700-ton destroyer *Elath* in 1967.

24. W. D. White, *U.S. Tactical Air Power: Missions, Forces, and Costs*, The Brookings Institution, 1974. White estimates the overall Israeli loss rate in October 1973 as about 8, as compared with 6.5 for the Allied First Tactical Air Force during the last seven months of World War II over Europe.

25. *Aviation Week & Space Technology*, March 17, 1975, p. 83. Photographs of live warhead tests of Stinger against a helicopter on the ground and an in-flight aircraft can be found in *Aviation Week & Space Technology* for December 1, 1975, p. 15, and September 15, 1975, p. 19, respectively.

26. If the reader is willing to indulge for a moment in some speculative science fiction, such an aid might be visualized as a hand-held, electro-optical device that is pointed at the suspected target. At the push of a side-mounted button, the "subharmonic monotone phase" target signature is captured and processed by a computer microprocessor. If the signature is that of a hostile, a red X is projected over the viewing field—a challenge to the technologists! .

27. An obvious exception to this would be IFFN systems incorporating a radar sensor (as opposed to IR sensors and other intrinsic emission detectors, for example). And even in the radar case, the enormous signal processing load in a multielement phased array radar system might require a financial investment exceeding that of the radar itself.

28. R. W. Keyes, "Physical Limits in Digital Electronics," *Proc. IEEE*, May 1975, pp. 740–67.

29. M. Minsky and S. Papert, *Perceptrons: An Introduction to Computational Geometry* (Cambridge: Massachusetts Institute of Technology Press, 1969).

30. *Electronics*, May 13, 1976, pp. 29–30.

31. *Vectors* (Hughes Aircraft Company), Winter 1975/76, pp. 6–10.

32. *Time*, March 31, 1975, pp. 20–27 and December 6, 1976, p. 23.

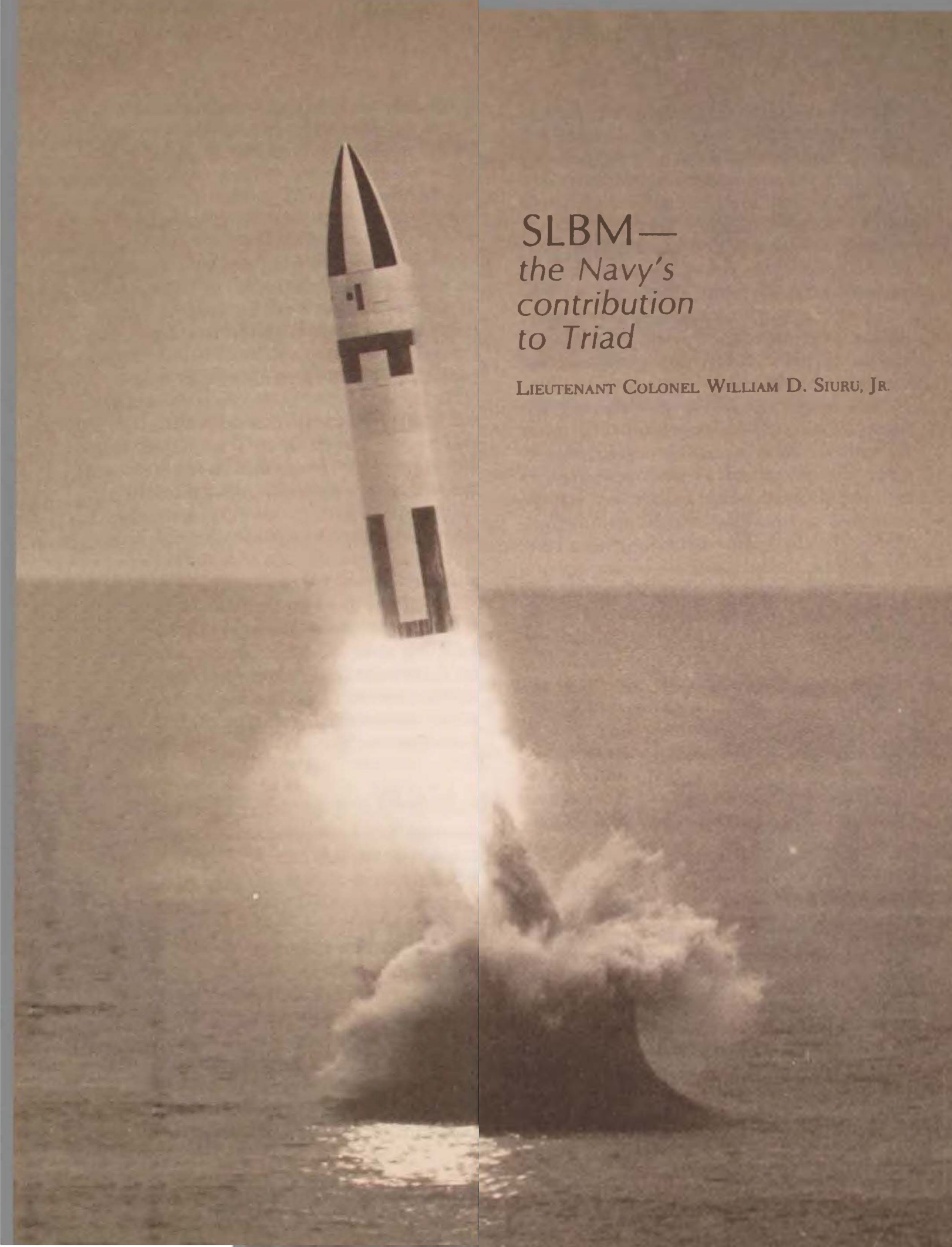
33. One legal objection to Project Jennifer is that the U.S. may have violated the law of the sea in clandestinely salvaging a vessel of another country in international waters.

34. A *radar* sensor inherently solves the correlation problem, of course, but an infrared sensor, alone, for example, has no way of determining how many separate targets are in its field of view.

35. George H. Heilmeier, "Guarding against Technological Surprise," *Air University Review*, September–October 1976, pp. 2–7.

The United States faces a state of insecurity in the future unparalled in our history. This grows out of the simultaneous existence of two basic factors. First, the juxtaposition in the world of the future of our great slow moving democracy, dependent for decision on the slow crystalization of majority opinion, side by side with powerful secret dictatorships, potentially capable of rapid aggressive action with little or no warning. The second basic factor is the tremendous recent advances of technology, making quite possible the delivery, relatively instantaneously, over vast distances, of powerful blows of such destructiveness as to be potentially decisive. Times have changed—and very much for the worse for us!

Major General Muir S. Fairchild
Editorial, *Air University Quarterly Review*
Winter 1947



SLBM—
the Navy's contribution to Triad

LIEUTENANT COLONEL WILLIAM D. SIURU, JR.

TODAY, the strategic deterrence policy of the United States is based on Triad, with dependence on its three elements —intercontinental ballistic missiles (ICBM), strategic bombers, and submarine-launched ballistic missiles (SLBM). There have been volumes written on Triad, explaining its merits and deficiencies, but its key attributes can be outlined quite simply. Each of the three Triad components contributes three quite different threats to the Soviet Union as a result of their individual operating environments, technical characteristics, and modes of deployment. Because of these distinct differences, Triad represents an enormous threat to the Soviets, one that takes a tremendous expenditure of national resources to counter, if indeed each component can be defended against to a satisfactory degree. The Soviets have invested heavily in a variety of detection and defense technologies.

In addition by having three elements, the United States is hedging against a Soviet breakthrough in one defensive technology that could degrade one of the elements. If a breakthrough does occur, the other two elements can still maintain a sufficient deterrence while the third one is upgraded to overcome its shortcomings. It is extremely unlikely that breakthroughs in defensive capabilities will simultaneously negate two or three elements. In other words, the United States has not placed its reliance on one deterrence system only.

By having three independent elements, the United States has a far greater chance to achieve and use its own technological breakthroughs to improve its deterrence posture. We have a threefold chance to create an improvement that will prevent the Soviets from exploiting their strategic systems or overcome a Soviet defensive superiority. What is even more important is that, because Triad is an integrated system, we can improve overall Triad deterrence capabilities by improving the element most amenable to upgrading at the time and the element that provides the greatest increment of improvement for the least investment of resources.

While each Triad element has key strengths, each also has weaknesses. However, the three elements complement one another so that a weakness in one element is compensated by a strong point in another. Thus when all three elements, each with its own unique capabilities, are taken as a whole, the sum of our deterrence posture represents an insurmountable obstacle to an opposing strategist. Even though he might be able to negate one or two elements, it is the entire Triad concept that deters. It is impossible to negate all three Triad elements simultaneously and hence avoid a retaliatory attack. Further, it should be noted that a single U.S. missile with its multiple warheads which slips through Soviet defenses still may represent an unacceptable amount of damage to the Soviets.

Finally, Triad gives the United States more bargaining power at the arms limitation negotiating table: we have more options and more items to be traded. A further confirmation of the validity of the Triad concept is the fact that the Soviets are adopting this three-element posture themselves.

what the SLBM contributes to Triad

While each Triad component has several advantages, the key advantage of the ICBM is its quick response and accuracy in hitting the desired target. For the strategic bomber, it is flexibility and the ability to be recalled after launch. The SLBM has its key advantage in its survivability and the difficulty it presents to enemy surveillance, detection, and defensive systems.

The SLBM submarine can go undetected in the vast ocean areas that comprise a major portion of the earth's surface. A U.S. nuclear submarine equipped with missiles that have a range of 2500 nautical miles, like the cur-

rent Polaris and Poseidon missiles, has millions of square miles of ocean to operate in and still be within range of targets in the Soviet Union.[1] Trident I missiles, destined for use in the early 1980s with a full payload range of 4000 nautical miles, will have access to even four-and-a-half times more ocean area in which to hide. The Trident II, planned for the mid-1980s, will achieve an even greater range and payload combination. Not only can the SLBM use vast amounts of the earth's oceans to avoid detection, it can stay away from port for relatively long periods of time, thus decreasing the possibility of its being trailed from port to its hiding place. The usual sixty-day tour on station is not dictated by the endurance of the submarine and its mechanical systems but is governed by the time the crew can remain in isolation without suffering severe decrease in efficiency and morale.

In addition, since the SLBM submarine can be constantly moving, the Soviets must keep real-time information on its position. They cannot just locate it once and file the position in the targeting computer. If they lose one submarine, they must detect it again because of the damage potential just one unaccounted-for submarine represents. Although antisubmarine warfare (ASW) capabilities are improving, there are still many countermeasures, decoys, and quieter submarines to counter these improvements. Thus, the SLBM's advantage from a detectability standpoint remains secure. And because the other Triad elements are contributing to the total deterrence picture, our deterrence capabilities are not degraded to an unacceptable level while these improvements are implemented.

In discussing the SLBM, one would be unfair not to point out some of its shortcomings and the environment in which it operates. The main defense a missile-carrying submarine has is the ability to hide: once detected and its position known, its effectiveness is degraded until evasive action can be taken to get lost again. Besides quieter operation and the use of decoys to confuse the enemy's detection systems, submarines can be made less detectable by operating mainly in regions of the ocean where storms and other ocean-produced noise mask the submarine's own sounds.

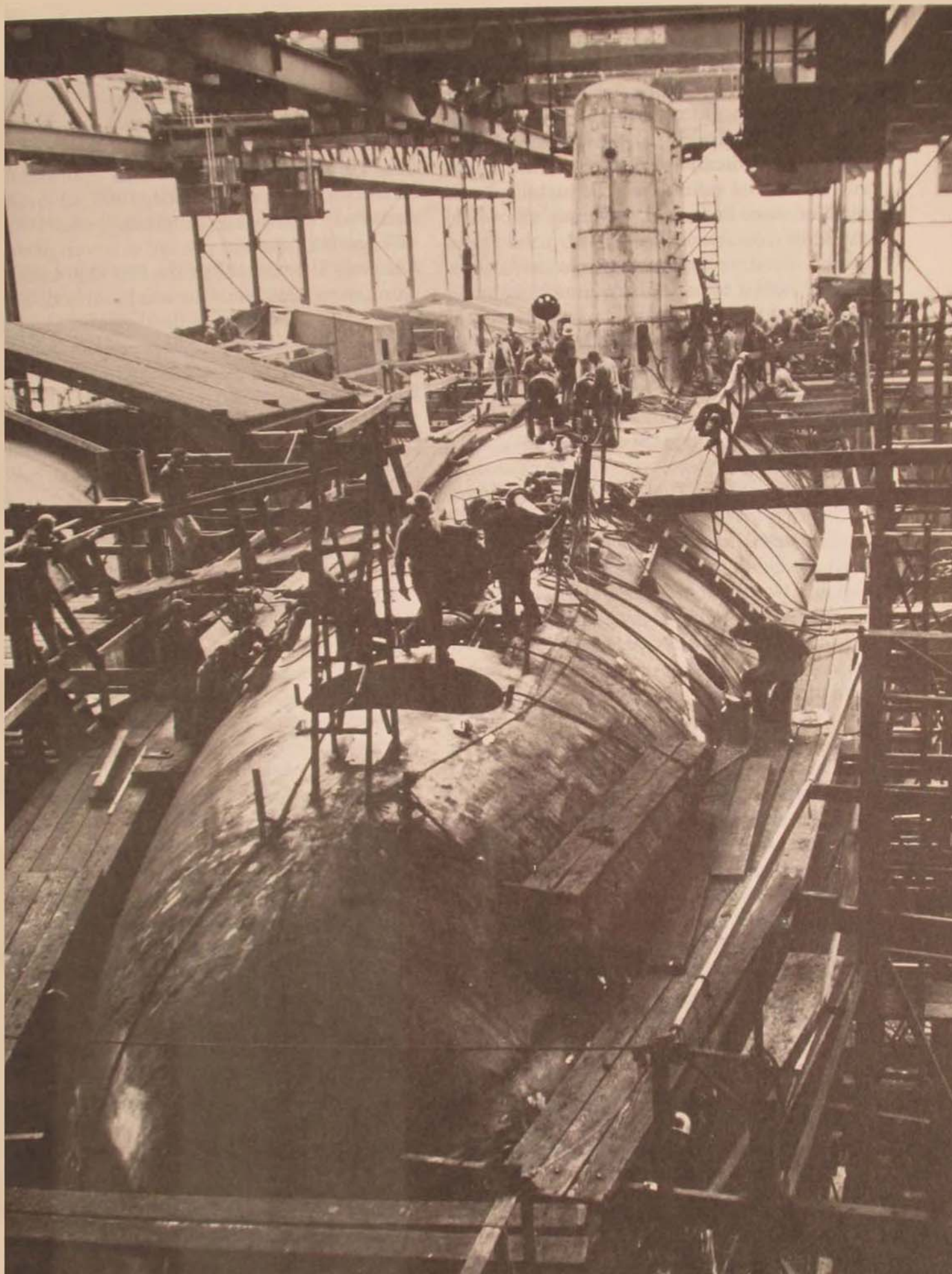
Because the submarine is a mobile launch point, it is difficult to know its precise location continually. Thus, since the starting point is an important part of a ballistic trajectory computation, the SLBM's accuracy on target is degraded in comparison to the land-based ICBM. Inasmuch as the SLBM carries 16 missiles—or in the case of future Trident boats, 24 missiles—a portion of the force is located in a single spot. A loss in capability occurs when the submarine is in port for repairs or crew change as well as when it is knocked out by enemy action. However, the SLBMs can be launched from port and still reach their targets. Also, in times of tension, more boats would be on alert.

Communications and command and control present some difficulties for the submarine force although not insurmountable. Very-low-frequency radio signals can penetrate a short distance into the water, so the National Command Authorities can be in communication with the submarines without their needing to surface and expose themselves.

Fortunately, weak points in the SLBM are compensated for by the other elements of Triad, and the SLBM is allowed to contribute its unique capabilities in the area of survivability and undetectability. The less accurate SLBM is still sufficiently accurate for "soft" targets such as industrial complexes and strategic bomber bases. The ICBM and bomber-based delivery systems, with their yield/accuracy combination, can be targeted against the "hardened" targets such as ballistic missile sites, hardened command centers, hardened industrial targets, etc., where es-

Continued on Pg. 22

The world's first nuclear-powered submarine, the Nautilus *(above) was launched in 1954 by the United States Navy, at the Electric Boat Company, Groton, Connecticut. . . . The A-2 Polaris missile was first launched from the U.S.S.* Ethan Allen *(below) off the Florida coast in October 1961. . . . The first successful underwater launch of a Polaris submarine-launched ballistic missile (SLBM) occurred in July 1960, from the U.S.S.* George Washington. *The* Washington *(right) is shown as it was readied for launching on 9 June 1959, by workmen at the General Dynamics Corporation's Electric Boat Division shipyard at Groton.*



sentially a direct hit is mandatory to achieve destruction.

Under normal world conditions, the usual number of missile-carrying submarines in port and going to and from station can be tolerated since essentially the entire ICBM force is continually on alert. Both the ICBM and the SLBM suffer from the inability to be recalled once launched. At times, the world situation may dictate that the United States merely indicate a show of force or national resolve rather than actually launching an attack. The strategic bomber offers this recall capability as well as several other unique features to Triad.

There is a point of controversy between the advocates of sea- and land-based ballistic missiles. Some proponents of the SLBM state that placing our deterrence force at sea decreases the chance that our country and especially its urban areas would be destroyed in a nuclear holocaust. If only our SLBMs were attacked, it would churn up the oceans a bit and we might lose some submarines and their crews, but our cities could go undamaged. But this is only part of the story. By having a single system to counter, the enemy has a much simpler targeting problem, just as if we used bombers or ICBMs alone. Additionally, the enemy might feel that we would not launch an attack if our submarines started to be destroyed. The United States would probably think twice before launching the remaining SLBM force against enemy cities, and because of the relative accuracy (or inaccuracy) of the SLBMs, they can be used effectively only against population and industrial centers. Such an attack would risk a retaliatory response against our cities, an unacceptable result. Thus, the U.S. could be subjected to nuclear blackmail and required to submit to enemy demands. As a result, the entire concept of deterrence would be undermined. It is only because of our maintenance of three viable elements of Triad that the enemy would hesitate to launch any type of attack. Consequently, we must retain a creditable deterrence posture.

history

The United States has had an operational SLBM force since November 1960, when the first Polaris-carrying submarine, the U.S.S. *George Washington,* put out to sea on patrol. This was five years after the first U.S. nuclear submarine, the *Nautilus,* was launched. This five-year period was needed to develop a solid propellant missile system to launch an SLBM from a submerged submarine. The first successful underwater launch of a Polaris missile occurred in July 1960, again from the *Washington.* A total of five submarines were fitted with the 1200 nautical-mile-range A-1 Polaris missiles.

To improve the capability of the Fleet Ballistic Missile (FBM) force, the 1500 nautical-mile-range A-2 Polaris was developed. The A-2 was first launched from the U.S.S. *Ethan Allen* off the Florida coast in October 1961. Eight nuclear submarines were equipped with the A-2 missile.

The next generation Polaris missile was the A-3, with a 2500 nautical mile range. Even though this Polaris fit in the same launch tubes as its predecessors, it was an 85 percent new missile.[2] Besides an increase in range, each missile now carried three warheads; however, they were not independently targeted but were designed to hit a target in a prearranged pattern. The first A-3 was launched from the U.S.S. *Andrew Jackson* in October 1963. A month later, President Kennedy watched the launching of another A-3 at Cape Canaveral. The A-3 became operational with the deployment of the U.S.S. *Daniel Webster* in September 1964. A total of 33 boats were equipped with the A-3, including the original five A-1 carrying boats which were refitted with the A-3. The A-3 equipped boats represented a significant in-

crease in deterrence capability, for with a 2500 nautical mile range this missile can reach any target on land.[3] By 1967, the U.S. had 41 Polaris submarines carrying either A-2 or A-3 missiles on patrol.

The next SLBM was so different from the Polaris that it was given a new name, Poseidon C-3. While the Poseidon was based on Polaris technology and still fits the same tubes, it was a larger, heavier missile. The most important difference was Poseidon's multiple independently targetable reentry vehicles (MIRVs). The first launching of a Poseidon from a submarine occurred in August 1970 from the tubes of the U.S.S. *James Madison*. The first C-3s became operational with the deployment of the U.S.S. *Madison* in March 1971.

Currently, the FBM force consists of Polaris A-3 and Poseidon C-3 missiles. Ten submarines are carrying the A-3, while the remaining 31 have been fitted with the C-3. The earlier A-1 and A-2 versions of the Polaris have been retired.

systems

Submarines. There are three classes of Fleet Ballistic Missile submarines in operation. The early five boats of the George Washington class with their 382-foot lengths and 6700-ton displacements carry the A-3 Polaris now. The boats of the 410-foot, 7900-ton Ethan Allen class also launch the A-3. The Poseidon-carrying boats consist of 31 Lafayette-class submarines with their 425-foot lengths and 8250-ton displacements. The submarines are powered by steam turbines that get their energy from water-cooled nuclear reactors. With an atmospheric control system of immense capacity, the submarine does not even have to raise a snorkel to obtain air. If it were not for the needs and endurance of the human crew, these submarines could stay on station almost indefinitely. Each submarine carries a crew of 12 to 14 officers and about 130 enlisted personnel, and each has two crews, a Gold and a Blue one. While one crew is on patrol, the other is in port training, orienting new crew members, taking leave, and in general getting ready for the next cruise. Normally, the submarines are on station for sixty-day periods.

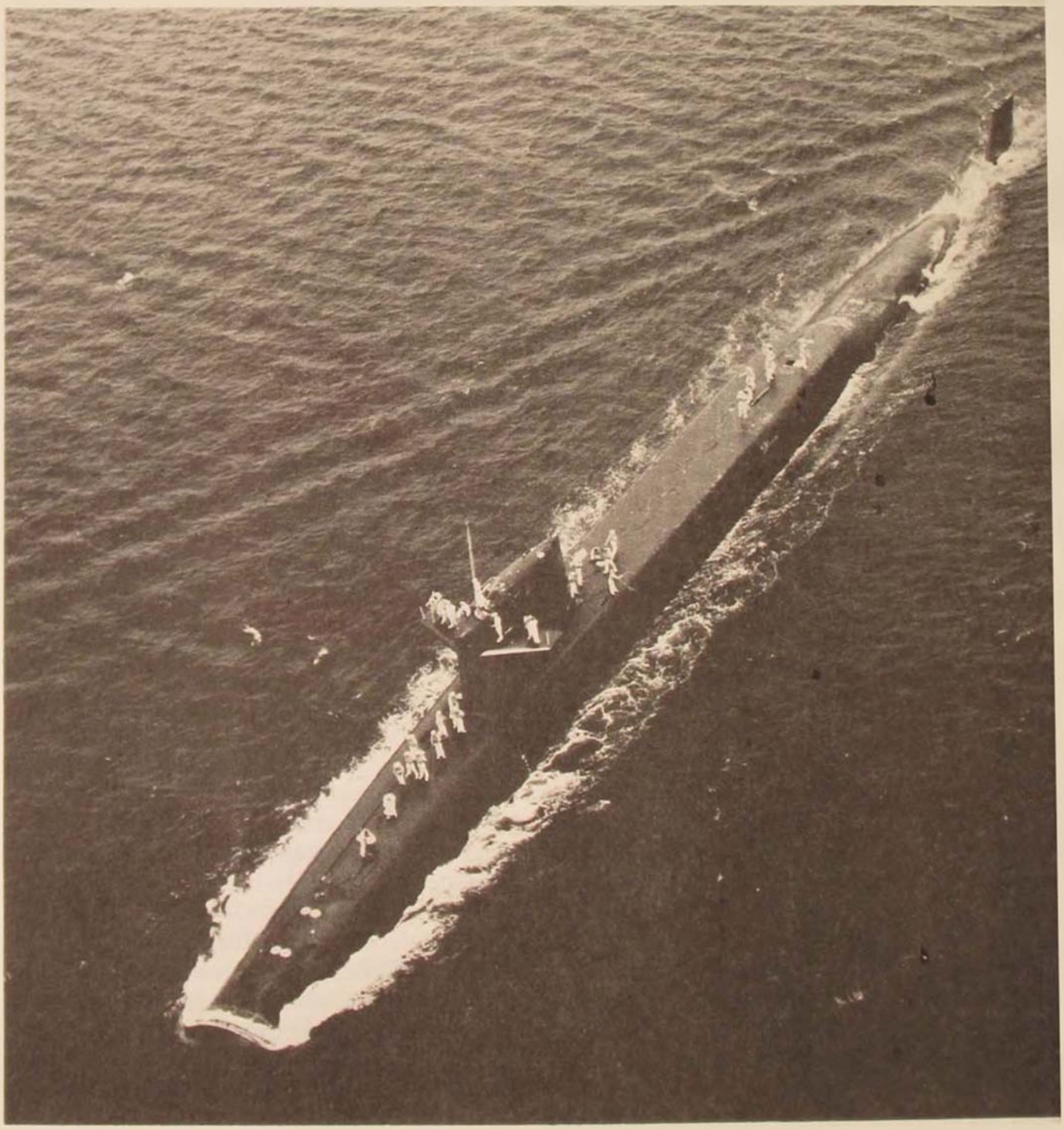
The Polaris and Poseidon missiles are launched from the submarine's 16 tubes while the craft is submerged and out of sight. The missile is ejected from the tube either by compressed air or by a gas and steam generator system. Once the missile reaches the water's surface, the first stage of the missile is ignited and sent on its way. There is access to each of the 16 independently controlled launch tubes even during patrol at sea for performing inspection and maintenance of the missiles.

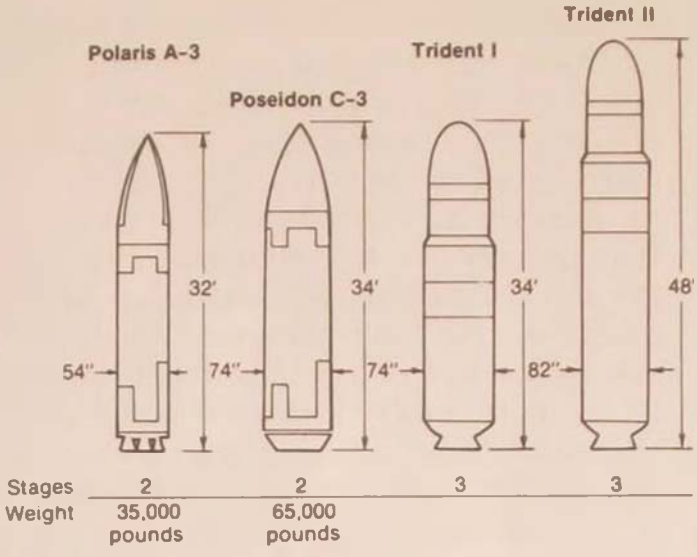
Missiles. The Polaris's two stages are filled with solid propellants. The first stage of the A-2 version of Polaris used a steel case, while its second stage and both stages of the A-3 have glass-fibre cases. Incidentally, the Polaris was the first large solid-rocket motor to have a glass-fibre case. The A-3 is 32 feet long, an inch longer than the A-2, both missiles having a 54-inch diameter. The A-2 and A-3 have total weights of 30,000 and 35,000 pounds, respectively. The Poseidon is also a two-stage missile with its solid propellants carried in glass-fibre cases. The Poseidon has a substantially larger payload capacity, achieved mainly by its larger size which allows it to carry as many as 14 MIRVed warheads. It is 34 feet long, has a 74-inch diameter, and weighs 65,000 pounds.

The Polaris and Poseidon missiles have inertial guidance systems for directing the missile on a ballistic trajectory after launch from the submarine tubes. The system compensates for winds and other flight effects, keeps the missile in a stable flight attitude, and triggers the separation of the reentry vehicle (RV) from the missile to allow the RVs to

Poseidon highlights

The next SLBM was a larger, heavier missile, the Poseidon C-3. Below, arriving in Apra Harbor, Guam, is the Poseidon-carrying submarine U.S.S. Tecumseh. . . . *The first launching of a Poseidon from a submarine occurred in August 1970 from the tubes of the U.S.S.* James Madison. *In the Atlantic Ocean (facing page, left), a Poseidon missile is launched during demonstration and shakedown number one from the nuclear-powered* Madison. . . . *An artist's sketch (facing page, right) indicates the payload capacity of old and new large missiles. The Polaris A-3 is 32 feet long, has a 54-inch diameter, and total weight of 35,000 pounds. The Poseidon C-3, also a two-stage missile, has a larger payload capacity. The Navy has added a third stage, the Trident I and II, to get more than 4000 nautical miles range out of the now somewhat larger 74-inch diameter by 34-foot package.*





continue on their ballistic trajectories to their targets. In order for the SLBMs to reach their targets accurately, very precise targeting information must be fed into the missile guidance memories prior to launch. Since the trajectories change as the submarine moves around, trajectory input data must be constantly updated. This is the function of the Polaris/Poseidon's fire control system. This system consists of a high-capacity digital computer that takes data such as the submarine's location, the local vertical direction, true north, and the target location and updates trajectories for each of the 16 missiles every few seconds. This system can prepare missiles for launch at a rate of one about every minute.[4]

Support facilities. There is more to the FBM fleet than just the submarines and missiles. First, there is the worldwide communications newtwork that ensures positive control over the launching of the missiles to assure that they can be launched if necessary at the command of the President. Land-based, airborne, and satellite transmitters all play a part in this network. By use of very-low-frequency radio transmitters, positive control can be maintained with the always submerged submarines without revealing their locations.

Then there is the fleet of support vessels, including several submarine tenders for maintaining and resupplying the submarines while at sea and transports for carrying mis-

siles. A converted cargo ship, the U.S.S. *Compass Island* is used to verify the accuracy of the navigation systems of the submarines which pinpoint their location at all times. A specially configured Operational Test Instrumentation Ship, the U.S.N.S. *Range Sentinel,* is used for flight safety and to gather telemetry data during operational test flights of the missiles.

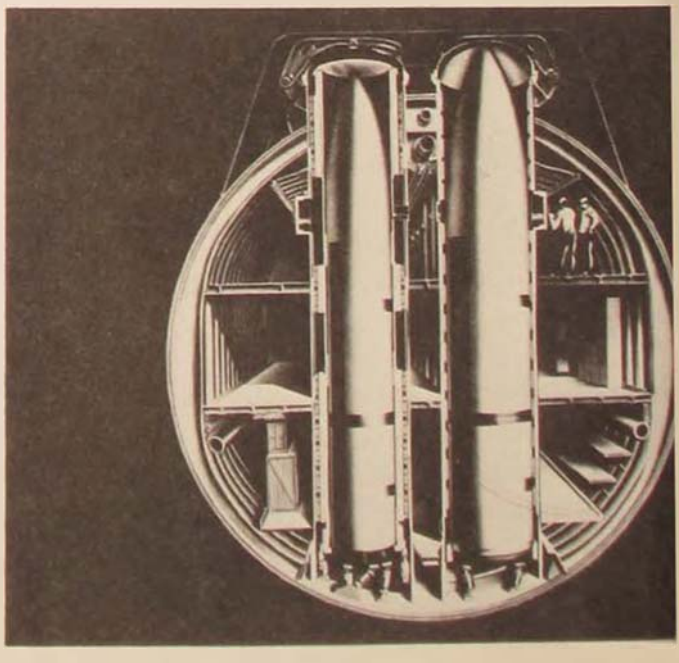
Finally, there are the land-based support facilities. Several shipyards on both the East and West Coasts not only built and initially fitted-out the boats but they also overhauled and refitted the new types of missiles and modernized the submarines themselves. To train the crewmen to meet the highly technical and demanding jobs aboard an SLBM submarine, the Navy has several specialized schools that teach everything from basic digital computer theory to nuclear power-plant operation. There are initial training schools that convert basic recruits to missilemen as well as advanced and refresher courses in every aspect of FBM duty. Since the FBM fleet uses both the Atlantic and Pacific oceans, operational support facilities are located on both coasts. Missile assembly facilities at Charleston, South Carolina, and Bangor, Washington, can assemble missiles from completed subsystems and sections supplied by contractors, check them out, store them, and finally load them aboard submarines, their tenders, or resupply transports. Naval shipyards at Charleston and at Bremerton, Washington, are equipped to perform maintenance and check-out of the submarines themselves. Finally, there are extensive facilities and test ranges used in developing and testing the entire SLBM system. The chief testing site is at the Air Force Eastern Test Range at Patrick Air Force Base, Florida. Here are the launching pads and blockhouses in addition to all sorts of missile assembly, check-out, instrumentation, supply, and administration buildings needed for development launches of new missiles. Additional testing is done at such locations as the Pacific Missile Range off the coast of California and at the Navy's China Lake facility in the heart of the California desert.

Trident I and II

The Navy currently has new missiles and submarines under development. They are the Trident I and II missiles, which use advances in technology to achieve greater range and accuracy.* There are also the new, larger Trident submarines, which will carry

*TRIDENT Test Successful. Navy's new TRIDENT ballistic missile was successfully test-fired in late April from a pad at Cape Canaveral, Fla., with all three stages working. This was the fourth test and some 20 to 25 more pad launches are scheduled before submarine launches are to be tested sometime in the summer of 1979. *Commanders Digest*/May 12, 1977, p. 4.

Currently, the Fleet Ballistic Missile force consists of Polaris A-3 and Poseidon missiles. Both systems installations are seen below. . . . Missiles are launched from the submarine while the craft is submerged and out of sight. At the Newport News shipyard (facing page), the 16 missile tubes of the U.S.S. Sam Rayburn *are seen. Poseidon C-3 missiles are now carried in these tubes.*



more missiles, use new technology to be quieter and faster, and employ advances in command and control techniques. They will be replacing the older of the Polaris/Poseidon boats, which will be reaching their projected twenty-year service lives by the early 1980s. By 1987, all the current 41 FBM submarines will be more than twenty years old.

The Trident I missile is designed to fit the same missile tubes as the Poseidon but achieve almost twice its range. Ten of the Poseidon boats will be fitted with these new missiles. In order to get more than 4000 nautical miles range out of the 74-inch diameter by 34-foot package, the Navy has done many things. First, a third stage has been added. Second, more energetic and denser propellants are packed into all stages to provide more efficient use of the propellant load.

Finally, many of the missile components have been made lighter so that weight saving can be applied to increasing range. More compact and lighter microelectronic circuits have been used in the design. Graphite epoxy materials have been substituted for aluminum, giving the same strength for half the weight in many of the missiles's load carrying structures. The nose of the Trident, which is subjected to searing temperatures while flying through the atmosphere, has a unique design. First, the nose is made of Sitka spruce wood. This material can sustain the heat load, is a good insulator, and is able to handle the loads during hoisting and loading aboard the submarine. Buried in the nosecap is an aerospike device that pops out during flight. At supersonic speeds, a shock wave is formed on this spike and drastically reduces the drag on the blunt, ogive-shaped nose of the missile. The postboost control system that drives the missile payload to the right location so that the warheads can reach the proper target is designed to operate at higher temperatures, thus reducing the weight for its thermal protection equipment. In all, these nonpropulsion items contribute hundreds of nautical miles of increased range.[5]

The first Poseidon submarine will be refitted with the Trident I missile in fiscal year 1979, and a total of ten submarines will be refitted through FY 1982. Although a goal of the Trident design was to retain as much commonality with the Poseidon missile as possible, the Trident will use about 30,000 individual pieces of equipment different from those in the Poseidon.[6]

A second generation Trident missile is also being planned for the 1980s. This is the larger Trident II missile which will capitalize on Trident I technology. In addition to the new missile, new submarines are also being built. These are the larger Trident boats with their 24 missile tubes. These boats will be made quieter and faster by using improved nuclear power plants. For example, for quieter operation, the submarine will use quieter air reducers and will be equipped with advanced sound isolation. These new boats will be fitted initially with Trident I missiles; however, by the mid-1980s they will be operational with Trident IIs aboard. The Trident submarines will be considerably larger than the Poseidon boats, 560 feet long versus 425 feet. This additional size will not only accommodate eight additional missiles but will allow more room for the crew, which will be essentially the same size as the current crews.

The increased range of the Trident system will provide for more than just a larger portion of the ocean in which to hide. The increased range allows basing to be entirely within the continental United States, thus eliminating costly and sometimes politically unstable overseas bases. The Trident-carrying boats can be on station virtually as soon as they leave port. This means more time on station during each patrol. So in reality there will be more missiles ready for launch at any one time.

For the Trident system, the Navy plans to have ship refit, missile support, base support,

and crew training located entirely within the United States. This means reduced personnel costs and greater stability for the crews and their families. When not at sea, the men will perform all the shore preparations and training at home, greatly reducing travel costs and hopefully increasing the retention rates of the highly skilled but volunteer crewmen. Although Polaris submarines have operated in the Pacific since 1964, basing of the Trident system in the Pacific will, in conjunction with the Atlantic-based Poseidon force, confront the Soviets with an extensive two-ocean threat. This threat will be expensive to counter and probably could not be very effectively countered without bases near the coastline of the United States.[7]

THE CONCEPT of Triad was perhaps best summarized by Secretary of Defense Donald H. Rumsfeld during Hearings before the House Armed Services Committee in support of the fiscal year 1976 military budget.

> U.S. strategic nuclear deterrence continues to be based on a Triad of strategic forces. These forces are designed to ride out a surprise attack and retaliate in a controlled second-strike at Presidential direction. A combination of ballistic missiles—land- and sea-based—and heavy bombers is necessary to diversify the strategic forces sufficiently, so that neither system failures nor enemy ingenuity could prevent retaliation. Responsive command and control of these forces is essential to deal with the possibility of less than all-out attacks and to terminate a nuclear exchange at the earliest moment possible if, despite best efforts, deterrence should fail.[8]

The United States SLBM fleet has contributed its unique capabilities of survivability and deception to Triad for over a decade. Polaris and Poseidon have served well and will continue to do so for some time into the future. However, this capability will be augmented by an even more capable system, the Trident missile and submarine.

United States Military Academy

Notes

1. Herbert Scoville, Jr., "Missile Submarines and National Security," *Scientific American*, June 1972, p. 18.
2. "Polaris and Poseidon—FBM Facts," Strategic Systems Project Office, Navy Department, 1973, p. 7.
3. Ibid.
4. Ibid., p. 13.
5. Clarence A. Robinson, Jr., "New Propellant Evaluated for the Trident Second Stage," *Aviation Week & Space Technology*, 13 October 1975, p. 15.
6. "Trident Subsystem Tests in Final Phase," *Aviation Week & Space Technology*, November 3, 1975, p. 38.
7. Tom Nugent, "The Trident Story," *All Hands*, February 1975, p. 6.
8. Statement by the Honorable Donald H. Rumsfeld, Secretary of Defense, Hearings on Military Posture before the House of Representatives' Armed Services Committee, 94th Congress, 27 January to 11 February 1976 (U.S. Government Printing Office: House Armed Services Committee, 94–13).

The illustrations for this article are official United States Navy photographs.

CAPTAIN FRANK J. DERFLER, JR.

NO, YOU don't need to check either your shot record or your musket. These micros are both infectious and revolutionary, but they really are here to help—and you will be glad to have them. The micros in question are microprocessors and microcomputers. Here at last is a technical breakthrough that is coming to the aid of the poor, beleaguered staff officer as well as the operational guy.

Presently, waiting in the wings of the United States electronics industry, are a device and a series of systems, which are in the same sleeper state that citizens band radio was ten years ago. The microcomputer, a kind of miniaturized computer, is perhaps a bit less flexible externally, a trifle more specialized, as "powerful" as the room-filling monsters of a few years ago, about the size of an office typewriter, and . . . cheap!

Recent (circa 1962) developments in large-scale integrated (LSI) circuit technology have led to the development of chips that can do the computing (binary counting, actually) of many sections of previous generation computers. The microprocessor chip is smaller than a ten-cent vending machine candy bar and can do the work of the desk-size central processing unit (CPU) of a computer younger than the new OER system. This microprocessor is combined with input-output devices (a cathode ray tube, keyboard, and possibly a photocopier) and memories, and the system is then called a "microcomputer." These microcomputers are not just small calculators. A computer carries out a whole chain or program of instructions automatically whereas a calculator does just one or perhaps a few steps at a time. To do anything with a calculator, one must enter the numbers through the keyboard and then enter what needs to be done with them (add, subtract, etc.).

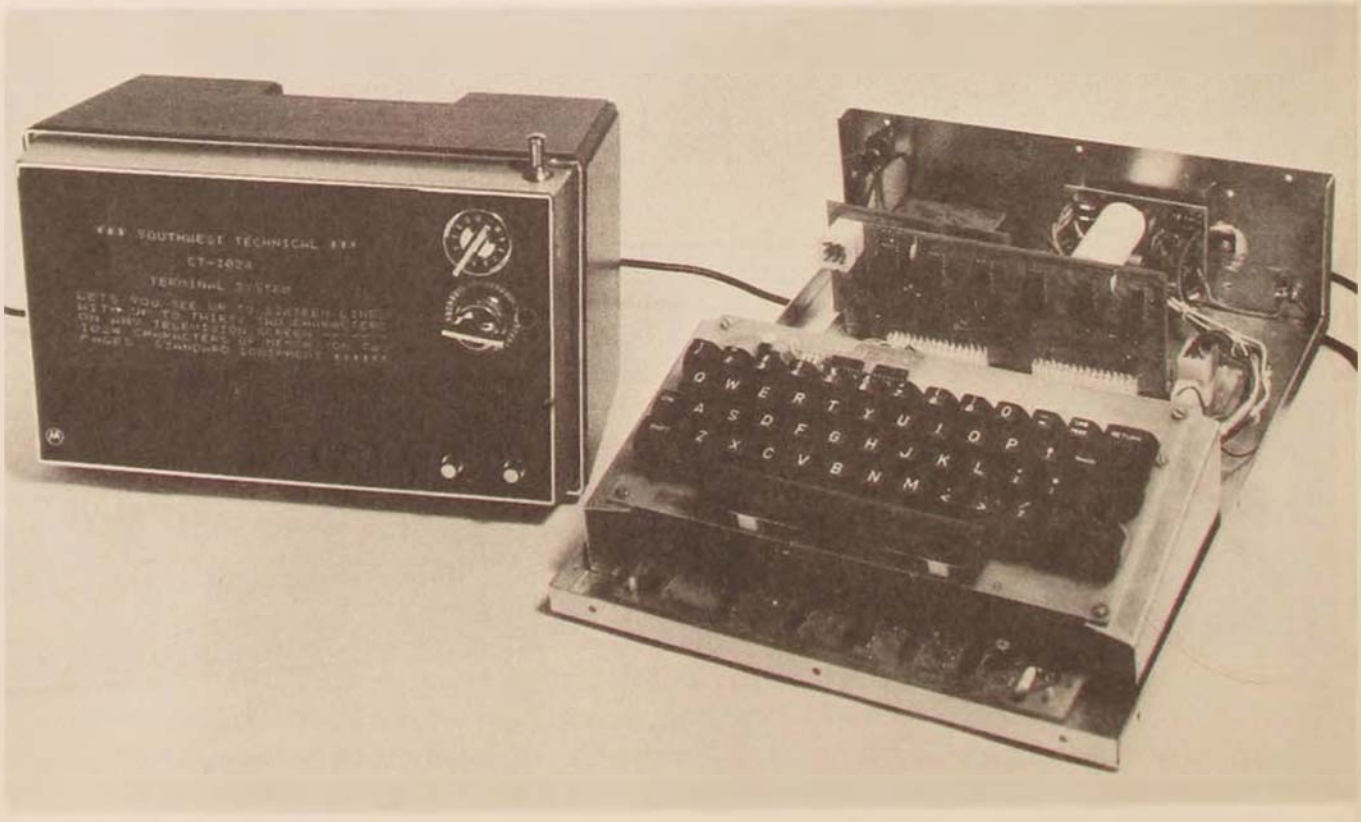
The calculator has an "instruction set" wired into it. The microcomputer has a set of instructions provided in the stored program. As the number of microcomputers increases, the cost of these programs will be reduced drastically. The same is true of the hardware.

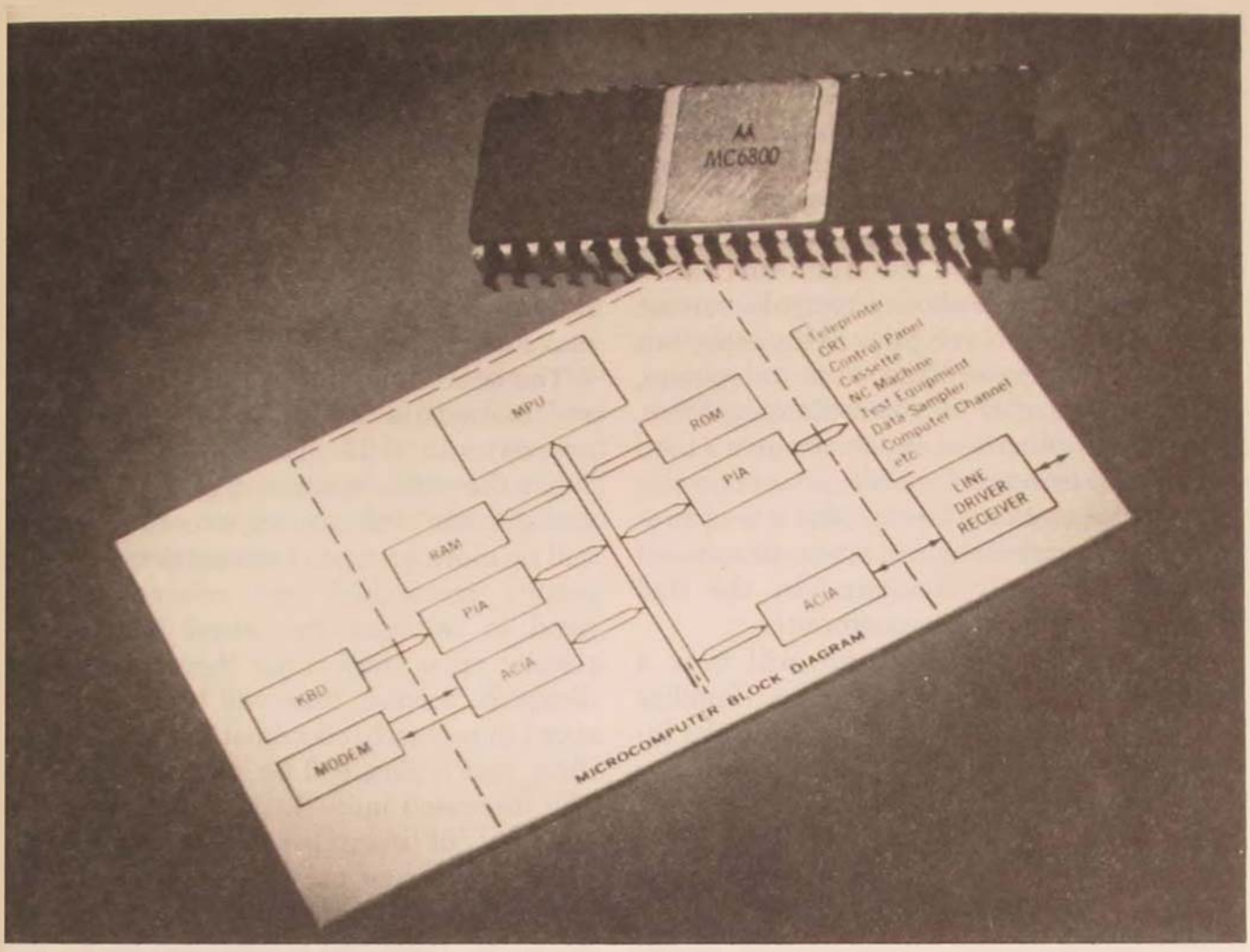
A microcomputer in mid-1977 cost between $1000 and $5000 with an internal memory of up to 64,000 computer "words." This memory holds the program and the most immediate data being manipulated. It

Microcomputer systems are available that use inexpensive tape cassettes as the memory.

can be supplemented by tape or disc memories that can hold up to a million computer words (about 20,000 English words) in file. The key here is memory. Processing has become cheap and is getting cheaper. Memory for computer systems is still expensive, but some functions can be performed very well with limited and slow (cheaper) memory systems. Systems using things called "charged coupled devices" and "bubble memories" will be available in mid-1978 at greatly reduced prices. The microcomputer companies (not the big computer boys yet) are selling computer systems with programs for bookkeeping in a small business, limited-inventory control, and for letter/document writing, correction, and transmission. In short, they are providing a device that can economically file away information, retrieve it quickly when needed, display it logically, and help to compose written correspondence about it—all functions of a good staff officer. Here, then, is the breakthrough for the staff officer I mentioned in the introduction. My prediction, based on knowledge of computers, staff work, and faith in marketing ingenuity, is that within 10 years we will find a microcomputer at every branch level of every major staff agency in the Air Force. Even so, military procurement will lag behind that of small business and "consumer" electronics. Those who are partial to gadgets (those who own both a microwave oven and a trash compactor, for instance) will have microcomputers doing the family books (even taxes!) and aiding in a thousand ways before they become evident in our offices. Let us look, then, at the staff officer/microprocessor

Smart terminals not only display information but also manipulate the data and remember what they display.





The highly compact microprocessor chip is the brain of the microcomputer.

interface and see what benefits we can find for the individual and the Air Force.

A recent straw poll around PACAF headquarters showed that about 35 percent of the staff officers have hand calculators of varying capabilities immediately available. They have provided these devices at their own expense. It can be inferred that these officers:

(a) frequently have to compile data in the form of numbers,

(b) cannot add, and

(c) need to save time in the statistical process.

Research for statistical and detailed information forms an ever increasing portion of the staff officer's workload. Officers with no training in money management are constantly being asked—How much will it cost? Another large portion of the workload consists of expressing, editing, and coordinating that which has been researched. Proper words, format, and style must be used. In all these major staff officer actions, a microcomputer can be of invaluable aid. It can, of course, do math like any calculator, but it can also indefinitely remember what it does, the

details and background behind the numbers used, and provide for a great many variables and variations. After the question of "how much if" has been quickly answered, our lucky staff officer of five years from now will only need punch up "format"—staff "summary"—and start inputting his draft. Certainly a few places on base now have word processors that will allow a typist to correct mistakes and then retype a clean copy, but the microcomputer can, via telephone, transmit the paper to a coordinating office, show the coordination, and finally give a hard copy to the command section or anyone else who wants it, automatically. Data storage, retrieval, manipulation, and transmission—all will be immensely facilitated by the staff officer's friend, the microcomputer.

The typical microcomputer will bear a physical resemblance to more familiar remote terminals, recognizable by similar input-output devices. Those remotes are presently called "dumb terminals," because they only repeat what they are told and cannot manipulate the data in any way. Remote (dumb) terminals must give and take everything with the central computer. This system does have the one advantage of centralized memory—only one memory must be updated as things like base loading figures and other details change. Everyone is working from the same base line data. A method of bringing this advantage into the microcomputer idea is through the use of "smart terminals." These microcomputer "smart terminals" augment their own internal memory by referencing a central memory as needed. Certain data common to all staff agencies can be placed in a central memory and updated as needed. Items unique to each staff agency and branch can be kept in the microcomputer, along with instructions for manipulating and comparing the data to satisfy special needs. Agencies with little need to reference base line data could do very well with an isolated microcomputer that receives updated information on cassettes from a central library if and when needed.

There are many cost/flexibility trade-offs among the systems available, and alternatives will be selected to meet requirements. In most cases, however, the capability of the microcomputer to manipulate data for the individual staff officer without using valuable time on an expensive computer system will make its choice a cinch.

The benefits to the Air Force can be many and immediate. First, accuracy will be improved, and wild guesses will be fewer. While the old computer adage "garbage in—garbage out" still applies, overall staff work will be more accurate because details will be readily researched and referenced. The need to reinvent the wheel because the regular crew chief is not there will greatly diminish. Second, time will be saved. Time spent in research, coordination, drafting, editing, and typing will be greatly decreased. The increased individual capability may be used to cut manpower or produce more work, depending on the need. Finally, the detail that so often trips the action officer will be better. Inscribed somewhere in the staff officer hall of fame is the following phrase: "It isn't what we don't know that gets us into trouble. It's what we think we know—but don't." With this filing system at our fingertips, the microcomputer will enable us to be sure of what we know—and don't know.

If we look at the "school solution" for defining a staff study, we find this outline:

Problem
Factors bearing on the problem
Discussion
Conclusion
Recommended action.

The most time consuming and detailed entry is "Factors bearing on the problem." The subheaders under this section all deal with facts and their characteristics. Questions like can the facts be proved, supported, defined? Are all pertinent facts available? It is in this

section, the most lengthy in the staff work problem, that the microcomputer can make its strongest contribution. Certainly, it can help in other areas, such as providing graphic displays for illustration, but in the area of remembering, cataloging, and retrieving facts for an individual, the microcomputer reigns supreme. The staff officer inquiry process does not demand speedy memories, just big ones. Relatively slow but big memory systems (tape cassettes, for instance) are available now at moderate prices. The facts and details in the staff study will be accurate, and more valid comparisons of alternatives will sparkle in the discussion points with the help of a microcomputer.

There is very little that any one individual can do at this time to anticipate or precipitate the staff officer/microcomputer relationship. The timing of this link up will depend on the maturation of appropriate software and the aggressive marketing of similar systems for private industry. The time will come soon, however, when some aggressive action officer will be given the project of determining the value and impact of having microcomputers readily available to the individual project officer. When he gets that job, I hope he thinks back to this article and then does the thing we are all pointed toward—a good piece of staff work!

Hq Pacific Communications Area

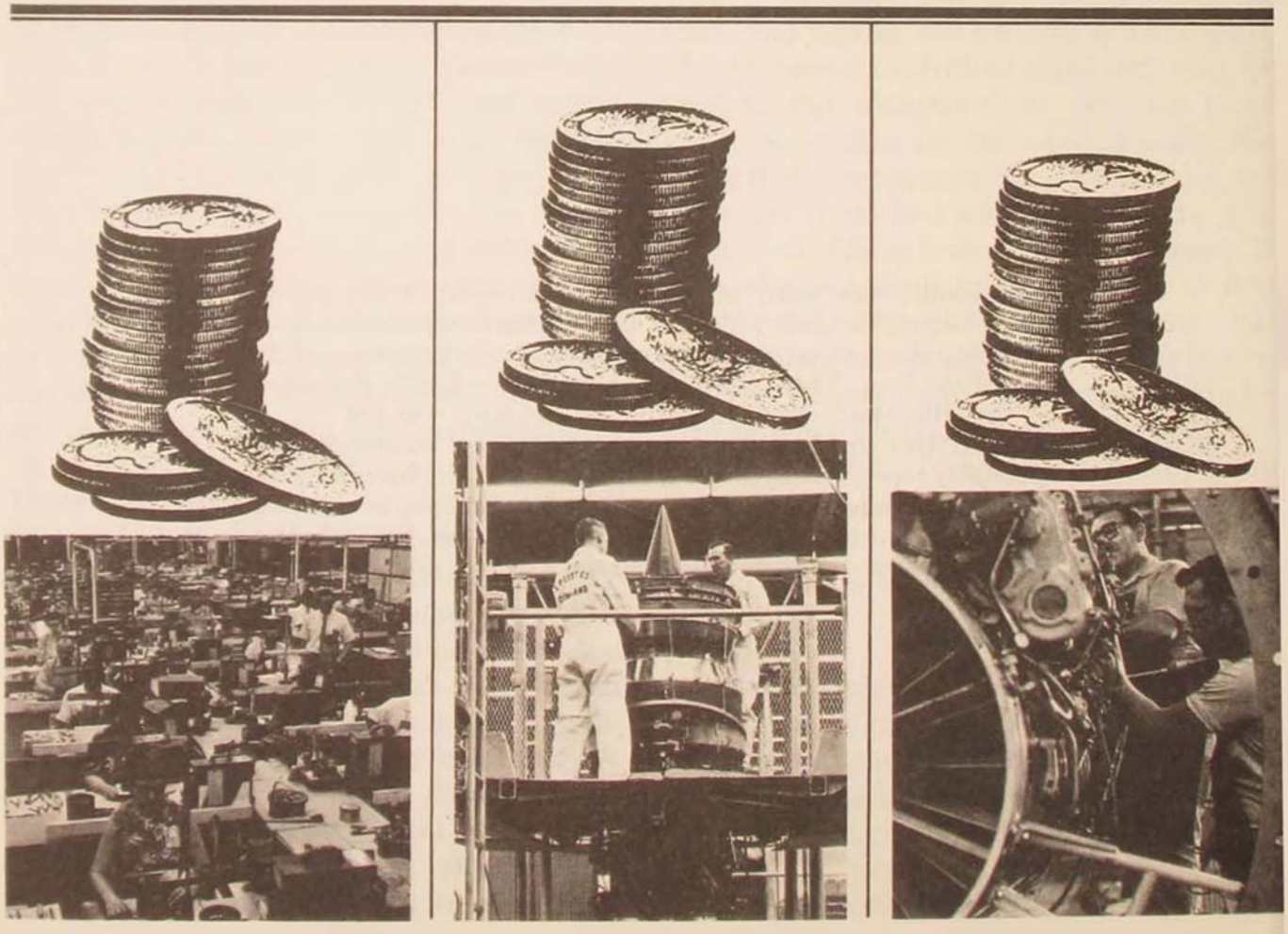
We wonder how many other sharp-eyed readers there are besides Glenn H. Chase, Jr., and D. W. Hitew who wrote in to question the caption accompanying a photo on page nine of the May-June issue. Their point, which cannot be lightly dismissed, is that the Mediterranean harbor of Leghorn was not " . . . choked with wrecked ships as a result of Allied bombings," but probably represents a deliberate scuttling, judging from the position of the ships. Our defensive rejoinder was that, in any case, the photo illustrates interdiction—theirs or ours. Nevertheless, our Art Editor awaits the lash, and the Editor is doing penance.

air force review

READINESS

a logistician's view

General F. Michael Rogers



DURING the past year, the Air Force has made an intensive effort to assess and improve the readiness posture of its combat forces. As this review progresses, certain key issues must be addressed. At the risk of appearing parochial, I should like to stress the part played by the logistic segment of the triad of strategy, tactics, and logistics.

Here is not the time to belabor the issue of "equivalence." The equality of strategy, tactics, and logistics in military operations is a fact long acknowledged by competent military writers.[1] Nevertheless, I sometimes feel the necessity to speak out in an advocate role —occasionally as the devil's—when logistics appears slipping in relative importance. Support of strategy and tactics is the key mission of the logistics process; without logistical support there can be no effective strategic or tactical operation.

Indeed, the old maxim "The Air Force's mission is to fly and fight" carries special significance for the Air Force Logistics Command. Our contribution to force readiness is an essential one, and without a responsive logistical support capability, our first line weapon systems would become little more than static displays. But fortunately for us all, AFLC has achieved its main task of improving materiel support to our forces while keeping wartime surge requirements foremost in its thoughts and actions.

The environment within which the Defense Planning, Programming, and Budget processes operate tends to obscure the objectives that guide the Air Force's war planning. The allocation of dollars, or the budgetary portion of this process, is geared primarily for a peacetime mode of operations while planning rightfully stresses the wartime mode. Simply stated, we are tasked to prepare for war, but we are being funded for peace. The resulting dichotomy adversely affects our readiness posture. The solution lies, in part at least, in achieving a balance of resources by integrating both peace and war requirements into the programming process. The Systems and Resources Management Action Group (SRMAG), in fact, addressed this issue in their Management Proposal No. 4, "Integrated Mission Area Analysis."[2] The introduction and successful application of this proposal could provide the Air Force with a management tool that will enhance our ability to combine our objectives, plans, programs, and budgets into an active readiness context.

To establish the role of logistics in the readiness equation, let us take a macroview of the logistics system and its critical interfaces. (See Figure 1.) Wartime scenarios establish the force posture needs. The Logistics Command translates the wartime planning scenarios and resultant force activity levels into materiel resource requirements. From these requirements we determine the resources, processes, and workloads that must be established and funded. But note that there is a return route within the system. If constraints (such as reduced funds) are placed on any component within the logistics system, there is a reduction in capability that in turn limits our support of the operational forces. If there were no constraints placed on the system, there would be no problem; but such a utopian situation will not and cannot exist. Peace inevitably creates more resource constraints than exist under mobilization conditions, but today, more than ever before, we must understand the effect these peacetime constraints will have on our ability to wage war.

The primary source of support requirements is the wartime planning scenarios developed by the operational planners of the Air Force. This places a weighty responsibility on them. Wartime scenarios and contingency plans must be as complete and as accurate as possible. They are the basis on which logistic actions are taken. Additionally, planners must carefully analyze the selection of weapons and the planned intensity of

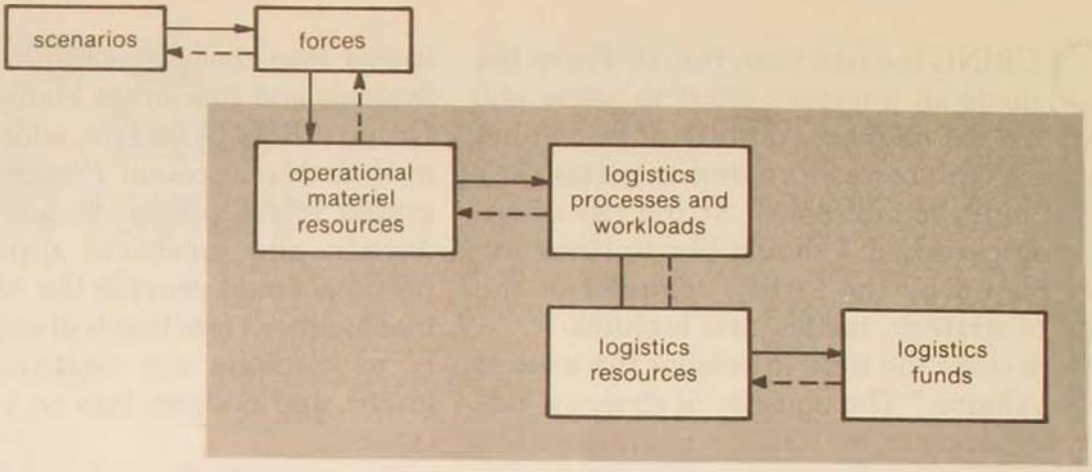


Figure 1. A macrolook at the logistics system and its critical interfaces

conflict because these factors too drive the resource decisions. If the planners have made poor choices in terms of logistics, the resulting chain of events will adversely affect the outcome of the conflict. Admiral Hyman Rickover has reportedly said, "Bitter experience in conflict has taught the maxim that the art of war is the art of the logistically feasible."

Planners must also contend with a certain measure of built-in flexibility in logistics. Logistical systems are sometimes slow to react because of long development and production lead times that are measured in months and years, not days. A large part of our job is to reduce lead time, but the more crucial element is that accurate planning base which allows adequate consideration of lead time factors.

The translation of war plans to required materiel support is a complex activity beginning with resources established to support the peacetime level of operation. In most cases, the level is far below wartime surge requirements. In fact, some weapon systems exhibit a 10 to 1 ratio of wartime to peacetime support needs.[3] The surge requirement becomes a problem of magnitude with resultant turbulence in the logistic system. To ease this problem, we exercise the same direct command and control over our people, facilities, and resources as is required for operational forces. We are dependent on our in-being resources to support early involvement in any contingency and to take up the slack caused by built-in logistic lead times. We rely, to a large extent, on our war reserve materiel (WRM) stocks to compensate for this lead time.

Computations of WRM levels are made to stock the consumable supplies and spare parts required to carry on the planned wartime activity until the industrial capacity of the Air Force and the nation can react to sustain our forces. If our computations are accurate, funding deficits become the major constraining factor on our ability to surge. In spite of some recent fiscal relief, we are still in an era of funds shortages.[4] With reduced dollars, we have been unable to buy WRM in sufficient amounts. Worse, we have had to borrow from existing WRM to satisfy some peacetime support requirements. Industrial preparedness also suffers when financial resources are scarce.[5] In the face of this reality, we are working hard to increase the effec-

tiveness of our logistic systems. We want to squeeze every last measure of efficiency and effectiveness out of the resources that are provided. To the extent that significant shortages continue, the Air Force must face the alternatives of (1) failing to meet planning requirements or (2) reconstructing the response of our forces by developing new strategies that we can support.

We seek increased effectiveness within the logistic system through in-depth analysis of our various processes. We are looking at the depot repair functions and the utility of contractor repair to achieve higher readiness levels. Decisions as to whether a contractor performs repair on our spares or whether the repair is performed in-house depend to a large extent on how such a contract might affect our ability to react to the wartime surge.[6] We continue to refine our analytical models to assist in assessing these alternatives.

Unfortunately, we cannot give full and equal support to all weapon systems. This fact of life has prompted us to develop a criterion for dynamic support. Weapon systems have become active competitors for our limited logistic resources. All too often, AFLC must decide on resource allocations that affect a weapon system's readiness posture without full knowledge of those variables outside the logistic arena. The critical element in this situation is the need for an effective system of priorities which can be applied in making logistic support decisions affecting our weapon systems or forces.

Major logistic decisions—not operationally ready, supply (NORS) objectives, WRM stockage, modification funding, and the like—require a priority system which assures that maximum readiness is obtained. Such a priority system must be oriented toward total force planning with the capability to discriminate between peace and wartime situations and problems. We have developed a prototype of just such a system and are introducing it incrementally into our decision-making processes.[7] If this effort is successful, an effective management tool will be available to Air Force planners.

Increased efficiency and effectiveness must be guided by major objectives in our war planning efforts. We can look on those objectives as a continuum, ranging from the peacetime objective through the reconstitution objective:

- Effective support to forces in peacetime with maximum economy (peacetime objective)
- Effective response to rapid buildup of forces (readiness objective)
- Effective support to wartime forces at any level of conflict (sustainment objective)
- Effective reconstitution of support to postconflict residual forces (reconstitution objective).

Constraints impact on the attainment of these objectives. For example, in peacetime, operating with budget-imposed shortages of spares and WRM stocks, Air Force readiness is affected directly. Underfunding our requirements to support the force until industrial capability reaches its wartime level will not allow us to sustain the force at the necessary level of conflict. Last, we must be able to plan for the reconstitution of our force so that residual stocks are in balance with the residual forces and capable of returning them to the desired postconflict level.

The need to keep these objectives in the forefront of our planning and programming efforts is imperative. Each objective must be considered during the logistic decision-making process. Failure to take into account any one of these objectives, especially readiness and sustained conflict, may throw the system out of balance. We at AFLC are aware of the need for balance in the establishment of our requirements computations, procurement, distribution, and maintenance policies. The task is made more challenging by the total

force policy that is included in our support planning and magnifies the depth and breadth of the planning problem manyfold.

The Logistics Command must be able to support the varied contingencies that involve the total mission of the Air Force, including the Reserves and Air National Guard; the ever-present risk of suboptimization is real and must be avoided. For example, we cannot establish policies that enhance the general purpose forces to the detriment of the strategic forces. Balancing the available support among operational forces sometimes causes a commander to assume that AFLC is not providing him the support he needs. In fact, the variances he sees are created by AFLC's mandate to provide balanced support within the priorities of forces and with limited resources.

An assessment of our posture cannot be simply a "snapshot" of today's requirements; it must also address the "what if" questions and provide alternatives based on realism rather than self-fulfilling prophecies. Our assessments must provide a clear measure of readiness in terms of sortie generation, weapon delivery, attrition, and other pertinent factors affecting the requirement. Only in this way will our assessments have the kinds of credibility that will cause our national leaders to understand the consequences of their funding decisions.

Contingency assessments are no more than an exercise of our information systems unless we act on the findings. There can be no sacred cows in our strategic, tactical, or logistical forces. Certainly, we can be advocates of a particular cause, but our advocacy must be justified in light of total force requirements. We must continually evaluate our priorities and question even the fundamental precepts on which we base our decisions. The time is ripe for innovative action with increased combat capability as our objective. Let us put our best minds to the task. Air Force schools, for instance, should direct their research efforts toward finding ways to improve readiness.[8] Our planners, both operational and logistical, should embark on a joint plans review and option analysis, and, where it makes sense, our organizational structures must be adjusted to facilitate readiness planning.

There is a pressing need to maintain and even expand the attention being accorded readiness planning. Insofar as the Air Force is concerned, there are several specific actions that I feel would keep this issue vital:

- Activation of a coordinated mission-area planning concept across the Air Force
- Review of war plans and their total system implications
- Development of a comprehensive and improved priority system for universal resource allocation decisions
- Development of credible capability assessment systems that measure output activity versus resource input in terms of readiness
- Intercommand coordination of research for improving readiness
- Review of USAF and MAJCOM organizational structure pertaining to readiness and readiness planning
- Establishment of "open channel" information networks in readiness planning.

Logistical readiness cannot be maintained in a vacuum. Complete operational command participation in the planning process is a necessity. In that regard, the Logistics Command has been working with the operating commands to review their readiness goals and to take action in pursuit of those goals. It is to our mutual benefit to assure that the role of logistics in the planning and operation phases of force employment is properly taken into account. In this business of readiness, the operator and the logistician do indeed walk together and work together.

These few observations hardly qualify as earthshaking revelations, but they do need to be discussed and acted on if our readiness

posture is not to suffer. Much remains to be done if we are to attain the kind of readiness described by Sun Tzu in *The Art of War,* written about 2500 years ago:

> Rely not on likelihood of the enemy not coming, but in our readiness to receive him; not on the chance of his not attacking but rather on the fact that we have made our position unassailable.[9]
>
> *Hq Air Force Logistics Command*

Notes

1. For example, the student of Napoleon, Baron Antoine Henri Jomini m *Précis de l'art de la guerre* (1836), and American George Cyrus Thorpe in *Pure Logistics* (1917).

2. SRMAG was chartered in 1975 by the USAF Chief of Staff, General David C. Jones. The group's final report contained some 37 management proposals to the Air Staff. The intent of these proposals was to improve the way the USAF acquires and manages its total resources.

3. This figure is an interpolation of representative war requirement ratios found in War Mobilization Planning (WMP) documents.

4. For example, in just the area of recoverable aircraft replenishment spares, the increase in the FY77 budget of $267 million still leaves us short $617 million.

5. We are not able to maintain alternate sources of repair, which will be required during a major war, thus reducing our capacity to surge.

6. AFLC currently maintains a 70 percent in-house versus 30 percent contract workload ratio. "Mission essentiality" most directly bears on the decision to use organic capacity or to contract out for certain goods and services.

7. This concept, known as "Logistic Support Priorities" (LSP), relies upon a complex data base drawn essentially from peacetime programs, unit priorities, and wartime plans.

8. For example, AFIT's School of Systems and Logistics, the USAF Academy, the Defense Systems Management Course (DSMC).

9. Sun Tzu, *The Art of War,* reprinted in *Roots of Strategy, A Collection of Military Classics,* edited by Major Thomas R. Phillips, USA (Harrisburg, Pennsylvania: The Military Service Publishing Co., 1940).

> When one speaks of Air Power, one implies, where great nations are concerned, a certain but undefinable standard of first line strength and, behind that, both the immediate and stored reserves which can be used to replace losses, and—which is as important—the manufacturing capacity and resources which can make good the gaps in the reserves and even increase the output in war. Reserves of personnel and adequate means for the training of human replacements are no less essential. Without such a solid background there can be no reality in Air Power. It becomes merely a facade which must crumble in war; as the sea power did which France sought to create for the War of the League of Augsburg at the end of the seventeenth century.
>
> J. M. Spaight
> *Air Power in the Next War (1938)*

INDUSTRIAL DEMOCRACY AND THE FUTURE MANAGEMENT OF THE UNITED STATES ARMED FORCES

DR. LAURIE A. BROEDLING

THERE IS an ideological movement afoot among the industrial, democratic nations of the Western world to enhance the "quality of work life." This movement is predicated on the belief that the nature of the work performed by most people in these countries is demeaning and dehumanizing. One of the primary components in the quality of work life movement is the pressure for increased participation of rank-and-file employees in decision-making, i.e., pressure for industrial democracy. It is crucial that United States military leadership at all levels be aware of this trend. If the nature of industrial democracy is understood by military leadership, it can be turned to the advantage of all. On the other hand, if this movement is ignored or misunderstood, there will be detrimental consequences.

Industrial Democracy in Retrospect

In order for one better to understand the driving forces behind the industrial democracy movement, it is useful to trace its historical development. As a type of democratic movement, it is, of course, partly related to the general historical trend in the Western world toward the fuller exercise of democratic and egalitarian principles. Ironically, at the end of the eighteenth century, when strides were being made in the establishment of political democracies, the advent of the Industrial Revolution created working conditions and practices that reduced rather than increased worker freedom and self-responsibility. These conditions continued well into the twentieth century, and as management became a skill and discipline in its own right, the first formal management style reflected these conditions perfectly, namely, scientific management. This approach to management dealt with human performance efficiency in the same way as with machine performance efficiency, by breaking the job down into the smallest, simplest individual tasks possible. Human motivation was assumed to be a function of need deprivation, best met with extrinsic reinforcers such as money. The underlying assumption regarding human nature was what Douglas McGregor characterized as Theory X:[1] People are basically lazy and must be enticed into working hard by the promise of tangible rewards for increased efforts. The result of this "scientific" approach to management was that work for most people was characterized by trivial, repetitive tasks, that employees were treated by management as untrustworthy children, undesiring and incapable of handling responsibility, motivated only by money and other tangible incentives.

The industrial democracy movement, which has gathered momentum in the past 10–15 years, has not only been a manifestation of a general political trend but more particularly a reaction to dehumanized, meaningless work content and to the demeaning way in which employees are frequently treated. In some ways, it has been made possible by the strong union movement which preceded it. When scientific management reached the zenith of its popularity at the beginning of the twentieth century, it was fairly accurate to assume that employees were primarily motivated by tangible incentives. Prior to World War II, the wages, hours, and working conditions for the average employee were poor, and improvements in the physical aspects of working life were understandably the most important. The unions derived their strength from satisfying worker demands for more extrinsic benefits, and unions generally have been highly successful in this regard.

The increase in extrinsic benefits for the rank-and-file employee relative to management, coupled with an overall increase in prosperity, has created a situation in which other, more intrinsic aspects of work have assumed a new salience. These relate to the nature of the work itself and the employees' feelings of control over it. Because there has now been an entire generation raised under conditions almost free from material deprivation, those entering the labor force in the last ten years have significantly different psychological demands and expectations of their working life than did those before them. Essentially they expect to have the opportunity to determine for themselves what work they do and how they do it. Not only do they expect to be given responsibility over their own work but they also expect to be asked to contribute suggestions toward overall operations. They expect to have their opinions

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valued and receive appreciation when they offer their opinions.

Unfortunately, the social upheaval of the late 1960s obscured in most people's minds, including those of the older military generation, this most fundamental aspect of the "youth revolution." During that time the most salient characteristics of youth emphasized by the media were self-indulgence, freedom of personal expression, rebellion against authority, and experimentation with unsanctioned experiences such as drugs, communal living, etc. Some of this behavior has been dismissed as that of only the radical few; some of it has been dismissed as a "phase" which all youth undergo in some form or another; some of it has been attributed to permissive childrearing practices. It is frequently assumed that these behaviors will change once individuals have to take responsibility for making their own way in the world. All of this discounting overlooks the one fundamental difference between this new generation of employees and their predecessors: the younger people expect and in fact will demand more responsibility and decision-making authority over their working lives, i.e., they are pushing for industrial democracy.

> Perhaps the toughest job in dealing with the youth will be that of the immediate supervisor. He will be at the interface of the generations, and a difficult place it will be. Most young people will see their supervisors not so much as a person with formal authority who tells them what to do, but as a facilitator who provides them with the things they need to get the job done. This facilitation could be in the form of technical knowledge, physical resources, financial resources, or moral support. The personal attributes young people are likely to react most favorably to in their immediate supervisor are technical competence, honesty, sensitivity to the feelings of others. Finally, they will expect their immediate supervisor to recognize their individual talents and to challenge these talents in an atmosphere that allows them as much freedom as possible to "do their own thing."[2]

This characterization of the new work force does not take into account individual differences. After many years of searching for the one best style of leadership, management theorists have developed a contingency point of view; that is, there is no one best leadership style, rather that which is most appropriate depends on the situation. Management theorists are presently busy trying to determine which characteristics of the situation call for which type of leadership styles. There are numerous variables that could affect the appropriateness of various management styles, not the least of which are the personalities and needs of the employees themselves. Since there are individual differences among people, it is not possible to state that a participative management style is appropriate in all cases. However, it *is* possible to state that participativeness is usually the most appropriate style to use with employees who are young, whose compensation is fairly high, and who come from higher socioeconomic classes. Since increasingly more employees are falling into these categories, the pressure for industrial democracy is becoming more widespread.

Industrial Democracy, Codetermination, and Unionization

"Industrial democracy" is a generic term encompassing all those activities in organizations which increase employee participation in problem-solving and decision-making, at the same time increasing their feelings of self-responsibility for job accomplishment and organizational productivity. The implementation of democratic principles in work organizations takes on a wide range of specific forms, from actions that allow the employee control over getting his or her own work done all the way to actions that give employees a say in the policies and practices

of the overall organization. Examples include various forms of group decision-making, flexible working hours, job enrichment, and reduction or elimination of supervision. It is specifically not meant to be confused with the effects of industrial management on the political arena; rather it pertains to internal management of organizations.

"Codetermination" is a concept similar to industrial democracy, and some people use the terms interchangeably. For purposes of this article, however, a distinction is drawn between the two terms since their implications are somewhat different. "Codetermination" means that the workers share decision-making power on an equal basis with management, thus giving the work force and management equal amounts of influence over the organization as a whole. It most often takes the form of having an organization's board of directors half comprised of employee representatives. The differences between industrial democracy and codetermination are ones of degree and scope. Industrial democracy does mean increased work force participation, but it does not entail the *equal* sharing of control of the entire organization. Moreover, while codetermination pertains exclusively to worker influence at the top of the organization, industrial democracy encompasses increased participation at any level, including one's own immediate area of work. Most rank-and-file employees are at an informational disadvantage relative to management in contributing to decisions regarding the whole organization, but they do have the advantage in making intelligent decisions regarding their own work since they usually know more about how to get it done than anyone else.

Another movement with which industrial democracy is often confused is "unionization." It is not the terms themselves that are confused but rather what these movements are meant to accomplish. While both attempt to increase worker influence, they differ in the areas in which they try to gain that influence. Unions in the United States try to increase tangible benefits for employees. Industrial democracy, on the other hand, presses for worker influence over the work itself—a revolutionary demand in terms of traditional labor-management relations in this country. Even in the most heavily unionized places, the organization of the work itself has tended to remain a management prerogative and is fundamentally that which has distinguished management from labor. Thus industrial democracy tends to be more concerned with intangibles such as increasing employee feelings of responsibility, autonomy, effectiveness, etc., rather than with tangible benefits.

The distinction between unionization and industrial democracy can be more fully appreciated by considering what union reaction in the United States has been to the industrial democracy movement. While U.S. unions differ in their acceptance or rejection of the concept of industrial democracy, it is fair to characterize their general reaction as ranging from cautiousness to hostility. For example, William Winpisinger, Vice President of the American Machinists Union, has expressed his opposition to worker participation on governing boards of organizations because it entails a fundamental change in the union's adversary role in bargaining. "Collective bargaining is an adversary relationship. Designed that way, it should be that way, and I think you have to be on one side or the other on it, to maximize your effectiveness. I think you dilute the effectiveness of whichever point of view you have if you deal on any other basis."[3] In May 1976, Thomas R. Donahue, Executive Assistant to the President, AFL–CIO, made the following remarks during an address to an International Conference on Trends in Industrial and Labor Relations:

> We've watched codetermination and its offshoot experiments with interest, and will con-

> tinue to do so. But it is our judgment that it offers little to American unions in the performance of their job unionism role (given our exclusive representation status and our wide-open conflict bargaining), and it could only hurt U.S. unions as they pursue their issues of quality of working life, worker alienation, job enrichment, and the like.
>
> We are impressed as any one with the new opportunities which modern plants and equipment, modern methods of work organization, may create for further humanizing the workplace, and we can be depended upon to participate in serious efforts to study these and develop them further. . . . But we can also be depended upon to scoff at some of the "rainbow chasing" being carried out by the less serious faddists. . . . And we'll be equally cautious . . . of those who will try to turn this into another effort to boost output without sharing the benefits of any increased productivity. . . . In spite of our best efforts to improve the quality of working life, it will remain "work" and the degree of difficulty . . . of discomfort or hardship, will be reflected, as now, as a factor of compensation.[4]

Another example of union negativism toward industrial democracy in the U.S. is the national AFL–CIO opposition to a Congressional bill to make it possible to institute flexitime (flexible working hours) in the federal government.[5] This bill suspends for a three-year experimental period the requirement for government agencies to pay overtime for time worked past eight hours per day as long as the staggered workdays and workweeks do not average more than 40 hours per week. Of the techniques for increasing industrial democracy, flexitime is probably the most universally successful one thus far. Not only does it provide the tangible benefit of personal convenience to employees but more fundamentally it increases worker responsibility for job accomplishment. Under flexitime employees have the freedom to rearrange their schedules to match the work flow, spending more time per day when the work flow is heavy and easing up when it is light. Moreover, worker responsibility is increased because employees spend more time unsupervised. Employees' feelings of self-worth usually increase as a result of this vote-of-confidence in their trustworthiness. Despite all these benefits of flexitime, the AFL–CIO is fighting the bill because they see it as a hole in their hard-fought dike for assuring employees overtime pay for overtime work. Thus, ironically, they are fighting a benefit that has proved immensely popular and beneficial to employees almost everywhere it has been instituted.

On the other hand, there have been some instances in the U.S. where unions have cooperated in introducing industrial democracy into organizations. The key to success seems to include actively soliciting the union's participation in the process at the outset, making them full partners in the associated decisions. The best known examples are the experiments presently being performed by the National Quality of Work Center, a nonprofit institution dedicated to the study of ways to enhance the quality of work life for employees as well as the effectiveness of organizations.[6] In each organizational site into which the center has introduced an experiment, the nature of the change is something that must be mutually generated by, decided upon, and agreeable to representatives of management, union, and employees and can be terminated at any time by any one of the parties. Thus, participation in making improvements is the keystone, and the model is one of cooperation rather than conflict. Examples of experiments include the creation of autonomous work teams in a Pennsylvania mining company; the introduction of a reward system (extra pay, time off, or the opportunity to attend school) to groups that meet production standards in less than eight hours in a manufacturing plant; the full-scale reorganization, directed by a joint management-labor-employee committee, of an engineering division of the Tennessee Valley Authority.

The success in gaining union cooperation

in implementing democratic organizational practices seems to be a function, then, of actively involving the unions from the outset and allowing them equal influence over the specific nature of the changes. This points to another difference between unionization and industrial democracy: unions work as intermediaries or bargaining agents for the employees, while there is no required intermediary between employees and management in order to institute industrial democracy reforms. Unions are asked to participate in decisions regarding increased democratic practices more because success depends on it than because they are supportive of the concept, which usually they are not. Experience in the U.S., as well as experience elsewhere to be described later, leads one to conclude that in unionized organizations industrial democracy cannot succeed without union support.

It is safe to say that in all democratic nations of the Western world there is an industrial democracy movement, even though its specific nature differs in form, causal factors, and intensity from one country to the next. A comparison of the industrial democracy movements in four countries—Sweden, West Germany, Great Britain, and Italy—with that of the U.S.[7] will suggest that the U.S. can expect to be influenced by what is happening in some of these countries; on the other hand, it can expect to have certain unique elements in its industrial democracy movement because of particular conditions in this country.

Comparative Analysis of Industrial Democracy

The Scandanavian countries have been in the forefront of the industrial democracy movement, and their industries were the first to become actively involved in experiments in increased employee participation. For example, the job enrichment programs in traditional assembly-line systems, such as Volvo, have received worldwide publicity. In Sweden the movement probably has its strongest ideological component: industrial democracy is felt to be morally right, and this is reason enough to support it. Moreover, industrial democracy has been relatively easy to implement due to the 60-year Swedish history of fairly classless cooperation between employees and management.[8] The union situation is streamlined, with most workers belonging to one of the two major union confederations. There are few jurisdictional disputes, and most bargaining occurs at national political levels. Consequently, the labor confederations have had a great deal of influence in seeing legislation passed to benefit their employees. These labor confederations have been actively pressing for all types of industrial democratic reforms. In 1946, works councils to represent employees on shop-floor matters became a legal requirement, and in 1973 legislation was passed requiring direct election of blue-collar and white-collar representatives to the board of any company having more than 200 employees, if the unions in the company so desire.[9] On 1 January 1977 legislation took effect providing employees with a qualified veto over many types of corporate decisions. Management must secure employee agreement on all major changes in organization, production, and large-scale staff transfers.[10]

West Germany shares the lead with Sweden in terms of the extent to which industrial democracy has taken hold, but the reasons differ. In Germany, industrial democracy was deliberately installed into the postwar government to ensure against any future return to totalitarianism. The most powerful instrument employed in this regard has been a legal requirement for one-third employee representation on the boards of most companies and one-half employee representation on the boards of steel and coal companies

(bearing in mind the close alliance between these latter two industries and the Third Reich). This coequal worker control represents true codetermination. Overall, the experience with codetermination has been viewed positively within Germany.[11] German unions have been the primary political force to press for codetermination, and currently they have been responsible for legislation being considered to require all companies to increase employee representation on their boards to half. The internal political debate on this issue is complicated by the external effects this bill's passage might have on relationships with other countries whose citizens own stock in German firms yet whose national policy and philosophy do not presently support codetermination. One legal opinion, for example, holds that instituting codetermination into companies which have U.S. stockholders is in violation of the German-American Commercial Treaty of 1954.[12]

Another current development indicative of the strength of industrial democracy in West Germany is the Humanization of Work program. This program, a result of union pressure, represents an expansion in the scope of German union interest in industrial democracy toward enhancing employee influence over their own work and workplace.[13] Under this program, field experiments in new forms of work and work organization are conducted. While almost all Western European countries have such a governmental program, the German one is the most ambitious, with government funding of about $15 million in 1976 and likely to be $20 million in 1977.

In Great Britain, the situation is quite different, with industrial democracy being far less advanced than in Sweden or Germany. The primary explanation is in terms of the fractionated state of British society, with deep-seated class conflict, deep-seated hostility between labor and management, and even considerable conflict across unions, whose structures are fragmented by craft loyalties. One result is that unions tend automatically to oppose almost anything that management advocates, even proposals to enhance participation of employees.[14] Unions see their power being undercut by abandoning their adversary stance. However, since the entry of Great Britain into the Common Market, the British unions have shown increased favorability toward the idea of having representation on company boards.[15]

Italy falls at the other end of the participativeness scale from Sweden and Germany. Many Italian industries are family-owned, and managerial positions are often occupied by family members. Lines of authority and hierarchy conform to traditional bureaucratic models and are clearly delineated. Unions work primarily at the national level rather than the local plant level and consequently focus on political issues. Unions advocate participative practices, but management has for the most part avoided such practices.[16]

The United States falls somewhere in the middle of this dimension of participativeness. Unlike most Western European countries, there is no federally sponsored program in the U.S. to run experiments in industrial democracy and work humanization.[17] Also unlike the unions in these Western European countries, U.S. unions tend to bargain individually at the local plant level, focusing on bread-and-butter issues, while European unions bring their influence to bear on political issues at the national level. The unions in the U.S. and Great Britain are the only ones of these five countries that do not support worker participation because of their adversary model of labor-management relations, with British unions being the more extreme of the two countries. What union support does exist in the U.S. favors ways to increase employees' influence over their own work rather than influence over organi-

zational governing bodies. Of all five countries, the U.S. has most management and corporate support for industrial democracy *relative to union or governmental support.* This U.S. management support is not based on ideological belief in egalitarian principles but on typical U.S. pragmatism for adopting anything that will result in increased employee productivity and satisfaction. The U.S., having had far less class conflict than Great Britain or Italy, has more informal participativeness in its work practices than either of these two countries. Consequently, there is less alienation of the working class even though formal participative practices are not that frequent.

Policy Implications

There can be no doubt that the United States is caught up in the industrial democracy movement which is sweeping the free world.[18] However, the implications of this fact have by no means been fully appreciated by the leaders of the U.S. armed forces. This lack of awareness, coupled with the conservatism of the military generally, has resulted in a working environment in which many military personnel are alienated because they feel underutilized, dependent, unrecognized, or oversupervised. They resent their potential for contribution going unnoticed, and they resent having little influence over the formulation of military policies and practices. The result is a military work force that is not fully motivated or productive and even sometimes destructive. The gap between the rising expectations and demands of the military work force in this regard and the extent to which these expectations are being met appears to be widening.

There are a number of practical reasons for U.S. military leadership to implement industrial democracy to the extent possible. First, if appropriate forms of democratic, participative techniques are implemented into military organizations, increases in overall military effectiveness and readiness can ensue.[19] Given the rapidly rising costs of military manpower, increased public questioning of those costs, and the general bite of inflation, it is imperative that this manpower be more fully utilized. Second, if appropriate democratic techniques are implemented into the military structure, the job satisfaction of personnel will increase. Since job dissatisfaction is related to absenteeism and turnover, there would be benefits for retention and personnel costs. Third, since the armed forces must compete with the private sector for manpower, the extent to which the armed forces can recruit sufficient numbers of qualified personnel is a function of what benefits it offers relative to the private sector. Democratic practices are a benefit that the armed forces will be obligated to offer as more and more private enterprises adopt these practices.

The last argument for instituting democratic practices is that it will lessen the pressure for unionization. The basic purpose of a union is to give employees a voice in influencing the conditions of their employment, and industrial democracy provides a partial vehicle for doing just that. This is not to say that democratic management will preclude unionization. Some personnel policies are determined outside the Department of Defense, and the most direct way for military personnel to influence these may be via unions. Moreover, given the current somewhat negative stance of U.S. unions toward industrial democracy, if unions do organize military personnel, industrial democracy will be that much harder for military managers to implement. Nonunionized companies in the private sector have a far freer hand in introducing democratic methods into their management practices than do unionized companies. Moreover, no matter how the unionization issue is resolved for the armed

forces, the pressure for industrial democracy will continue. The extent to which these demands for democratic practices are met will have progressively more of an effect on the ability of the armed forces to fulfill their mission.

In addition to the practical benefits, there are moral benefits as well. The military force that sees its mission as defending a nation devoted to democratic principles is forever having to justify why it does not practice those principles it is defending. Management practices that enhance one's feeling of competency, self-esteem, and job satisfaction are worthwhile as long as they do not hamper organizational functioning.

There are two levels at which industrial democracy should be implemented in the armed forces, at the level of general personnel policy and at the level of individual leadership. In personnel policy, there is a management philosophy issue, an image issue, and a policy formulation issue. Military policy-makers must confront the fact that implementing democratic practices represents a fundamental change in the traditional hierarchical, authoritarian managerial philosophy of the armed forces. As the management philosophy changes, so will the public image of that philosophy change. In certain ways, the traditional military management philosophy has more symbolic than actual meaning, since in fact military personnel with technical jobs and skills are rarely being managed by highly authoritarian methods. However, the public image of the military establishment has always been one of strict hierarchy. Top military leadership must be prepared for both the positive and negative public reactions to a change in its management image.

In terms of policy formulation, vehicles should be created for enabling military personnel to have input into decision-making. Due to its combat mission, the armed forces will undoubtedly always have some element of a chain-of-command structure. Consequently, it will require considerable ingenuity to develop representational vehicles, particularly since the vehicles developed in the private sector are probably not directly applicable. In an analysis of the implications of industrial democracy for the U.S. Navy, Krendel and Gomberg stress the need for sharing decision-making with the junior officer corps.[20] It is important to note that there are two broad types of policies governing the armed forces: those which the armed forces set for themselves and those which Congress sets for the armed forces. The vehicles for enabling rank-and-file input would be somewhat different for these two areas. An example of policies determined by the military would be the rules governing appearance and behavior of military personnel. With rank-and-file input, military leadership should be prepared for changes in those regulations that inhibit personal freedom without hampering productivity or readiness, e.g., personal appearance. An example of military policy set by Congress is compensation. It is reasonable to assume that budget requests to Congress for personnel compensation, for example, would carry more weight if they represented the collective body of opinion of members of the armed forces as opposed to representing the opinions of a handful of high-ranking officers.

At the level of specific command and individual leadership, those democratic methods, if any, which are appropriate depend on the individuals involved and the nature of the unit's mission. Contingency theories of management specify that there is *no one* best style of management. One instance where democratic methods are rarely appropriate is when a unit is under fire, when quick decision-making is of utmost importance. This is the argument most frequently presented against democratic methods for military management in general. However, most U.S. military personnel never see com-

bat and in fact serve in situations highly amenable to democratic practices.

It is at the level of command leadership that the U.S. armed forces have already taken initiative in introducing democratic practices. This has been done in conjunction with their organization development/organization effectiveness programs. It is here that participative practices are incorporated into some of the decision-making of individual commands. The most extensive of these programs, the Navy's Human Resource Management System, among other things allows representatives from almost all ranks to contribute toward a command action plan for their organization's improvement.

At the level of individual leadership, there is a real need to introduce material on the techniques of democratic managerial practices into the formal leadership training provided. There is also a need to increase the frequency with which such training is offered. An example of an appropriate training package is that of Vroom and Yetton.[21] In their scheme there are five basic leadership styles, ranging from one extreme, in which the supervisor makes the decision alone, to the other extreme, in which his work group makes the decision. The supervisor chooses the most appropriate style by defining the situation at hand in terms of seven attributes, such as whether the supervisor believes he or she has sufficient information/expertise to make a high-quality decision himself, whether acceptance or commitment on the part of subordinates is critical to the effective implementation of the decision, etc. To the seven situational attributes are applied a set of decision rules to maximize the quality of the decision and the acceptance of the decision by the work group. The outcome is the most appropriate style or set of styles for the supervisor to employ. The training consists of teaching supervisors how to apply these decision rules.

THE IMPETUS within the Western world, since at least the Renaissance, has been in the direction of increased egalitarianism, democracy, and protection of basic human rights. Like any institution, the armed forces must adapt to changes in the environment in order to maintain their effectiveness. While the armed forces have been quick to adapt and adopt when it comes to technological change, they have lagged behind in assimilating changes in the social and cultural environment. Much attention has been paid of late to military personnel restiveness, attributing it to erosion of tangible benefits. While benefits are certainly an important factor, just as fundamental a concern is the right to participate in the decisions regarding those benefits as well as in all aspects of one's working life. This constitutes the demand for industrial democracy, and it is likely that the U.S. armed forces will have to accommodate this demand. The extent to which military leadership takes appropriate action soon or postpones it to the eleventh hour will affect a number of important aspects of military functioning, including recruiting, retention, readiness, the role of unions in the armed services, and the overall quality of military work life.

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Notes

1. Douglas McGregor, *The Human Side of Enterprise* (New York: McGraw-Hill, 1960).

2. Eugene Koprowski, "The Generation Gap, from Both Sides Now," in Gordon L. Lippitt, Leslie E. This, and Robert G. Bidwell, Jr., editors, *Optimizing Human Resources: Readings in Individual and Organization Development* (Reading, Massachusetts: Addison-Wesley, 1971), pp. 287–88.

3. *Bill Moyer's Journal*, "Why Work" Part I, produced and written by

Alan Levin and Marc Levin, March 21, 1976, pp. 13–14.

4. "Collective Bargaining, Codetermination, and the Quality of Work," *World of Work Report*, 1 (August 1976), p. 1.

5. Joseph Young, editor, *Federal Employees' News Digest* (June 14, 1976), p. 1.

6. *The Quality of Work Program: The First Eighteen Months.* National Quality of Work Center, Washington, D.C. (April 1974–October 1975).

7. It is not within the scope of this article to describe the unionization movement per se in other countries or the unionization of the armed forces in other countries. However, the latter topic has been well covered in an earlier issue of *Armed Forces and Society*, 2 (Summer 1976), in a series of articles on military unions in Belgium, West Germany, the Netherlands, Sweden, and France.

8. Nancy Foy and Herman Gadon, "Worker Participation: Contrasts in Three Countries," *Harvard Business Review* (May-June 1976), pp. 73–74.

9. Ibid., p. 74.

10. "Swedish Legislation to Give Veto Rights to Workers," *World of Work Report*, 1 (July 1976), p. 6.

11. A parliamentary commission was appointed to review the German experiences with codetermination through the end of the 1960s. Their findings were based primarily on extensive discussions with managers and others actively involved, and their conclusions were quite positive. Their final report, *Codetermination in the Enterprise* (commonly known as the "Biedenkopf Report" after the commission's chairman) published in January 1970, is available in English translation from the Anglo-German Foundation for the Study of Industrial Society, St. Stephen's House, Victoria Embankment, Westminster, London SW1A 2LA.

12. Wilhelm Wengler, "A Legal Opinion Given at the Request of the American Chamber of Commerce in Germany," American Chamber of Commerce in Germany, 1974.

13. "Germany's 'Work Humanization' Program Aims at Major Advances in Work Reform," *World of Work Report* (May 1976), pp. 3–5.

14. Nancy Foy et al., "Worker Participation: Contrasts in Three Countries," *Harvard Business Review* (May-June 1976), pp. 75–78.

15. David Orr, "David Orr on Employee Representation and Cooperation," *Harvard Business Review* (January-February 1977), pp. 36–41.

16. Arnold S. Tannenbaum, Bogdan Kavcic, Menachem Rosner, Mino Vianello, and Georg Wieser, *Hierarchy in Organizations* (San Francisco: Jossey-Bass, 1974), pp. 36–46.

17. The National Quality of Work Center began as the Quality of Work Program under the Federal Price Commission in 1972 but has since become part of the private sector. It is funded through government, foundation, and corporate sources.

18. The extent to which the movement has become a truly popular, broadly based one as opposed to one of a few narrow interest groups can be ascertained by its extensive coverage by the public media. Among the numerous books on the topic are Studs Terkel, *Working* (New York: Avon, 1972); and Barbara Garson, *All the Livelong Day* (Garden City, New York: Doubleday, 1976). Television coverage has included a two-part series in *Bill Moyer's Journal*, "Why Work," broadcast on PBS, March 21 and 28, 1976, and segments on CBS's "Sixty Minutes." In addition, the Department of Health, Education and Welfare report *Work in America* (1972), which described the degradation in attitudes of the American employee toward his work, received much publicity and was the focus on considerable attention.

19. Synergy, the enhanced capability of a group to find a better solution to a problem than any single group member, is well-documented for many types of problems. In a large-scale evaluation of the effects of redistributing influence and control in organizations, Raymond Katzell and Daniel Yankelovich conclude that generally this can produce an increase in both worker satisfaction and overall organization effectiveness, provided that a thoughtful combination of techniques be used rather than a single one in *Work, Productivity, and Job Satisfaction* (New York: The Psychological Corporation, 1975), pp. 1–36.

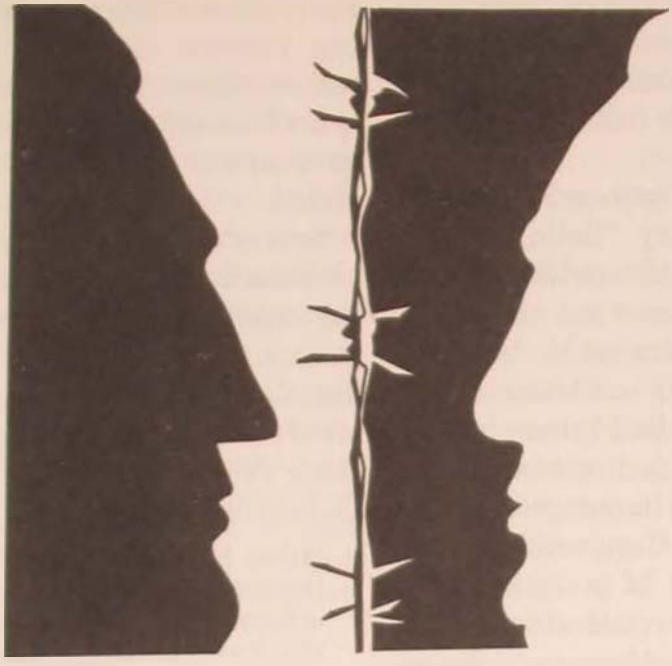
20. Ezra S. Krendel and William Gomberg, *The Implications of Industrial Democracy for the United States Navy*, NKG-10 (Philadelphia, Pennsylvania: Management and Behavioral Science Center, The Wharton School, January 1975).

21. Victor H. Vroom and Philip W. Yetton, *Leadership and Decision-making* (Pittsburgh, Pennsylvania: University of Pittsburgh Press, 1973).

The long term questions are equally grave. Basic to all of them is the fact that we have indeed become the dependent America pictured thirty years ago by the late Secretary [of Commerce, William Cox] Redfield. Both our economic well-being and our lasting security will rest increasingly on the degree to which we are able to buy abroad the materials once obtainable at home, but now permanently withdrawn from the "carrying power" of our homeland. Hand in hand with provision for a rising flow of imports must come the realization that we can never again afford to be profligate in spending what is left of our natural heritage. The question is no longer one of merely being damned by future Americans as wasters of their inheritance. Instead, it reads: How and to what extent can we provide in the future the assured supply of materials demanded by a healthy and growing American economy? The military corollary follows: without adequate security for such commerce from source to port of entry, our economic future will rest on a gamble.

Colonel Herman Beukema, USA
"U.S. Economic Prospects,"
Air University Quarterly Review
II (Winter 1948), p. 27

military affairs abroad



NEGOTIATING WITH THE ENEMY

LIEUTENANT COLONEL KARL P. PIOTROWSKI, USA

RUMORS of an imminent cease fire filtered up to the district town of An Khe in the highlands of Binh Dinh province, South Vietnam, in the late fall of 1972. As the last remaining American adviser, I already had PCS orders in hand in anticipation of a speedy withdrawal from Vietnam. Then the news arrived via the local grapevine: President Thieu would address the nation and announce the cease fire arrangements. I packed my few belongings in a footlocker and prepared my equipment for speedy turnover to the district chief.

The district staff officers and their last "co-van" (advisers) eagerly gathered around the radio in the district chief's office, straining to hear the fading, wavering signal as President Thieu told the people that the cease fire would begin in four days. Early the next morning I signed my property over, paid sev-

erance pay to my Vietnamese employees, packed my advisory files for shipment, and sat by the radio awaiting instructions from the Province Advisory Team Headquarters in Qui Nhon.

One by one the nine districts were called, and a pickup time was given when the chopper would arrive to extract the few remaining advisers in the field. My call was the last to be made — two hours until pickup. I could already see the smile on my wife's face as I arrived home early from a short tour for a change.

As I bounced into the Province Senior Adviser's office with a cherry "hello," I was greeted with unexpected news: "Karl, you've been chosen to serve on the Four Party Joint Military Commission; be prepared to leave for a briefing in Pleiku within the hour." Why me? What had I done wrong this time? "It's your master's degree in international relations and your language capability that got you the job. Congratulations." Congratulations? Dreams of a quick trip home and a joyous family reunion vanished in a haze of blue smoke. However, seven months later, when I finally did get aboard the "Freedom Bird," I was glad that I had been chosen to negotiate with the enemy.

the U.S. delegation

There had been two months of frustrations as a deputy team chief of the United States element in a field team of the Four Party Joint Military Commission (FPJMC) at Bao Lap. It was frustrating because the team never became operational, the enemy refusing to deploy members to the field to begin supervising the cease fire. Things changed quickly when I found myself transferred to the Central Delegation in Saigon and taking part in the field negotiations for the release of the last acknowledged U.S. prisoner of war (POW), Captain Robert T. White.

While the rest of the U.S. delegates to the FPJMC withdrew when the commission was dissolved after sixty days, fourteen of us remained in Saigon to negotiate the implementation of Article 8 (b) of the Paris Agreement[1] pertaining to the exchange of information about missing persons. I became the Deputy Chief of the Negotiations Division of the newly formed U.S. Delegation to the Four Party Joint Military Team on Dead and Missing Persons (FPJMT). Agreement on this rather exact title for the organization required nearly two weeks to negotiate and gave us our first hint of the semantic pitfalls ahead.

Scores of formal and informal negotiating sessions in both Saigon and Hanoi added to my experience and formed a sad yet pleasant memory when the plane carried me home at last. Colonel William W. Tombaugh, second chief of the U.S. delegation, expressed the same feelings in the Foreword of the first Delegation Yearbook;

> It has been a year punctuated by incredible frustration, hard work, and remarkably little achievement regarding the implementation of the Protocol to the Paris Agreement. Nevertheless, it has been a year which I will recall with great pride and sentimentality.[2]

Truly, we had learned to respect the wisdom of Secretary Henry Kissinger when he noted: "The peace negotiations in Paris have been marked by the classic Vietnamese syndrome: optimism alternating with bewilderment; euphoria giving way to frustration."[3] As an extension of the prolonged Paris negotiations, our work was no less simple. Early in our research to establish a framework for our negotiating strategy, we read with great interest the history of the French negotiating efforts, after the 1954 Geneva Accords, to account for their missing. As our opponents' negotiating strategy gradually unfolded, we noted the use of the same techniques by the delegates of the Provisional Revolutionary Government of South Vietnam (PRG) and the Democratic Government

of Vietnam (DRV) that had proved so successful in frustrating the French attempts to arrive at a complete accounting for their missing persons. Although the 1954 agreement set 1 July 1956 as the deadline for a complete accounting and repatriation of remains, as late as 1967 the French government still had a graves registration team working in North Vietnam, attempting to locate and repatriate remains.

The individual DRV–PRG negotiators also seemed to pose a striking resemblance to the Communist Chinese–North Korean delegates encountered by U.S. negotiators at the Korean Armistice Conference. U.S. senior delegate to the conference, Vice Admiral C. Turner Joy, might have been describing our foes across the table when he wrote:

> The Communist system of negotiating does not depend critically on the individuals involved. Their method is a dogma followed slavishly by each of their representatives. . . . Persistence and unruffled demeanor in the face of logic seemed to be prime characteristics of their negotiating group at the Korean Armistice Conference.[4]

Communist negotiating techniques

The Communists pursued a policy of obstructionism cleverly laced with half-truths and distorted polemics designed for a wider audience than the four parties that gathered for four hours twice weekly around the oval table at Tan Son Nhut. In July, after almost four months of nonproductive negotiation, the U.S. delivered a diplomatic note in Paris to the North Vietnamese (DRV) Delegation charging the DRV with delaying progress in the proceedings in Saigon. The note made it clear that

> . . . what the DRV has done has been to obstruct and delay the practical steps of urgent, humanitarian nature. . . . The DRV has justified its position on the grounds that such practical steps must await total agreement on all points by all parties to the FPJMT. . . .[5]

The Communists consistently maintained that a complete set of agreed-on operating principles was necessary before any concrete actions could be undertaken to begin the process of accounting for the missing persons of the various parties. As their strategy was revealed through the process of step-by-step negotiations, it soon became evident that the other side intended to rewrite completely the already agreed-on provisions of the Paris Agreement pertaining to the work of the Four Party Joint Military Team under the guise of " . . . reaching agreement on the contents for implementing Article 8 (b). . . ."[6]

The DRV quickly seized the initiative and on 14 April, during the second week of the FPJMT, tabled a draft set of general operating procedures. These took the form of a careful rewording and expanding of each phrase in the original document signed at Paris. The stated Communist rationale was one of ensuring that we all had a common understanding of the original intent of the agreement. But in practice this allowed them to substitute wording which subtly changed the intent and/or raised new controversy that could be used to delay progress and obstruct the flow of the negotiations.

This technique was not new to the American experience. Admiral Joy had already observed in Korea, "Communists are not embarrassed in the least to deny an agreement already reached. It makes little difference that such agreements may be in written form. If so, the Communists simply state that your interpretation is an incorrect one."[7] This attitude became evident early in Saigon when at the first FPJMT meeting on 4 April 1973 the Communists stated their intent to review, and renegotiate as necessary, the eleven points pertaining to delegates' privileges and immunities that had been agreed to by the Chiefs of the Four Party Joint Military Conference at their last meeting on 28 March 1973.

The fall of 1972 marked the cease fire in Vietnam. A field team of the Four Party Joint Military Commission (FPJMC) was proposed to negotiate with the enemy for release of Americans. During the FPJMC period (March 1973), PRG-DRV representatives inspected the Communist delegates' living sites at Bao Loc, accommodations for a field cease fire monitoring team.

The entire sixty days of the FPJMC's existence had been largely devoted to negotiating those eleven points. Now our adversaries were telling us we needed to go back to the starting point and review the entire thorny issue, which the U.S. and Republic of Vietnam (RVN) side had considered resolved to everyone's satisfaction. A month of the FPJMT's time was spent in reviewing those points before a minute of agreement was signed on 3 May 1973, in which all parties agreed to abide by the 28 March agreement and " . . . should problems arise and require additional items to insure completion of tasks of the team, the FPJMT will discuss and decide the matter on the basis of unanimity."[8] This addendum left the Communist side with a neat mechanism for reopening the issue any time they desired to impede progress.

This same pattern was prevalent throughout the talks. The other side always insisted on putting qualifying phrases in all the agreements that would allow the issue to be renegotiated whenever an attempt to apply agreed-on procedures in practice did not serve DRV/PRG purposes. This is a standard Communist negotiating strategy since

> . . . communists believe that once negotiations have been initiated, to delay progress toward consummation of agreements tends to weaken the position of their opponents. They hope to exploit to their advantage the characteristic impatience of Western peoples, impatience to complete a task once it has been begun.[9]

They were adept at creating incidents to

delay the negotiations and shatter our illusions of progress. Side issues such as alleged transportation difficulties, communications problems, power failures, and other assorted logistics matters regularly took up precious plenary session negotiating time. The ultimate issue for delay, however, was the Saigon-Hanoi liaison flight procedures.

The United States, during the Four Party Joint Military Commission period, in the interest of expediency, had agreed to provide a weekly USAF C-130 liaison flight to Hanoi to allow the DRV delegation an opportunity to rotate delegates and receive instructions from their government. It is often true that "The diplomat who faces his opponent across the green baize sometimes acts only as a messenger. His powers may be so restricted that he can merely deliver prepared statements, outline positions as prescribed by his government, and receive communications from the opponent."[10] This was certainly true with the DRV/PRG representatives. So the flight seemed a necessity, the only other link the DRV delegation had to their superiors being via unreliable and insecure radio communications constantly monitored by South Vietnamese intelligence personnel.

Immediately after the FPJMT was formed, the DRV raised the issue of who was authorized to use the flights. They insisted that Provisional Revolutionary Government of South Vietnam delegates be allowed to travel to Hanoi with their DRV comrades. The Republic of Vietnam delegation objected and refused PRG representatives exit rights from Saigon on the basis that the PRG seat of government was alleged to be at Loc Ninh in South Vietnam, and a series of scheduled flights under Two Party Joint Military Commission (TPJMC) supervision were provided using South Vietnamese helicopters to give PRG delegates access to their authorities at Loc Ninh. This dispute was temporarily resolved by a tacit agreement between the DRV–RVN, mediated by the U.S. delegation, which provided that PRG delegates were allowed to go to Hanoi only if accompanied by an equal number of RVN delegates and only if the PRG officers returned to Saigon on the same flight since the DRV had refused to allow U.S. or RVN delegates to remain in Hanoi overnight. But just as the issue appeared to be settled, an 8 June shipboard fire provided the Communists with a heaven-sent opportunity for obstructionism.

8 June 1973 incident

Little did I realize as the burning particles from the DRV satchel began flying across the plane toward me that a nine-month delay in progress was about to begin. This flight had been scheduled to complete details for the repatriation of the remains of those U.S. POWs who had died in prison in the north and had been identified in lists exchanged at Paris at the time of the signing of the basic agreement. I was feeling quite confident after a successful detailed negotiating session with Hanoi officials. It looked as though repatriation would be possible during the last week in June. In fact, it was March 1974 before the remains were finally released at Gia Lam airport in Hanoi. The accident over the Red River shortly after takeoff from Gia Lam gave the Communists all the excuse they needed to delay repatriation and play on our Western impatience.

The fire, which originated in the satchel of a DRV captain known to us to be an explosives expert, we suspected to be a true accident caused by the premature ignition of a faulty magnesium-type document destructor. However, the North Vietnamese immediately seized on this opportunity to obstruct progress. Within minutes after the flames were extinguished by a highly efficient USAF crew, as senior U.S. delegate aboard the flight, I extracted a written statement from the still visibly shaken chief of the DRV delegation. This handwritten admission clearly

humanitarian portions of the Paris Agreement, had no difficulty in making a travesty of the entire "peace" agreement.

WHAT LESSONS are to be learned from our unhappy experience in attempting to negotiate with the Vietnamese? How can we improve our continuing efforts to resolve the question of those missing in action (MIA) that currently is the central issue impeding the normalization of U.S.–Vietnamese relations?

Certainly the key to understanding the Vietnamese position lies in the theory of reciprocity. The Vietnamese realize that the information they possess is a valuable bargaining chip. They will not release that information until they can link the surrender of their most valuable negotiating issue to a reciprocal surrender by the U.S. of something equally valuable, be it money or U.S. support for some Vietnamese political objective. Hanoi intends to exact the maximum price obtainable for answers to the questions that have troubled the minds of the MIA families these many years.

To appeal to Vietnamese humanitarianism is an utter waste of effort. They react to only two stimuli, reward and punishment. Since we have ruled out the use of the latter, the only course of action left is that of "buying" information. The only issue to be decided is the "price."

How should our negotiators prepare themselves to meet this wily enemy at the round table? What tactics should be used to minimize the price we must pay to achieve our goal?

The first step must be to form a special team of carefully selected negotiators. They should be people familiar with the language, philosophy, history, and culture of the enemy they are about to confront. Our negotiating team should thoroughly research the history of the French experience in the 1954–55 negotiations with the North Vietnamese about this same issue. Hanoi's delegates can be expected to follow the same scenario used in those talks. The records of our 1973–74 FPJMT delegation and those of the Korean Armistice Conference will also provide valuable insights into day-to-day Communist negotiating tactics. Together these sources will help prepare our team to detect and avoid many of the pitfalls the Communists are sure to construct. Our negotiators should also receive formal instruction in the psychology of patience and mental endurance.

Maximum use of private sessions should be made during the actual negotiations. Staff members on both sides can work out many of the nagging details that disrupt formal sessions if a continuing environment of staff coordination is created. This method of resolving details will also tend to minimize the opportunity for polemics in the plenary sessions. The Communists will continue to use open sessions as a forum for their propaganda. We should also continue our publicity efforts to solicit world opinion support for our position. However, it should be realized that this technique has no effect on the Vietnamese position.

A maximum effort should be made to gain the initiative in the talks by using a carefully planned series of graduated offerings of reward to determine the minimum price we can expect to pay for the information we are seeking. Our objective should remain consistent, and all Communist attempts to move from the specific issues at hand to abstract issues should be blocked. Abstract discussion in the plenary sessions should be avoided, and our specific objectives and our position on the specific issues should be clearly and continuously stated.

Since the Communists have historically chosen to clothe their negotiators in military uniform for negotiations with the free world, there is a need to develop within the U.S. military establishment a group of officers

trained in the techniques of negotiating with the Communists. There already exists within the services a body of officers trained in the general area of international relations in support of various intelligence and foreign area specialty programs. Consideration should be given to creating a DOD training course, in coordination with the State Department, to prepare selected officers in the specifics of negotiating tactics and the particulars of negotiating with Communist representatives. The stakes are too high in these types of confrontations to continue to use hastily thrown together groups of officers in the hope that their general knowledge and individual high motivation will overcome their lack of thorough preparation and training in the art of negotiation. The Communist delegates are all carefully trained, experienced negotiators, who have spent long months and even years in painstaking preparation for their roles. We can afford to do no less.

Since the Second World War we have amassed a considerable body of knowledge and experience about how to negotiate with Communists. Therefore, the information needed exists to form a solid foundation for a concentrated training program to prepare selected individuals, both in the military and other governmental agencies, to meet and defeat this enemy at the bargaining table.

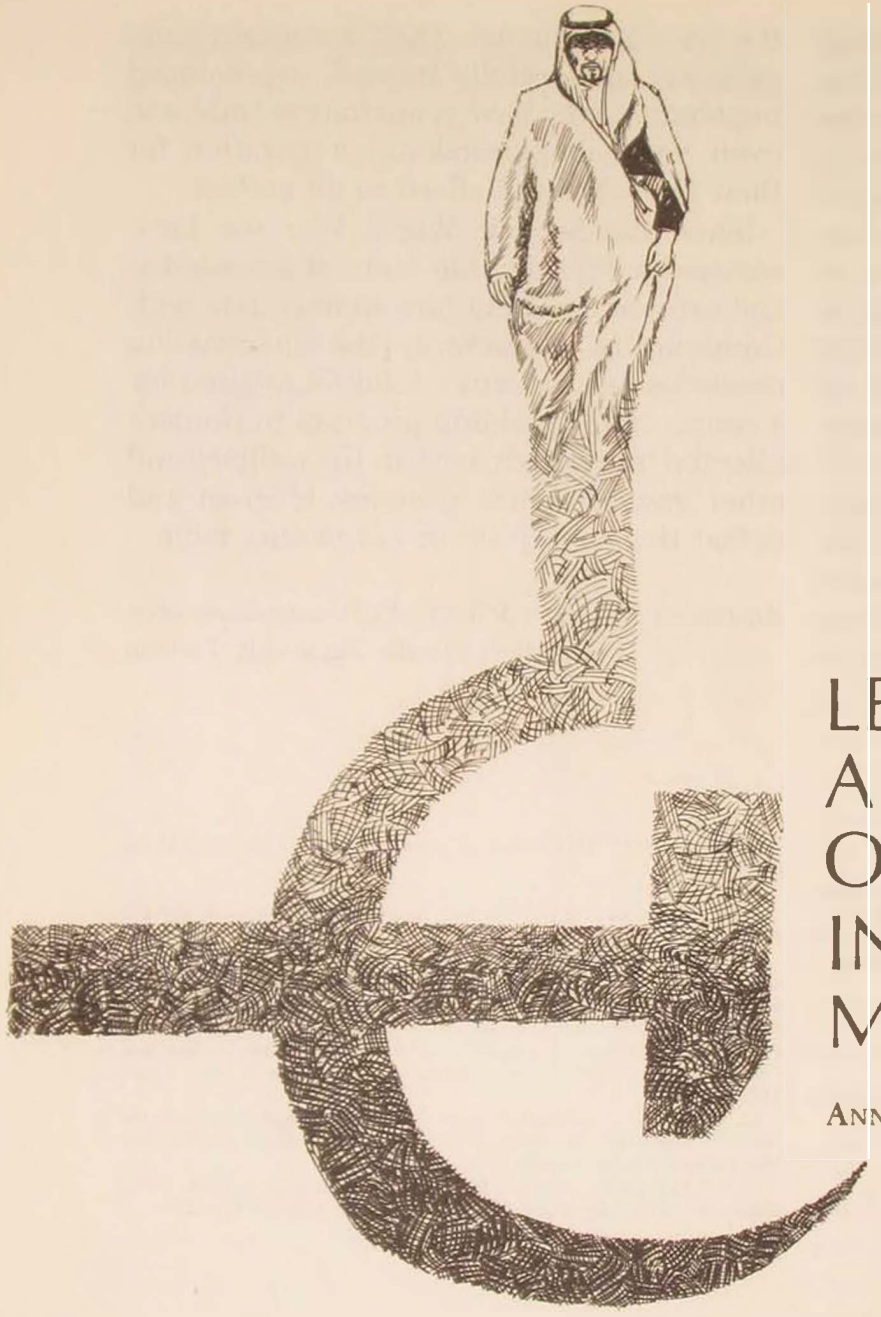
American Embassy School of Chinese Language and Area Studies Taichung, Taiwan

Notes

1. Full title: The Agreement for Ending the War and Restoring the Peace in Viet Nam; With Four Protocols, signed 28 January 1973 in Paris by representatives of the United States of America, the Republic of Vietnam, the Democratic Republic of Vietnam, and the Provisional Revolutionary Government of South Vietnam.
2. U.S. Delegation to the Four Party Joint Military Team Yearbook, April 1974, Saigon-Republic of Vietnam, Foreword.
3. Henry A. Kissinger, "The Viet Nam Negotiations," *Foreign Affairs*, January 1969, p. 211
4. C. Turner Joy, *How Communists Negotiate* (New York: The Macmillan Company, 1955), p. 10.
5. U.S. note delivered to the Democratic Republic of Vietnam Embassy in Paris on 21 July 1973, p. 1.
6. DRV translation—minutes of FPJMT meeting, 15 May 1973, p. 1.
7. Joy, p. 130
8. Point Four of FPJMT Minute of Agreement signed 3 May 1973 at Tan Son Nhut, p. 1.
9. Joy, p. 39.
10. Fred Charles Ikle, *How Nations Negotiate* (New York: Harper and Row, 1964), p. 123.
11. Point Four of Agreement Approved by the Delegations to the FPJMT on the Examination of the Burned Bag Involved in the Incident Occurring on the U.S. Aircraft During the 8 June 1973 Liaison Flight and the Return from the Said Aircraft to the Headquarters of the DRV Delegation and the PRG Military Delegation; prepared by Lieutenant Colonel Vo Tho Son, Chief of the PRG RSVN Military Delegation, Host of the Session, 11 June 1973, p. 1.
12. William W. Tombaugh, "Some Thoughts on Negotiating with the North Vietnamese," *The National Security Affairs Forum*, The National War College, Spring/Summer 1975, p. 57.
13. U.S. Delegation Four Party Joint Military Team History, 31 March–31 December 1973, Saigon-Republic of Vietnam, 28 June 1974, p. 29.

You fight in your way and we fight in ours; we fight when we can win and move away when we can't.

LIN PIAO
Long Live the Victory of People's War! (1965)



LEBANON, SYRIA, AND THE CRISIS OF SOVIET POLICY IN THE MIDDLE EAST

ANNETTE E. STIEFBOLD

THE Soviet Union's experiences in the Middle East have been characterized by both success and failure beyond expectation. In large part this is because although the U.S.S.R. has aggressively pursued opportunities as they occurred, the initiative has usually remained with the countries of the region. The Soviets have found willing takers for their economic, military, and political aid but have learned that such support does not necessarily increase their leverage or their control over developments. Consequently, Soviet policies and influence have become entangled in the Middle East's political and military conflicts, risking involvement of the U.S.S.R. in situations more costly and less certain of payoff than it had bargained for.

Thwarting Moscow's Objectives

The Middle East has frequently confounded Soviet perceptions and prognostications. This is well illustrated by recalling Communist Party of the Soviet Union (CPSU) General Secretary Leonid Brezhnev's confident assurances at the Congress of U.S.S.R. Trade Unions in March 1972 that "our relations with our Arab friends have never been as firmly based and all-pervading as now,"[1] in light of the expulsion of Soviet advisers from Egypt in July of that year; the Sinai agreement of September 1975; Egyptian abrogation in March 1976 of the Soviet-Egyptian Friendship Treaty; and the problems with Syria over Lebanon.

The fratricidal nature of intra- and inter-Arab politics accounts in large measure for Moscow's inability to ensure its control over its would-be clients' policies and guarantee the stability of its influence. The Soviets have long decried the factionalism within individual Arab countries and the inability of the Arab nations to coalesce around common policies. The failure of the Arab countries, including those with more or less socially and politically progressive regimes, to marshal their united efforts in the anti-Israeli, anti-imperialist struggle has confounded even the U.S.S.R.'s top Middle East experts. As Rostislav Ulyanovsky, Boris Ponomarev's deputy in the International Department of the CPSU Central Committee, maintained, unity of the anti-imperialist, national-democratic, and progressive forces within the Arab world as a whole is impossible as long as the disunity of these forces within individual Arab countries persists.[2]

Moscow and the Lebanese Crisis

The crisis in Lebanon posed the latest threat to Moscow's painstaking efforts to achieve a resolution of the Middle East conflict favorable to itself and its clients. For reasons of both ideology and practicality, the situation in which two Soviet-armed clients, Syria and the Palestine Liberation Organization (PLO), confronted each other in a power struggle was one in which the Soviets could not long remain impartial. The threat of a resurgence of the right in the Arab national liberation movement had become a greater concern to Moscow since the defection of Egypt and the flowing of enormous oil wealth predominantly to conservative regimes. Thus, the consequences of a smashing defeat of the Palestinians and Lebanese left and the possible realignment of Syria were too serious to be countenanced. Having been warned before by Arab Communists, including the Lebanese, that its policy of encouraging national-democratic regimes was backfiring because it had allowed the recrudescence of the right,[3] and having defined the Lebanese religious community cleavage strictly in class terms, linking the Phalangist party to the "ruling reactionary financial oligarchy,"[4] Moscow now seemed convinced that it had to act to prevent any further erosion of the left's position in the Middle East. Thus, when it became apparent that the impact of Syria's intervention was a de facto alliance with the rightist elements in Lebanon, which themselves were tainted—in the Soviet view—by Israeli support, the Soviets had no alternative but to side openly with the Palestinians and their allies among the Lebanese left. Moscow initially tried to apply behind-the-scenes pressure on Syria; gradually, however, as the Soviets themselves came under increasing pressure from Arab leftists to do more than give token verbal assurances of their solidarity, private arm-twisting yielded to public denunciations. Even then, however, the Soviets' determination to avoid a rupture with Syria if at all possible was evident, for once having enunciated its strong public condemnation, Moscow muted its attack and took an altogether different approach.

Soviet analysis and pressure on Syria

The Soviets reached back into Arab history for an acceptable explanation of the root causes of what they euphemistically termed "the present flareup of inter-Arab strife" in Lebanon.[5] It is not surprising that vestiges from the feudal relationships of only a few decades ago should remain in the economy, public life, and political thinking of the Arab countries, Soviet commentator Dimitri Volskiy observed. The religious strife is another undesirable legacy from the past which Arab progressive forces consider essential to overcome, but, this takes time, Volskiy acknowledged.

A revealing insight into the depth of Soviet consternation over Lebanon was provided by two small but significant deviations from this analysis. An author in the Soviet journal *New Times* contended that the Lebanese situation was really a matter of *class conflicts* that were being masqueraded as religious strife, while a *Pravda* editorial insisted that no internal contradictions in Lebanon could have led to such destructive consequences were it not for the interference of Israel and "imperialist circles."[6] The Israelis, the Soviets maintained, were delighted to be able to point to the Lebanese civil war as proof that followers of different religions could not coexist peacefully within a single state.

When the Syrians invaded Lebanon on May 30, 1976—hours before Premier Aleksei Kosygin arrived in Damascus on an official visit—the Soviets publicly adopted a cautious wait-and-see attitude. The Syrians, Moscow stressed, had given assurances that their intervention was only for the purpose of putting in place a cordon sanitaire between the opposing forces and would be of short duration. While the official Soviet-Syrian communiqué issued June 4 following Kosygin's visit made no direct mention of the presence of Syrian troops in Lebanon, a *Pravda* article of June 6 attempted to put a good face on the situation, attributing to Syrian papers the report that Syrian army units had entered Lebanon and that their presence had "helped ease the situation" in a number of regions of the country.

As the Syrian military presence in Lebanon dragged on and it became increasingly obvious that Syrian forces were engaging the Palestinian commandos and Lebanese leftists in direct combat, the Soviet position became untenably awkward. According to *Le Monde,* on July 11 Brezhnev sent Damascus a message conveying the Soviets' total exasperation with the Syrians' conduct in Lebanon. "We understand neither your line of conduct nor the aims which you are pursuing in Lebanon," Brezhnev is said to have declared.[7] The Syrians were urged to withdraw their troops to facilitate cessation of the conflict. The message concluded with a thinly disguised threat of a rupture in Soviet-Syrian relations if Syria failed to comply.

the Syrian response

On the afternoon of July 20 Syrian President Hafez al-Assad delivered a lengthy address to the members of the newly elected Syrian provincial councils, devoted almost in its entirety to a defense of Syria's intervention in Lebanon.[8] Assad justified Syria's actions as designed to preserve the political equilibrium and restore stability in Lebanon. He insisted that the intervention was motivated by the dual necessities of foiling Israeli-supported plans to partition Lebanon and preserving the Palestine resistance movement in Lebanon. Ostensibly endorsing the Soviets' opposition to partition because it would vitiate the Arab's position on the viability of a democratic secular state and acquit Israel of the charges of racism,[9] Assad indirectly revealed concern of another order. The Syrian president expressed the fear that partition as a result of the Lebanese civil war would spawn a state comprised of rancorous and

embittered people, whose history of oppression would lead them to reject pan-Arab and Islamic values; in other words, a state that would present fertile ground for Marxism. More to the point, Assad charged that the Palestine resistance was being manipulated by forces inside Lebanon and in the international arena, which were seeking to exploit it for their own tactical and strategic objectives. The Palestine resistance was, therefore, unwittingly fighting to accomplish the goals of others, against the true aims and interests of the Palestinian people.

Although he detailed even previously confidential inter-Arab overtures to end the Lebanese crisis, Assad did not mention the Soviet note, the existence of which was by then becoming known from other sources. Later he was to express his astonishment that the Soviets had permitted the note to become public.[10] Assad's rebuff of the Soviet démarche was no less emphatic, however, for having been made by indirection. Ostensibly rejecting the right of any Palestinian Arab to demand Syria's withdrawal from Lebanon, he declared in the strongest language that only the constitutional authorities of Lebanon had the right to make such a request. Moreover, he added darkly, the demand for Syria's evacuation was being made "for the sake of everything other than" the liberation of Palestine.

Moscow and Damascus

The Syrian spurning of the Soviet request ultimately forced Moscow to call openly for the withdrawal of Syrian troops and their replacement, as urged by the Arab League, by inter-Arab security forces. The Syrians were implored to support their "natural allies," the leftists and Palestinians. Their intervention, the Soviets charged, was playing into the hands of the "imperialists and Zionists," who were seeking to prolong the Lebanese conflict in order to undermine the Arab national-liberation movement and divert the Arabs from their main task, the struggle against Israel. As a Radio Moscow commentator ruefully asserted, the "imperialists and Zionists" had succeeded in obtaining what they had only dreamed of in the past: a deep division in the Arabs' ranks and distraction of their efforts from the struggle against Israeli aggression and occupation.[11] In the words of an important Soviet government policy statement, to which repeated reference has been made since its issuance April 28, 1976, "obvious attempts are being made to strike a blow at the forces of the Palestine resistance movement and draw the Arabs into a fratricidal war. This is the real meaning of the events in Lebanon."[12]

The Soviet Union's limited leverage over Syria in the Lebanese debacle points up the extent to which its policy options have been circumscribed in the Middle East. After the costly injury to Soviet prestige and influence inflicted by the Egyptian rupture, Moscow could not afford a permanent breach with its Syrian client. The extent of the Syrians' freedom of maneuver was reflected in President Hafez al-Assad's rejection of a direct appeal from Brezhnev on September 11 for withdrawal of Syrian forces from Lebanon, despite a threatened reduction in Soviet military and technical aid.

In a revealing interview with a Beirut journal published on October 1, President Assad first gave vent publicly to his reaction to the Soviet initiatives, which had already been communicated in private.[13] Assad stated that he regarded Brezhnev's request for a Syrian withdrawal simply as an expression of a point of view on a matter which was not subject to compromise because it concerned Syria's fundamental national interests and principles. He repeated his justifications of Syria's action, adding that he had hoped Syria's "Soviet friends" would understand and support its position. In reply to the assertion of the questioner—who clearly was not out of

sympathy with the Syrian presence in Lebanon—that Moscow undoubtedly felt justified in chastising Assad for preventing the establishment of a leftist state in Lebanon, Assad retorted: "If the Soviet Union has the right to reproach us, then we have the right to ask the Palestinian resistance not to become a tool in the scheme that can lead only to partitioning Lebanon." Finally, Assad acknowledged receipt and rejection of the second Soviet message and confirmed the questioner's depiction of both messages as being based on the premise that Syrian intervention was "robbing nationalist forces of the chance to establish a progressive regime in Lebanon."[14]

Frustrated by their failure to get their position accepted by their Syrian ally, the Soviets sought to rally the Arabs around their shared hostility to Israel by assigning Israel a large share of responsibility for the Lebanese debacle. Soviet spokesmen indicated a genuine concern that the negative impact on Arab unity and hence ability to prosecute the anti-imperialist struggle would be long lasting. They accused Israel of supplying weapons, training Lebanese Christian soldiers on its territory, instituting a naval blockade against the Palestinian-held Lebanese ports of Tyre and Sidon, and, under the terms of a secret agreement, allowing Phalangist troops to infiltrate southern Lebanon from Israel. Furthermore, they charged that Israeli troops had invaded Lebanon with the eventual aim of conquering the southern part of the country. Moscow denounced any attempt to partition Lebanon as creating "a new imperialist state, a new Israel."[15] Such a partition, the Kremlin feared, would further erode the Soviet position in the region.

In an obvious exercise of rubbing salt into old wounds, the Soviets also laid the blame for the Lebanese disaster at Egyptian President Sadat's doorstep. They charged that the Lebanese events were the "worst consequences" of the Sinai agreement, which they tarred with the epithet of having stabbed the Palestinian Arab people in the back.[16] A *Pravda* article claimed that the U.S.–Israeli policy of "partial steps" and the Sinai agreement had been the "detonator" for the flare-up of the Lebanese crisis.[17] According to the Soviets, the Sinai agreement had permitted Israel, the "imperialists" and Arab reaction to fan the flames of civil war in Lebanon, against the unified Arab front, and to liquidate the Palestine resistance movement. Because the Palestine resistance was the "vanguard of the Arab national-liberation movement," the Soviets asserted, the brunt of the "imperialists' " attacks were directed against it.[18] Writing in the CPSU journal *Kommunist,* Soviet Foreign Minister Andrei Gromyko exhorted the warring factions to resolve their differences in order to permit the resumption of the main business at hand, the anti-Israeli (and, more important from the Soviet point of view, the anti-imperialist) struggle.[19]

Moscow was apparently hopeful that the election of Elias Sarkis might be a first step toward satisfactory resolution of the Lebanese crisis. TASS reported that political circles in Beirut believed that Sarkis commanded sufficiently broad-based support to enable him to find a solution to the crisis acceptable to all. The intensification of the Syrian-rightist Christian offensive against the Lebanese left and the Palestinians was therefore said to have placed Sarkis in a difficult position and to have torpedoed the political talks he had undertaken with a view to settling the crisis.[20] Syria was directly accused of aiding the rightists, who themselves were said to be in league with "aggressive NATO quarters" and Israel. The Soviets openly scoffed at Syria's official explanation that its aim was to help stop the fighting and normalize the political situation. The entry of the Syrian troops into Lebanon had not helped terminate hostilities, Moscow bluntly asserted, but in fact had exacerbated them.[21]

Obviously, the Soviets were anxious to avoid a repetition in Lebanon of a Sinai-type dénouement that would further erode their influence in the region. Moscow emphatically asserted its stake in Lebanon in an official response to hints of possible Western military intervention there. "The Soviet Union is forced to declare in this connection," the TASS statement read, "that the Middle East is much closer to the Soviet Union than to those who issue such threats and, in any case, the Soviet Union is not less interested in how the situation in Lebanon and around it develops and continues to develop. Nobody should lose sight of this."[22]

The Soviets' consistent message to the Arabs was that inter-Arab agreement on Lebanon was a necessary *precondition* to an overall Middle East settlement. Thus, in early September Moscow declared that the Lebanese crisis, which contained all the contradictions in the Middle East, had to be "liquidated" before it would be possible to resolve the fundamental issue: elimination of the consequences of the 1967 Israeli aggression. The Soviet formula called for a political solution based on a reasonable compromise by the Lebanese themselves without outside pressure, which would preserve the national independence, sovereignty, and territorial integrity of Lebanon. The settlement, furthermore, should not be achieved at the expense of the Palestinians' rights or without taking into consideration the lawful demands of the Lebanese national patriotic forces.[23]

A New Soviet Approach

Soviet Foreign Minister Gromyko's September 28 speech to the U.N. General Assembly restated his country's basic positions on Lebanon and the Middle East, except for the intriguing suggestion that a reconvened Geneva Conference should examine "*all* the main questions of a Near East settlement."[24] Notably absent from Gromyko's speech was any direct criticism of Syria. On the other hand, Gromyko continued the Kremlin practice of verbally hedging on the PLO, by using the term "Arab people of Palestine" instead of referring to the PLO by name; on other occasions the Soviets have referred generically to the "Palestine resistance movement."

While at the U.N., Gromyko also met with PLO Executive Committee member Faruq al-Qaddumi to discuss the Lebanese situation. According to TASS, Gromyko stressed the Soviet Union's full support for the Palestinian Arabs' struggle for "their inalienable rights, including the right to set up their own state."[25] The indication is that in emphasizing the precise parameters of the U.S.S.R.'s support while stressing its desire for a comprehensive settlement of the Middle East problems within the Geneva context, Gromyko may have been letting the Palestinians know that the Soviet Union considered that only further damage could be done to their central cause by delaying a return to the Geneva conference table while divisive but tangential issues were pursued in Lebanon.[26] The TASS notation that the conversation took place in a "friendly atmosphere" connotes a less than total identity of views.

On October 1, Moscow issued a formal proposal calling for a reconvening of the Geneva Peace Conference as early as October or November, before prior resolution of the Lebanese conflict.[27] Declaring that the Middle East situation was "highly unsound and unstable" and that a new military explosion could erupt there at any moment, the Kremlin now asserted that only an overall Middle East settlement could restore peace to the Middle East. Moreover, it explicitly linked the problem of Lebanon to such a solution. Perhaps the Soviets hoped they could cajole the Syrians with the prospect of gains at the conference table. In any event, the Kremlin statement sharply admonished that only those who were striving to preserve the

existing situation in the Middle East for the sake of their own narrow purposes could oppose achievement of a broad political settlement.

In addition to the obvious motivation of trying to steal a march on Secretary of State Kissinger, who the week before in his address to the U.N. General Assembly had indicated United States support for a reconvening of the Geneva Peace Conference, the Soviets may have been responding to their own growing apprehensions that once again they were becoming captive of events in the Middle East. Caught between their commitments to the Syrians on the one hand and the Palestinians on the other, plus the ever-present necessity of burnishing their revolutionary credentials, the Soviets saw their policy options rapidly diminishing. The very day the Soviets announced their new proposal, in fact, the Central Political Council of the national and progressive parties and forces in Lebanon publicly called for additional tangible Soviet support. Invoking the "strategic solidarity" existing between the worldwide national liberation movement and the Soviet-led Socialist camp, it appealed to "world progressive public opinion" to go beyond the role of "spectator" and grant effective material support to the struggle against the "imperialist plot" carried out by Syrian forces.[28]

Gambling with High Stakes

In calling for a reconvening of the Geneva Peace Conference at a time when its own fortunes in the Middle East had reached a post-1967 nadir, the Soviet Union gambled that it would be better able to stem the erosion of its prestige and exert more influence on the outcome of the settlement through its role as cochairman than by a continuation of its unsuccessful individual diplomatic efforts. Lebanon for the Soviets was a hopeless quagmire in which its entire Middle East strategy risked being submerged. At one stroke, Moscow seemed to be trying to get its Middle East cart back on track, by virtually forcing the Arabs to put aside their disagreements over Lebanon and reunite in a solid anti-Israeli front. It is only on this basis, the Soviets believe, that their own objective of permanently altering the regional correlation of forces in their favor can be achieved.

For Syria, too, the Lebanon operation represented a dangerous gamble. Pulled in opposing directions by pressure to join an alliance of "radical" Arab states including Libya, Iraq, and Algeria (reportedly urged by Kosygin during his Damascus visit in June[29]) or to mend its fences with such "conservative" states as Egypt, Saudi Arabia, Kuwait, and Jordan, Syria had somehow to convince critics (both domestic and within the Arab world) of the justice of its course in Lebanon. Economic pressure resulting from a suspension of Saudi Arabian aid over Syria's feud with Egypt and Iraq's suspension of oil deliveries threatened to undermine Assad's regime from both within and without, while a permanent break with the Soviet Union would result in a cutoff of the arms and technical assistance essential to back up Syria's ambitions both in the Arab world and toward Israel.

Clearly, Syria's immediate goal in invading Lebanon had been to prevent the creation of a radical Lebanese-Palestinian state in the volatile region on Israel's northern flank and thereby to reduce the chances of being dragged into a war with Israel contrary to Syria's interests by forces over which Syria had little or no control. The ideal outcome for Syria was a unified Lebanon dependent on Syria for maintaining internal order and external security and a chastened PLO whose presence in Lebanon would be governed by a more restrictive application of the 1969 Cairo accords. Syria's goals also included improved relations with Egypt and restoration of some balance in its relations between East and West. These moves would

facilitate obtaining more economic assistance from both the United States and the conservative oil states and possibly bring closer the ultimate goal of a negotiated return of Israeli-occupied Syrian territory.

PERHAPS THE most significant effect of the Lebanese civil war outside Lebanon itself was the way it engendered a realignment of forces first within the Arab world and second between the Arabs and the protagonists of East and West. Syria, whose reputation as champion of Arab nationalism and socialism had been enhanced both within the Arab world and in Moscow as a result of its strident denunciation of Egypt's unilateral acceptance of the Sinai agreement with Israel, suddenly became politically isolated from its former allies, while gaining the support of such an unlikely colleague as Jordan's King Hussein. Egypt, perhaps seizing on an opportunity to regain lost standing, assumed the role of one of Syria's most vociferous critics and a prime mover in seeking inter-Arab resolution of the crisis, while Libya emerged as Moscow's latest (and certainly most unpredictable) trump in the Middle East. The war even provided an opportunity for France to fulfill its ambition of exercising an independent diplomatic role. Lebanon also, of course, dramatically highlighted the limits of the Kremlin's ability either to control its Middle Eastern clients or effect crucial gains on their behalf. Moscow knows that no matter how much the Arabs may denounce the Sinai agreement, they recognize that the only substantial recovery of territory lost to Israel has occurred through United States mediation. The Soviets, therefore, urgently had to demonstrate to their Arab clients that they, too, can "deliver." This explains the Soviets' October 1 move to place the Middle East problem before what they hoped would be a more hospitable venue. As cochairman of the Geneva Conference they might reasonably expect to regain the diplomatic initiative that the preceding events had denied them.

Coral Gables, Florida

Notes

1. L. I. Brezhnev, "Decisions of the 24th CPSU Congress, A Program of Action for the Soviet Trade Unions," March 20, 1972, in L. I. Brezhnev, *On the Policy of the Soviet Union and the International Situation*, prepared by the Novosti Press Agency Publishing House, Moscow (Garden City, New York: Doubleday & Co., 1973), p. 175.

2. R. Ulyanovsky, *Socialism and the Newly Independent Nations* (Moscow: Progress Publishers, 1974), p. 139.

3. Kerim Mroue, "The Arab National-Liberation Movement," *World Marxist Review*, vol. 16, no. 2, 1973.

4. See Nadim Abdel-Samad, Political Bureau member and Central Committee Secretary of the Lebanese Communist Party, "Tension Persists: Political Events in Lebanon," *World Marxist Review*, vol. 18, no. 9, September 1975. See also John K. Cooley, "The Shifting Sands of Arab Communism," *Problems of Communism*, March-April 1975, pp. 22–42; Cooley notes that in a typically Lebanese paradox one of the country's leading leftists, Kamal Jumblatt, was also one of the largest landowners. It was feared that Jumblatt's assassination in March 1977 might shatter the fragile peace that had ended the nineteen-month civil war the previous November.

5. D. Volskiy, "The Lebanese Drama and the Middle East," *New Times*, no. 29, July 1976.

6. L. Volnov, "The Tragedy and Courage of Tel al-Zaatar," *New Times*, no. 32, July 1976; and "Stable Peace for the Near East," *Pravda*, July 27, 1976.

7. Message from Leonid Brezhnev to the Syrian leaders, *Le Monde*, July 20, 1976.

8. Damascus Domestic Service, July 20, 1976.

9. Although not all Arabs believe in the slogan of the democratic secular state, Assad asserted, it serves the Arab cause far better than the previous vow to "throw the Jews into the sea," which rendered "great service" to Israel.

10. See interview by Salim al-Lozi with President Assad in *Events* (Beirut), vol. 1, no. 1, October 1, 1976.

11. Farid Seyful-Mulyukov, Commentary in English to Africa, Radio Moscow, August 27, 1976.

12. TASS, April 28, 1976.

13. Interview, *Events*, October 1, 1976. In the interview Assad denied that he had made a secret trip to the U.S.S.R. prior to delivering his July 20 speech.

14. Ibid.

15. Farid Seyful-Mulyukov, Moscow Broadcast in English to Africa, August 27, 1976.

16. Moscow Broadcasts in Arabic to the Arab World, September 9 and 11, 1976.

17. Yu. Glukhov, "Tel Aviv's Undeclared War," *Pravda*, September 19, 1976.

18. Moscow Broadcast in Arabic to the Arab World, September 9, 1976. The authoritative *Pravda* "Observer" on August 30 also referred to the "Palestine resistance movement and the Lebanese national-patriotic forces" as the vanguard of the Arab national-liberation movement.

19. *Kommunist*, no. 14, October 1976.

20. TASS, September 22 and 29, 1976.

21. Leonid Biryuzov, "The Tragedy and Hopes of Lebanon," *New Times*, no. 36, September 1976. The Soviets also added to the litany of "imperialist" objectives in Lebanon the weakening of Syria itself; see Y. Tyunkov, "Seventeen Months of Bloodshed," *New Times*, no. 38, September 1976.

22. TASS Statement in English, June 9, 1976.

23. "A Way Out of the Lebanese Impasse Must Be Found," *Pravda*, September 8, 1976.

24. *Pravda*, September 29, 1976; emphasis added.

25. TASS, October 3, 1976.

26. The feeling that the PLO's involvement in the Lebanese civil war had severely undermined the Palestinian cause was shared by some Palestinian officials. As the President of the Damascus-based Palestinian National Council, Khalid Fahum, remarked: "Now we have all the support of the Communist parties in Europe, in France, in Italy. But is this helping us? No." Reported by James F. Clarity in the *New York Times*, September 29, 1976.

27. "Proposal from the Soviet Union on a Settlement in the Middle East and on the Geneva Peace Conference," TASS in English, October 1, 1976.

28. Beirut Domestic Service [Procoup radio], October 1, 1976. Lebanese leftist leader Kamal Jumblatt also called for more decisive Soviet action, including a public Soviet demand for Syrian withdrawal and defiance of the blockade against Sidon and Tyre; see *Le Monde*, October 10–11, 1976. The head of the PLO office in Belgrade sharply criticized the Soviet's Geneva initiative, saying it indicated Moscow's continued support of Syria as its last base in the Arab world; he threatened that a PLO defeat in Lebanon would lead to the closure of all Soviet embassies in the Arab countries. Cairo MENA in Arabic, October 12, 1976.

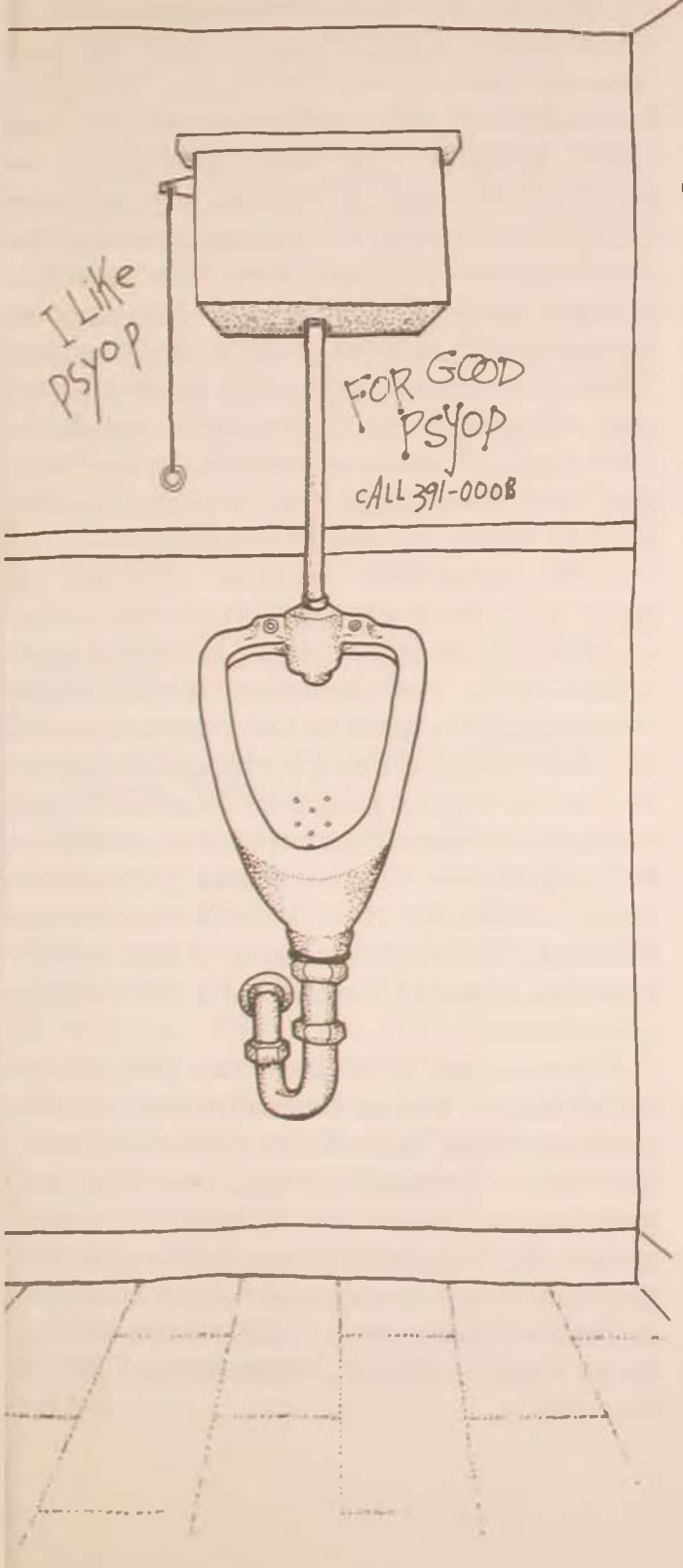
29. See *Events* interview, October 1, 1976.

The day may dawn when fair play, love for one's fellow men, respect for justice and freedom, will enable tormented generations to march forth serene and triumphant from the hideous epoch in which we have to dwell. Meanwhile, never flinch, never weary, never despair.

Winston Churchill
Parliamentary Debates
March 1, 1955

PSYOP IS A NASTY TERM— TOO BAD

MAJOR FRED W. WALKER



TODAY'S money crunch continually requires that the Air Force do more with less. Yet while concern focuses on perceptions of the eagle's strength, we neglect the sparrows, who by their numbers range wider with more persistence. We are missing a bet by neglecting the field of psychological operations, commonly known as PSYOP. Here is a vast array of principles and techniques which, properly employed, can send powerful signals to enhance Air Force effectiveness at relatively little cost—perhaps no definable cost at all.

Too often, psychological aspects of operations are placed at the back of the book and completely neglected. Commanders and staff officers usually fail to consider these aspects because the term is misunderstood. Many are unaware of PSYOP's true nature, and intangibility makes it difficult to quantify or measure its effectiveness. To compound this, one enters a dense forest of obscurity when seeking official guidance. No clear direction is established for the military services except in wartime. As a result, the services are reluctant to deal with it at all, and operational effectiveness suffers.

To illustrate, several months ago the Air Force began a program in an overseas area where specially equipped aircraft flew night-and-day reconnaissance missions over U.S. bases and supply convoys to help protect them from bandits. When the responsible

unit sent its operations plan to higher headquarters, a staff member noted that its PSYOP annex contained only a general statement of no value. Nevertheless, the plan was approved, and the unit was advised to expand its PSYOP annex prior to implementation.

The furor thus raised might have been classed as comic relief were it not such a sad indicator of the ignorance surrounding PSYOP and a prime example of its neglect as detrimental to the mission. Amid numerous phone calls, one colonel was aghast that we would contemplate any such thing without specific, highly classified guidance from the State Department, the ambassador, and numerous other headquarters. The issue was referred to me, and I was asked to deal with the calls and further operation.

Explaining that we simply wanted an unclassified and completely truthful information release describing the aircraft as sentinels, I noted that while no national policy specifically directs us to employ PSYOP techniques in daily activities neither is there any clear restriction. So long as material is in consonance with public information guidelines and national objectives, no prohibition exists. He reluctantly admitted that, though it sounded good, he still felt it was illegal.

He used the term "psychological warfare" (PSYWAR), as if that were involved, and maintained that we military people are constrained by laws and regulations regarding such nefarious activities. True, but we were not talking about psychological warfare. We discussed regulations and terminology to no avail, and the subject was dropped at levels above my staff position. In retrospect this was probably best; we *were* acting in a poorly defined area, so fraught with misunderstanding that it could have brought trouble. Still, the incident clearly illustrates the problem and hints at obstacles barring the way to improvement.

Here was an operation to prevent possible violence, injury, and loss of property. A major deterrent feature would have resulted with a modest and well-instituted bit of publicity—to inform potential thieves that aircraft were watching, equipped to see and give alarm even at night! Certainly this would have followed State Department public information guidance, but there seemed no need to seek out individual approval for a single minor item. I suspect that, had the issue not been linked to the term "PSYOP," it would have been conducted without one raised eyebrow. The term itself seems to stimulate thoughts of demons and witches' cauldrons. Because of ignorance, misunderstanding, and probably fear, this valuable tool was not used; and the operation was not executed with the best possible effectiveness. Though we cannot, even with hindsight, assess whether it would or would not have been more effective—due to the tool's intangible nature—few could objectively say that PSYOP would not aid such a program.

Many Americans consider "PSYOP" a nasty term. Among some more-or-less logical reasons most widely accepted is its close association with, and inclusion of, the term "propaganda"—another innocent term with an oddly acquired unsavory image because it has lost its original religious connotation and has come to mean lies, or at least an unethical twisting of truth. There is even a propaganda book facetiously titled *The Un-American Weapon.* Without foundation, or knowing its meaning, people have labeled it as unethical and evil.

All communication has some psychological objective, and government communication is naturally intended to support national objectives. Nothing is wrong with this; any government might be faulted for communicating otherwise. But, rather than engage in a dull, semantic analysis of terms such as "truth," "perception," "information," etc., let us briefly examine definitions and official doctrine:

> Psychological operations—These operations include psychological warfare and, in addition, encompass those political, military, economic, and ideological actions planned and conducted to create in neutral or friendly foreign groups the emotions, attitudes, or behavior to support the achievement of national objectives.
>
> Propaganda—Any form of communication in support of national objectives designed to influence the opinions, emotions, attitudes, or behavior of any group in order to benefit the sponsor, whether directly or indirectly.
>
> Psychological warfare—The planned use of propaganda and other psychological actions having the primary purpose of influencing the opinions, emotions, attitudes, and behavior of hostile foreign groups in such a way as to support the achievement of national objectives.[1]

Are these necessarily sinister? As they are official definitions, one may logically expect official policy and guidance regarding them. Sadly, it is difficult to find and quite often very general in nature. For example, JCS Publication 2, *Unified Action Armed Forces,* has only part of a sentence buried at the back of the book:

> . . . the Department of State has primary or collateral interest in determination, among others, of policies concerning: . . . any matters involving psychological warfare, information and propaganda, and attitudes toward the indigenous populace.[2]

Though the terminology suffers, an idea is there. Psychological warfare is indeed highly constrained and directly controlled. It is a limited field concerned with hostile targets in wartime. Note the differences between PSYOP and PSYWAR. This discussion involves the nonwartime areas of PSYOP, where it is in the national interest for military capabilities to be understood; where perceptions of power influence balances and budgets, strategies and economic policies; where national strength provides a cornerstone for diplomatic effectiveness. Here the military should have clear guidance regarding the psychological implications of every action.

General guidance for military forces does exist, though finding it practically requires a major research project. The terms "PSYOP" and "PSYWAR" are often incorrectly interchanged, and policy statements are difficult to ferret out. Within the Department of Defense guidance is thinly scattered above service levels. Some guidance is in unified command plans and policy directives; we must look for the appendix at the back of the book, and it may often be characterized by the term "ambiguous." Lower in the system, it becomes more definitive. Among the services, the Army has broadly defined doctrine, as do the Air Force and Marine Corps, but service doctrine often reflects the ambiguity above service levels. This leaves it in a limbo of inattention because it cannot be effectively used without more specific direction.

Air Force guidance is contained in our Special Operations doctrine manual, Air Force Manual 2–5:

> All aerospace forces have essential capabilities to produce psychological effects as a result of characteristics such as range, mobility, responsiveness, and over-all tactical versatility.[3]

These capabilities are clearly spelled out:

> (1) Show of force, which can vary from a specific planned mission and deployment, to simple publication of the fact that a friendly force is in the area.
>
> (2) Attack on a selected target to demonstrate the futility of further resistance.
>
> (3) Harassing actions to limit enemy effectiveness, such as night attacks to interrupt rest, sonic booms to terrorize, etc.
>
> (4) Exploiting aerospace force maneuverability and mobility to demonstrate military superiority.
>
> (5) Leaflet and loudspeaker missions to inform or convince target audiences.
>
> (6) Humanitarian operations and support for US or indigenous civic actions.
>
> (7) Monitoring, evaluating, and analyzing the effects of operations.[4]

Examination reveals that only number five is concerned with propaganda while just two of the seven involve warlike activities. Em-

phasis is on demonstrating capabilities for desired attitudinal or behavioral response. This emphasis supports our deterrent policy. There certainly does not appear to be anything nasty, untruthful, or unethical about these capabilities, or restrictions on use of them toward national objectives. It is part of our mission.

An unwritten national PSYOP doctrine may be deduced from a White House press release as long ago as 1953:

> [there is] no strategic concept for psychological operations separate and distinct from a strategy concept for gaining national aims without war. [Psychological operations ... are] "inherent in every diplomatic, economic, military action. There is a 'psychological' implication in every act ... [and not] apart from the act." *These fundamental propositions constitute the foundations of Doctrine* about which everyone inquires. If these propositions and their implications are understood then there is no mystery about doctrine. It is an expansion of these ideas.[5]

Regardless of the validity of this statement, ambiguity remains because policy, or national doctrine, has not been written in directive form so that the military services may take positive direction from it. Why is specific doctrine found only at lower levels with increasing obscurity as we seek reference higher? In comparison, the military public information service has little problem determining guidance. Every information officer does not run to the State Department or National Security Council to receive individual blessings on each news release or issue of the local base paper. Release of public information is a local command function,[6] and guidance comes ultimately from the same national authorities. So what is wrong with emphasizing capabilities to obtain the best possible results?

The answer is simply, nothing! More important, the reason that written doctrine is lacking, and that we do not use this valuable tool is ignorance. If that seems too strong, let us say that most commanders and staff personnel have little knowledge of the true nature and value of PSYOP. This is especially evident when we encounter people using the terms "propaganda," "PSYOP," and "PSYWAR" interchangeably. The Air Force has failed to fully train commanders regarding the concept, and they in turn have not explained it to those who influence policy. We have minimal training and only rudimentary means of identifying and managing what limited expertise we do have. Without cognizant staff personnel at each level of command, there is no effective communication channel for implementing PSYOP. Inputs from the field seldom reach National Command Authorities; direction and guidance are seldom, if ever, passed back down to the field.

Perhaps we have concentrated too much on equipment. Most people attending a PSYOP briefing expect an array of loudspeaker, leaflet, and mobile printing capabilities. These are merely small adjuncts to PSYOP and have little to do with the concept. They only bring to commanders' minds thoughts of the cost of equipment and people to use it, not appreciation of the concept. Whatever the reason, we must change.

Instead, we must inform people of the idea. PSYOP is the great magnifier, and a PSYOP-oriented staff can magnify the impact of any operation a hundredfold—if only it is recognized as a legitimate and valuable participant in both the planning and conduct of operations. It cannot be tacked on as an afterthought or added as a general statement to complete the format of a plan. In order to put this idea across to our people and enhance operations, let us examine where we presently stand and determine what we must do to use such a valuable resource.

The Air Force seems to cycle through interest and disinterest in PSYOP, like a historical roller coaster. In the early 1950s, training involved sending scores of officers to

courses at Georgetown University, followed by field experience with Voice of America—obviously a result of PSYOP's demonstrated value in World War II. However, economy did away with specialized units after Korea, and training ceased. Our PSYOP capability was dispersed.

In 1967, the long-term effect of this neglect was apparently recognized. Some training was re-established with a course at the USAF Special Operations School but discontinued for lack of funds in 1968. Interest was kept barely alive by a brief description in professional military schools and a nebulous block of instruction at the Air Force Academy. It was also emphasized in counterinsurgency and unconventional warfare courses.

A third major revitalization came in late 1974, when the Special Operations School was again tasked to develop a course tailored to Air Force requirements. This latest effort was sparked by General Momyer's study of lessons learned from the Vietnam debacle. In this study he concluded that USAF: (1) needs a highly trained group of staff officers capable of planning and directing PSYOP, (2) should pursue a modest research and development program on supporting equipment, and (3) should maintain research programs with the professional military schools to develop appropriate PSYOP methodologies.[7]

This course is presently fulfilling designed objectives. Only one week long, it is aimed at providing officers with theory and techniques in planning and conducting PSYOP and making them aware of the psychological impact of every military action. It is not designed to produce specialists, merely to provide a solid background for middle managers. However, continued lack of interest at major command levels has decreased the impact and effectiveness of this training.

Early in 1975, *USAF Basic Doctrine* was completely rewritten, and nearly all direct references to PSYOP were deleted. Although implicit references remain, the term may only be found buried in a sentence under Special Operations, " . . . and functions which may be considered adjuncts to or in support of various other operations."[8] Thus, PSYOP is left to the imagination, despite the obvious truth and historical fact that *all* aerospace forces have, and will continue to have, these essential capabilities to send highly perceptive signals in support of national objectives.

That is where we stand at present. Our most recent and promising upward surge of the interest cycle may be ready for yet another downward swoop. Specific steps might prevent this—place PSYOP in its proper, officially sanctioned perspective, and then use its signal-sending value.

First the Air Force must put its own house in order by: (1) removing PSYOP from the enigma of being grouped only under Special Operations, specifying the all-encompassing nature of PSYOP regarding *all* Air Force actions, and delineating responsibilties as applying to all forces; (2) establishing *and using* a system to identify and manage trained resources—the Special Experience Identifier (SEI) is fine but not presently used to its intended capability—operations and planning staffs must require certain Unit Detail Listing (UDL) positions to have PSYOP SEIs. To be properly employed, the PSYOP officer should usually be in the operations rather than the plans section of the staff. (3) Providing support, emphasis, and expansion to PSYOP training—all commanders and staff personnel need not be trained, but certainly they should be oriented to its nature and value; (4) establishing channels through which PSYOP opportunities, intelligence, and suggested themes may be reported from the field to national decision-makers; and (5) requiring operations and planning staffs to include and apply tactical PSYOP concepts. Even if no PSYOP actions are undertaken, the commander and staff should be advised of psychological implications and opportuni-

ties of every planned action, as directed by the USAF War and Mobilization Plan.

Second (and more difficult because of bureaucratic considerations) USAF must request, through established channels, more definitive guidance from National Command Authorities regarding PSYOP objectives. Each service should have a clearly defined and mutually supporting PSYOP mission, stemming directly from national objectives. Given proper direction, neither the Air Force nor other services should have difficulty in applying PSYOP principles.

While the need to enhance Air Force PSYOP is very real, unlike other pressing needs, to do so is not costly. No additional personnel are required, no equipment, and only minimal additional training. Instead we must pay attention to the subject, put command emphasis on our fledgling program, and use it daily. For a small investment, potential rewards are great with this force magnifier.

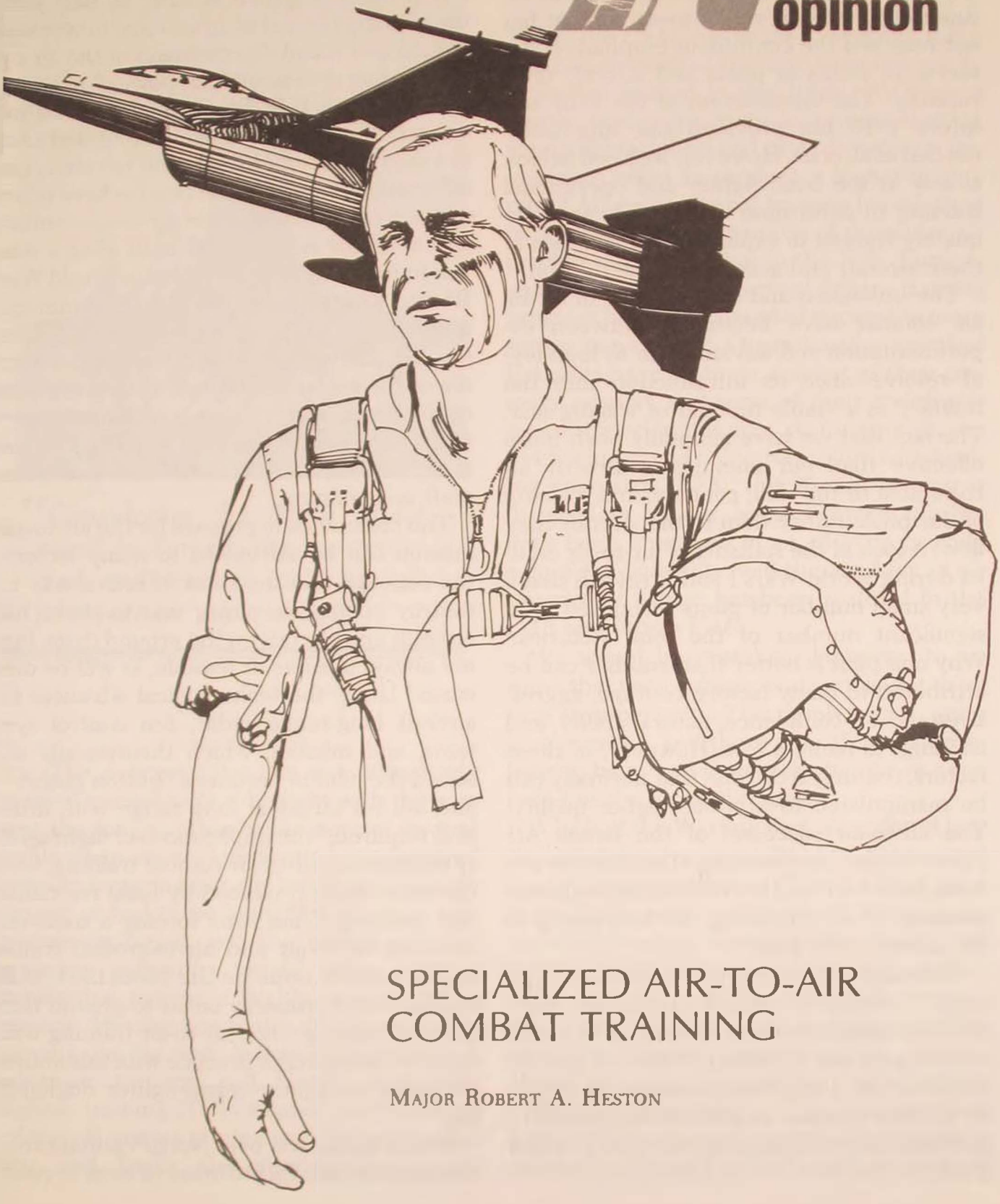
WHAT CAN we possibly lose by spreading understanding and emphasis? If folks still insist that the terminology is nasty, we may have to start by correcting that. Nevertheless, can we afford to do without it? Less money and monumental mission requirements force us to seek maximum effect from every action. Now is the time to make more people aware of the importance of PSYOP as a powerful perception tool.

Kailua, Hawaii

Notes

1. JCS Publication 1, *Dictionary of Military and Associated Terms* (Washington, D.C.: U.S., Office of the Joint Chiefs of Staff, 3 September 1974), pp. 263–65.
2. JCS Publication 2, *Unified Action Armed Forces* (Washington, D.C.: U.S., Office of the Joint Chiefs of Staff, October 1974), p. 141.
3. AFM 2–5, *Aerospace Operational Doctrine, Tactical Air Operations—Special Air Warfare* (Washington, D.C.: U.S., Department of the Air Force, 10 March 1967), p. 20.
4. Ibid.
5. Franz Henry Michael, Gerald L. Steibel, and Frank N. Trager, *Soviet and Chinese Psychological Operations and the United States' Response* (Arlington, Virginia: 1970), study submitted to Office of the Deputy ASD/ Policy Plans and NSC Affairs/ISA, p. 113.
6. AFR 190–12, "Release of Unclassified Information to the Public" (Washington, D.C.: U.S., Department of the Air Force, March 1973), p. 1.
7. Paul R. Stankiewicz, "U.S. Air Force Psychological Operations," Lecture, Joint PSYOP Conference, 20 November 1974.
8. AFM 1–1, *United States Air Force Basic Doctrine* (Washington, D.C.: U.S., Department of the Air Force, 15 January 1975), p. 3-4.

in my opinion



SPECIALIZED AIR-TO-AIR COMBAT TRAINING

MAJOR ROBERT A. HESTON

THE CONTROL of the air has always been a primary mission of the United States Air Force and is the key to victory in any conflict. Yet the ability to perform an air superiority mission via air-to-air combat has not received the continuous emphasis it deserves in terms of pilots and aircraft until recently. The introduction of the F-15 and future F-16 has provided the superiority needed in aircraft. However, we need to look closely at the basic fighter and operational training to determine if the pilots are adequately trained to exploit the capabilities of these aircraft and accomplish the mission.

The utilization and effectiveness of air-to-air combat have fluctuated between experimentation and adventurism to high-level resolve since its introduction into the military as a viable method of waging war. The fact that we have generally been more effective than our enemies is directly attributable to the skill, courage, and training of our pilots rather than to the aircraft they flew. A look at the statistics of air-to-air credits during World Wars I and II reveals that a very small number of pilots accounted for a significant number of the total victories.[1] Why one pilot is better than another can be attributed to many factors: courage, aggressiveness, self-confidence, natural ability, and training, to name a few. However, of these factors, training is the one that normally can be manipulated to produce higher quality. The air-to-air successes of the Israeli Air Force in the last two Arab-Israeli wars are thought to be directly attributable to the superiority of their training, not necessarily to the aircraft they flew.[2]

Assuming that training is essential to success, I propose a method to provide more effective training to develop the pilots necessary to gain and maintain control of the air. In particular, I will focus attention on air-to-air combat training in aircraft designated to perform the multipurpose role, the F-4 and F-16.

past training and organization

A brief look at the past and the evolution and employment of the air-to-air fighter is revealing. Douhet proposed as early as 1921 that the primary mission of an air force in war was to gain and maintain command of the air by eliminating the enemy's air power.[3] In every war in which U.S. air power has been involved, this mission has been attempted and, to a degree, accomplished—but not always as efficiently as possible. The need to have pilots and aircraft specialized for air-to-air combat was normally not realized until after a war was in progress, as was evident in World War II[4] and Korea.[5] As a result, little command guidance was given to air-to-air combat training and tactics until we were in the middle of the air battle. However, in every war or conflict one group emerged with the primary mission of engaging the enemy in air-to-air combat, many times with ill-suited aircraft and training.

This reluctance to prepare for the air-to-air mission can be attributed to many factors: the concept that the most effective way to destroy enemy air power was to strike his airfields and aircraft on the ground (true, but not always possible or feasible, as will be discussed later); the technological advances in aircraft long-range radar, fire control systems, and missiles, which theoretically allowed the pilot to become a "button pusher" and kill his target at long range with little skill required;[6] the implications of flight safety concerning air-to-air combat training; and the restrictions produced by fiscal restraints and reduced flying time forcing a trade-off between air-to-air and air-to-ground training. As a result, until the late 1960s the USAF concentrated primarily on air-to-ground tactics and training while air-to-air training was reduced to intercept practice with minimum emphasis on fighter-versus-fighter dogfighting.[7]

It took the air war over North Vietnam and the Arab-Israeli wars to bring us back to real-

"Considering the likely threat posed in Europe, are we organized and trained well enough to ensure air superiority?"

ity. The average pilot was not adequately trained to engage in a dogfight with the enemy, the long-range missiles were of limited value when visual identification was required prior to engaging (usually inside of minimum range) or had to be launched against a maneuvering target, and the tactics and maneuvers currently taught were largely ineffective against a highly maneuverable enemy. The reaction to this dilemma was the same as in the past: increased emphasis on air-to-air training and tactics in tactical fighter training (TFT) courses, the initiation of top-off courses in advanced air-to-air training, and, finally, the creation of a special squadron to provide dissimilar air combat training employing enemy tactics.[8]

present training and organization

Today the USAF has made a quantum jump in air-to-air combat training from the conditions that existed in the 1960s. We have a fighter lead-in program to screen aspiring young fighter pilots and provide better training in an effort to produce a higher-quality pilot.[9] Air-to-air combat training has reached new highs by the expansion of dissimilar air combat tactics training in the U.S., Europe, and the Pacific. The tactical fighter training program has been expanded to provide more sorties per student. Operationally, specified F-4 units have air-to-air combat as their primary mission, and most of their training is concentrated in this area. As for aircraft, the F-4 has improved maneuverability with leading edge slats (LES), the 20-mm cannon is installed in all our latest fighters, missiles have been improved in an effort to provide a dogfight capability, and the need for an air superiority fighter has been realized in the F-15 and future F-16.

We would be mistaken, however, to assume that these advances are sufficient to assure air superiority. This is only a start, quite long overdue, and there are still many problems to be solved if we want to ensure command of the air in the future.

A look at the Warsaw Pact air order of battle and defensive capability highlights some of the future problems. What the Pact lacks in quality is well compensated for in quantity, which leads to the conclusion that the air battle will be massive. In an all-out conflict between NATO and the Warsaw Pact countries, many aircraft tracks per day could be possible, seriously degrading the employment of ground-controlled interception (GCI) and radar missiles.[10] The probability of destroying enemy air forces on the ground is seriously degraded by their sophisticated air

defense systems and dispersed and hardened aircraft shelters. With the probability of radar and communications jamming, the air war could quickly be limited to many visual, multiship engagements, the outcome resting on the individual pilot's ability. The examples could continue, but to win the air war, we must specialize a significant portion of our fighters and pilots in close-in, maneuvering air-to-air combat, and the kill ratios must be highly in our favor. Now the question becomes, Considering the likely threat posed in Europe, are we organized and trained well enough to ensure air superiority?

To answer this question, one must take a critical look at our present air-to-air combat training conducted at the F-4 TFT schools and the situation in the operational units. The following points stand out:

"The technological advances in air-to-air capable aircraft and their increased maneuvering potential will greatly challenge the pilot's ability to fully exploit their tremendous potential."

1. A significant portion of the training is conducted in the F-4C which has limited maneuverability and marginal air-to-air fire control system.[11]

2. Of the 21 air-to-air training sorties each student receives, only 20 percent to 40 percent of each sortie will be used for actual engagement training; the rest of the time will be spent transitioning to and from the training area and repositioning for subsequent engagements.[12]

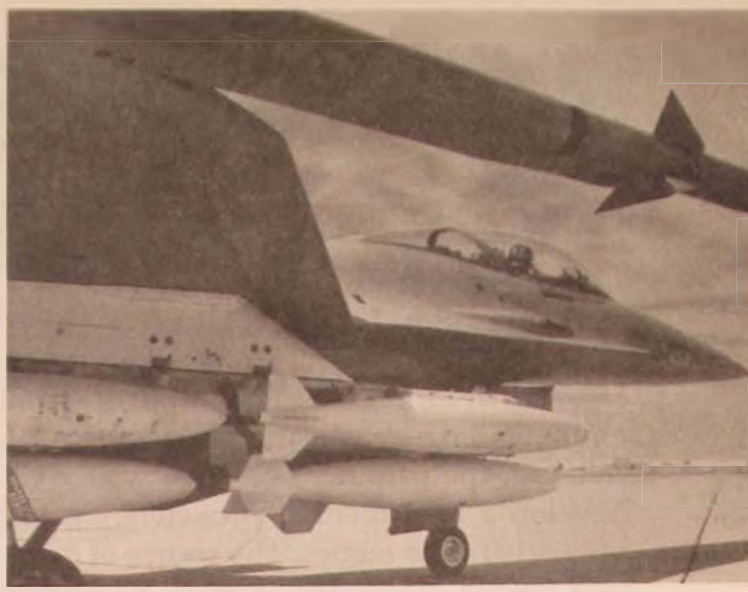
3. The training progresses rapidly from basic fighter handling and maneuvers to advanced air combat tactics. It is highly complex, covering all aspects of air-to-air combat rather than concentrating on the basics of offensive and defensive maneuvering.

4. Even though the student may be assigned to a unit with a primary air-to-air mission, all TFT provides the same general instruction. However, one may be weighted a little more heavily than the other toward the air-to-ground mission. This places an added burden on the operational units by forcing them to devote a portion of their critical training time to further basic training with the new pilot to make him operationally capable.

5. Operational units having a primary air-to-air mission must also devote a significant amount of their training time to their secondary task, possibly an air-to-ground requirement. Although this concept provides a flexible force, it does so at the expense of proficiency in the primary mission.

To sum up the current trends in air-to-air training, we have increased our awareness of the need for air combat training both in the tactical fighter training and the operational units. However, TFT produces a multitrained pilot with limited capabilities in either air-to-air or air-to-ground employment procedures, and most operational units are faced with the problem of maintaining a proficient capability in both missions. The complexities of present and future conven-

tional warfare do not lend themselves to the multipurpose role as in the past. The technological advances in air-to-air-capable aircraft and their increased maneuvering potential will greatly challenge the pilot's ability to fully exploit their tremendous potential. The air-to-air arena will be more confusing because of the numbers involved. However, we are developing systems and procedures to meet the threat with Airborne Warning and Control System (AWACS), advanced missile and fire control systems, and higher level tactical employment concepts. We are faced by a quantitatively superior enemy, and to win the air battle, we must recognize these factors and further refine our air combat capability.



"Although the aircraft will be fully capable of the multipurpose role, maximum effectiveness will be obtained by pilots' specializing in either the air-to-air or air-to-ground mission."

a proposed training program

The need for better air-to-air combat training becomes evident with an appreciation of the first priority of battle: accomplishing the counterair campaign. As General Robert J. Dixon said in 1974, "Ground forces that do not enjoy protection from an attack and are without benefit of substantial air support will not prevail over a force possessing these essentials."[13] Although the least efficient method of gaining air superiority is by air-to-air combat, past experience and future considerations make this method plausible. Past examples such as the enemy sanctuaries of the Korean War (north of Yalu), political considerations as in North Vietnam, and the present strong defenses and hardened aircraft shelters characteristic of Eastern Europe may preclude or minimize the effectiveness of attacks on enemy airfields. These considerations imply that a major portion of our air effort will have to be expended in meeting the enemy in the air. This leads to the role of the F-4 and follow-on F-16 as the "swing fighters" capable of both air-to-air and air-to-ground employment. Although the aircraft will be fully capable of the multipurpose role, maximum effectiveness will be obtained by pilots specializing in either the air-to-air or air-to-ground mission. This specialization must begin in TFT and continue to include the operational mission of the selected squadrons or wings.

Air-to-air training. Because the new fighter pilot received a general, multipurpose program in TFT, he must receive additional training in operational units before he can be gainfully employed. Besides consuming the pilot's valuable flying time, the unit must consider his limited capabilities in the overall training program that directly affects the level of training and the tactics employed. This problem of inexperience was a major factor leading to the rigid wingman concept employed in air-to-air tactical formations used in the Korean War and Viet-

nam and is still discussed as a major problem today.[14] To counter the problem, the new fighter pilot must be adequately trained in the basics of air combat prior to reporting to his new unit so he can be immediately included in advanced tactics training. This basic instruction must be the task of TFT.

The present F-4 and future F-16 TFT should be structured to provide primary training in either air-to-air or air-to-ground employment. In consideration of air-to-air training, the primary objective would be to develop a high level of proficiency in basic maneuvers and tactics. The course of instruction would generally include a transition proficiency phase, an air-to-air proficiency phase, and an air-to-ground familiarization phase. The aircraft utilized for the training should be compatible with the mission and those used by the operational units.[15]

The transition phase would require 25 percent of the training and would provide the same training as currently specified in the TFT syllabus.

The air-to-air phase would constitute 60 percent of the training and involve a controlled progression through the basics of air combat. This phase would be subdivided into three units of instruction: techniques concerning flight characteristics and one-on-one maneuvers; two-on-one maneuvers and tactics; and air-to-air gunnery.

(1) The basic handling and one-on-one maneuvering unit would comprise the major portion of the air-to-air phase, approximately 55 percent. Besides the obvious requirement to be able to maneuver against the opponent, this training provides the basis for the more advanced tactics that depend on the individual's ability to position and attack successfully.

(2) The two-on-one tactics training unit would involve another 20 percent of the phase. It would be designed to demonstrate and effect the practical application of the one-on-one maneuvers as they apply to teamwork and mutual support employed by the two ship formation. The use of dissimilar aircraft is necessary for at least half of the one-on-one training and all of the two-on-one tactics training. The value of dissimilar training is considerable, and it must be introduced into the program as early as possible.

(3) The remaining 25 percent of the air-to-air phase would be devoted to aerial gunnery training. The importance of gunnery training cannot be overemphasized, for during most close-in maneuvering engagements the majority of the opportunities for a kill have come with the gun.

Overall, by concentrating the air-to-air training only on the fundamentals, a base will be established that can be more readily expanded by the operational squadrons to advanced tactics and multiship engagements.

The air-to-ground gunnery phase would comprise 15 percent of the total TFT and would involve only an introduction and basic familiarization. Instruction would be limited to controlled air-to-ground delivery techniques and would not extend to the tactical applications.

Operational squadrons. The operational squadrons selected for a primary air-to-air mission should be specialized to the degree that approximately 80 percent of their training involves air-to-air employment. Their purpose must be to maintain a high degree of proficiency through constant training, refine their current tactics to optimize their capabilities, and develop new tactics as necessary to counter the enemy threat. When their secondary mission involves air-to-ground employment, it should be limited to maintaining a familiarization level in deliveries and not include the more sophisticated elements of weapon employment and advanced tactics. This specialized emphasis must also extend to the higher-headquarters evaluation process and readiness inspections. The overriding indicator of the operational squadrons' performance must be based on

their ability to develop and maintain a high level of expertise and capability in the primary mission.

Impact. The general impact of the proposed solution will be examined in four areas: personnel policy, TFT orientation, operational force structure and levels, and costs.

Personnel policy would have to be expanded to include the follow-on operational assignment when assigning a pilot to specialized TFT. This could be accomplished prior to or during the course as long as compatibility was maintained. Reassignment policy concerning pilot transfers to a different unit with the same aircraft would have to consider the pilot's specialty and that of the gaining unit. If they are not compatible, he must attend an abbreviated course in the new specialty prior to reporting to his next unit.

TFT would require reorientation toward specialized missions, and this could be accomplished either at the wing or squadron level. For the F-4 TFT the governing factor would be the type aircraft possessed. Air-to-air training should be conducted only in the F-4E. This would not be a factor with F-16. Specialized syllabi would be required but should not pose a significant problem since syllabus revision is an ongoing process.

The impact on the force level and structure of the operational units would be mainly a reduction in the number of pilots capable of performing both the air-to-air or air-to-ground mission. Presently all F-4 (and future F-16) pilots are capable in either mission with the inherent advantage of flexibility. Under the more specialized concept, the advantage would lie in the attainment of higher proficiency and capability levels to accomplish both missions. There would be a residual capability in the secondary missions, but a combat-ready level of proficiency would be lacking.

A major cost generated by specialization would be attributed to the increase in the dissimilar aircraft training support. Approximately twice the support presently required would be necessary for the air-to-air TFT. No major personnel or aircraft/equipment changes should be necessary.

The overall impact involves the trade-off between flexibility and specialization and the associated quantity-quality advantages and disadvantages. However, an appraisal of the air threat, the requirement to have air superiority, the sophistication of future tactics and weapon systems, and the quality needed to maintain the advantage imply the need for greater specialization and concentration of effort.

"To capitalize on this potential effectively, . . . pilots must be well trained and specialized."

THE REQUIREMENT for highly trained pilots and quality aircraft in the air-to-air combat arena has existed since the beginning of aerial warfare and will become more important in the future. With inclusion of the F-16 in the inventory to augment the F-15 force, we

have the highest quality aircraft available today and for the near future. To capitalize on this potential effectively, however, pilots must be well trained and specialized. The tremendous power of specialization and training is evident when considering that the top 15 German aces of World War II accounted for 3574 kills.[16]

My proposal to specialize the F-4 and F-16 TFT schools and operational squadrons is based on the contention that the pilots cannot effectively maintain the proficiency necessary to accomplish both the air-to-air and air-to-ground missions. Survival in the modern aerial battlefield will require intimate knowledge of the mission, and we may not have time to reorient our training after the battle has begun.

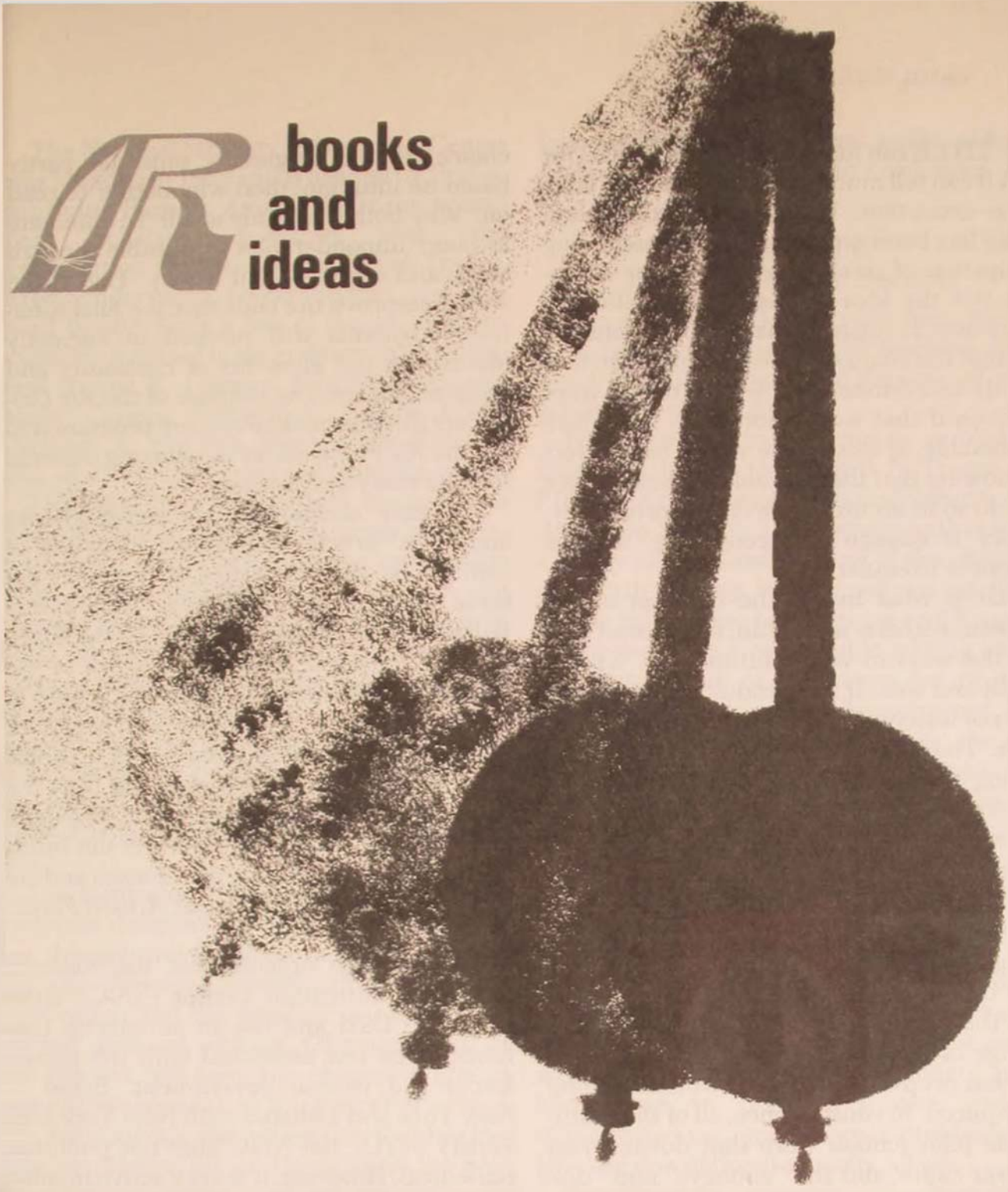
Given the nature of the threat and the requirement for air superiority, we must have a significant air-to-air force capable of performing consistently with the highest degree of excellence. Even a few capable fliers trained in the best air-to-air fighters can carry out this mission with the highest probability of success.

Langley AFB, Virginia

Notes

1. *Annals of Reliability and Maintainability*, New York, 5th Reliability and Maintainability Conference, July 1966, p. 305.
2. "10 Men—3,176 Kills and a Goal to Shoot For," *Armed Forces Journal International*, May 1974, p. 34.
3. Giulio Douhet, *The Command of the Air* (New York: Coward-McCann, Inc., 1942), p. 31.
4. Edward H. Sims, *Fighter Tactics and Strategy, 1914–1970* (New York: Harper and Row, 1972), p. 88.
5. Pierre Grasset, "Dogfighting Makes a Comeback," *Interavia*, December 1974, p. 1188.
6. Ibid., p. 1189.
7. Ibid.
8. Advanced air-to-air combat training was conducted at Nellis AFB in the early 1970s for selected F-4 RTU graduates and instructor pilots. The 64th FWS (Aggressor Squadron) was organized in 1973 to provide the dissimilar aircraft and enemy tactics training.
9. Lawrence R. Benson, "The New USAF Fighter Lead-in Program," *Air University Review*, March–April 1975, p. 57.
10. "New Look at the NATO Air War," *Armed Forces Journal International*, May 1974, p. 32.
11. The F-4C has limited maneuverability compared to the F-4E modified with leading edge slats.
12. The time consumed during transition to and from the area depends on the training base and relative location of the training area but in general averages about 50 percent. The time used to reorganize and reposition will average about 50 percent of the time in the area depending on student and instructor proficiency. The training time per sortie is further reduced, depending on the number of students per flight.
13. General Robert J. Dixon, "The Range of Tactical Air Operations," *Strategic Review*, Spring 1974, p. 24.
14. USAF 1975 Tactical Fighter Symposium (U), (Final Report), p. 1-21 (U), Secret.
15. The F-4E modified with leading edge slats must be used for the air-to-air training.
16. Sims, p. 255.

books and ideas



WATCHING THE PENDULUM SWING

A Look at the Works of the National Strategy Information Center

LIEUTENANT COLONEL DAVID R. METS

A TITLE can make or break an article, for it can tell much, lie, or say nothing. Ours is no exception. Watching the pendulum swing has been a dangerous but fascinating occupation of peacetime soldiers for centuries. But the idea implied by the title is a faulty one. It suggests that history is change and that the change follows a regular rhythm in only two dimensions. Would that it were so! Even if that would not make the future predictable, at least there would be comfort in knowing that things would indeed change and do so in an orderly way. Unfortunately, history is change *and* continuity, and its change is irregular.

That is what makes the business of the peacetime soldier uncertain, for he must predict the ways in which future wars will be fought and won. If the pendulum swings and he is not watching, the penalties will be enormous. The Yankees' failure to see that the coming of the minié ball had undermined the effectiveness of the Napoleonic offensive and enhanced the strength of the defensive caused them to drench the slopes of Fredericksburg with their blood. Less obvious is the fact that a prediction that the pendulum has swung when it has not, or one that is premature, can be equally disastrous.

In the late fifties, some were saying that the age of push-button warfare had arrived and that prop-driven aircraft would not long be required. In consequence, all of the multiengine pilot schools were shut down. Then the war came, and the "gooneys" and "dollar-nineteens" were demothballed in droves. We trotted out a host of tired old lieutenant colonels and restless young lieutenants to Vietnam to fly the things. Thus, that time the premature prediction of the swing was not disastrous—there were enough old and young men around to pick up the slack.

But what of the manned bomber? Is its day gone by? Who can say? We can systems-analyze the thing to death, but in the end the intuitive judgment will make the final choice. If our judgments must be partly based on intuition, then why bother to read on? Why bother to study at all? To eliminate as many imponderables as possible through study and analysis—that is why. That is the way to improve the odds that the final intuitive judgments will succeed in correctly identifying the elements of continuity and those of change! The purpose of the *Air University Review* book reviewing program is to aid the Air Force officer in selecting material for this study and analysis.

We have occasionally published "Books and Ideas" articles to examine the works of institutions that specialize in national defense matters. The first of these, "Swords into Ballpoints" by Colonel Harley E. Barnhart, covered *Strategic Review,* the work of the United States Strategic Institute (USSI); it was presented in our November-December 1973 issue. Our second survey of national security literature was "Something New under the Sun" by this writer in the May-June 1976 issue. It covered the work of the Inter-University Seminar on Armed Forces and Society and especially its journal, *Armed Forces and Society.*

Another such organization, the National Strategy Information Center (NSIC), antedates the USSI and has an authorship that tends to be less associated with the armed forces and federal government. Based in New York and affiliated with New York University (NYU), the NSIC does not publish a periodical. However, it is very active in soliciting a variety of topical studies concerning national security and in conducting seminars and conferences on the subject throughout the nation. A body of important literature has emerged from this effort. NSIC publications in print at the time of writing cover four principal areas: general studies, works on the use of the political instrument of national policy, books on military affairs, and essays on the economic sinews of our national security policy.

The National Strategy Information Center was founded in 1962 and is headed by Professor Frank Barnett. Among the many prominent scholars associated with the organization are Klaus Knorr, Frank Trager, Fred Sondermann, Gerald Steibel, and Bernard Brodie. Only a few of the participants made their names in the military world: General Harold K. Johnson, USA (Retired) and Major General Richard A. Yudkin, USAF (Retired), to cite two. More of the directors and advisers come from the business world.

The NSIC is a nonpartisan organization dedicated to an educational program in international affairs based on the assumption "that neither isolationism nor pacifism can provide realistic solutions to the challenge of 20th century totalitarianism." It has been granted tax-exempt status by the federal government. The NSIC receives no financial support from the U.S. government. Rather it is supported by donations from individuals and organizations, mainly businesses. Its 1974–75 budget was close to one million dollars.

The institution is involved in a variety of activities designed to influence public opinion through the intellectual elite that leads the way. The work is done with a program of publication and the conduct of seminars in several different settings. Of course, few of our readers will have the chance to attend one of the seminars, so it is the other part of the NSIC's work, the publishing, that has the greatest interest for us. These works are produced in three series: general teaching tools, Strategy Papers, and Agenda Papers. For this review, I have divided these series into the following categories: general works, political studies, military affairs, and economics.

Tools for the Study of National Security

The general works are ones that, for the most part, were designed as teaching tools. The three works in print at the time of writing are presented first.†

The keystone to the entire publishing effort may be said to be Frank N. Trager and Philip S. Kronenberg's *National Security and American Society.* The average anthology is a spotty affair. Usually, some of the chapters are worth reading, but the rest just tag along for the ride. Not so here. Trager and Kronenberg have done a remarkable editing job in that virtually all of the pieces are of good quality. The book is logically organized, and there is little excess baggage. Given the rate of political and technological change, this work, like all others in international affairs, tends to become dated rather rapidly. Though it was published only four years ago, parts of it need updating to account for some of the events of the recent past (the October War, energy crisis, fall of Vietnam, and Watergate). I am told that a new edition will be prepared presently. Meanwhile, officers serving in a technical specialty would not go far wrong in using this book to update their knowledge on national security policy, strategy-making, and internal problems related to our national security affairs.

Another of the general works from NSIC and NYU's National Security Program is *Modules in Security Studies.* This book

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†Frank N. Trager and Philip S. Kronenberg, editors, *National Security and American Society: Theory, Process, and Policy* (Lawrence: University Press of Kansas, 1973, $8.95), 612 pages.

Alden Williams and David W. Tarr, editors, *Modules in Security Studies* (Lawrence: University Press of Kansas, 1974, $3.50), 229 pages.

Frank R. Barnett, *Alternatives to Détente* (New York: NSIC, 1976, $1.00), 25 pages.

should find a wide audience among the students and faculties of Professional Military Education schools and ROTC detachments. It is a handbook composed of vignettes on a wide variety of national security topics. Each includes a preliminary bibliography. Some of the topics covered are Military Power, Deterrence Theory, Strategic Nuclear War, Arms Control, Strategic Weapons Systems, The Sea in United States Strategy, Psychological Reactions to Combat, and many others. *Modules in Security Studies* would be an excellent starting point for a wide variety of studies from lesson planning to term paper writing.

The entire tone of the National Strategy Information Center's work can be found in Frank Barnett's compact *Alternatives to Détente.* His is the voice of caution in a world of enthusiasm for détente. Barnett holds that there is a fundamental difference between the Russian and American definitions of détente, which could lead to disaster for us. The United States tends to look on détente as an end in itself, whereas the Russians see it as a means to an end—the goal of Communist World domination. He remarks that the Russians look on détente merely as the continuation of the old struggle by other, nonviolent means—or means without total war, anyhow.

Political Instruments of National Policy

We turn now to an examination of the NSIC works loosely classified as "political."† The collective voice of these works tells us that the pendulum is swinging in important ways; economic difficulties, the Nixon Doctrine, the fall of Vietnam, and the Yom Kippur War—all suggest that the U.S. can no longer play an omnipotent role in world politics. A reappraisal of our foreign policy has been undertaken and should continue, but the reaction must not be too extreme. We cannot allow the pendulum to swing all the

†Frank R. Barnett, *Seven Tracks to Peace in the Middle East* (New York: NSIC, 1975, $2.00), 28 pages.

Donald G. Brennan, *Arms Treaties with Moscow: Unequal Terms Unevenly Applied?* (New York: NSIC, 1975, $2.00), 29 pages.

Alvin J. Cottrell and Walter F. Hahn, *Indian Ocean Naval Limitations: Regional Issues and Global Implications* (New York: NSIC, 1976, $2.00), 42 pages.

James E. Dougherty, *How to Think about Arms Control and Disarmament* (New York: Crane, Russak, 1973, $2.95), 202 pages.

Lyman B. Kirkpatrick, Jr., and Howland H. Sargeant, *Soviet Political Warfare Techniques: Espionage and Propaganda in the 1970s* (New York: NSIC, 1972, $1.00), 82 pages.

Robert M. Lawrence and Joel Larus, editors, *Nuclear Proliferation: Phase II* (Lawrence: University Press of Kansas, 1974, no price given), 256 pages.

Franz Michael and Gaston J. Sigur, *The Asian Alliance: Japan and United States Policy* (New York: NSIC, 1972, $1.00), 92 pages.

Jay B. Sorenson with Bill F. Francis, *Japanese Policy and Nuclear Arms* (New York: American-Asian Educational Exchange & NSIC, 1975, $1.00), 60 pages.

Gerald L. Steibel, *Détente: Promises and Pitfalls* (New York: Crane, Russak, 1975, $2.95), 89 pages.

James D. Theberge, *The Soviet Presence in Latin America* (New York: Crane, Russak, 1974, $2.95), 107 pages.

George G. Thomson, *Problems of Strategy in the Pacific and Indian Oceans* (New York: NSIC, 1970, $1.00), 42 pages.

way back to the old isolationism.

The books on arms control (Brennan, Dougherty, and Lawrence and Larus) constitute a warning signal. One emerges with the idea that arms themselves are not and never have been a prime cause for war, though it is admitted that arms races have exacerbated conflicts that had their roots in other causes. James Dougherty tells us that general and complete disarmament has been a pipe dream from the outset, and the best we can hope for are some partial disarmament measures that will contribute to the stability of deterrence. Donald Brennan is no more enthusiastic about the outlook. He feels that the U.S., so far, has gotten the short end of the SALT arrangements. Those areas where we were behind have been limited, and the ones in which we had an advantage were left unlimited. Thus, the U.S.S.R. has a free hand in catching up with our technology in MIRV and accuracy, but we are prevented by treaty from overcoming our lag in throw-weight and numbers of missiles. In general, Robert M. Lawrence and Joel Larus give us an equally dark picture. Though some authors do not feel that proliferation need be destabilizing, the consensus is that the Non-Proliferation Treaty will not prevent the spread of nuclear weapons, and the diffusion will be dangerous to world peace.

What is to be done now that all the kids on the block are certain to have their own "nukes"? Mostly wring our hands. We can only hope that possession of nuclear weapons will make some of the statesmen involved more responsible than they have been in the past, and we can and should cooperate with them in every way in the development of their nuclear safety and antiterrorist programs.

One of the clichés of the historical profession holds that humanity is condemned to reinvent the wheel endlessly because of the lack of perspective resulting from an incomplete education—insufficient history, of course. Gerald Steibel adds substance to that idea in his discussion of détente as he shows that the phenomenon is really nothing new. The history of United States–Soviet relations is marked by a series of détentes interrupted by various confrontations. The Soviets, starting with Lenin, have deliberately promoted periods of improved relations as tactical measures that would contribute, in the end, to the objective of the grand strategy: the achievement of the Communist World revolution.

Lyman Kirkpatrick and Howland Sargeant issue a similar note of caution in their essays on espionage and propaganda. In spite of détente, it seems, the Soviets are making as large an effort as ever to gain information and to win friends and influence people. Both their espionage and propaganda programs have an advantage in timeliness and cohesiveness that arises from centralized direction, but their interpretation of intelligence often misses the mark because of the sheer volume of material collected and the Russian tendency to look at things through Marxist-tinted glasses.

The Russians are also trying to give the pendulum a shove in their own direction in Latin American politics. They are doing it in a cautious, pragmatic way. While they try to take advantage of every opportunity, they do avoid direct confrontation with the United States. James Theberge's *The Soviet Presence in Latin America* argues that in spite of the fall of the Allende government in Chile and of the tremendous costs of supporting Cuba, the Russian position in Latin America is better than ever before. Though the U.S.S.R. is not ready to risk détente for the sake of Latin American gains, and though her advantages there are more psychological than strategic, Theberge does warn us that the long-term threat is significant and that we ought to plan to counteract it.

Two books deal with the growing importance of the Indian Ocean basin, a subject

that has not received enough attention in the U.S. military periodicals. It is a faraway place, but the area has inherent importance that has been obscured by various cultural factors. However, it is now gaining a new significance that makes it vital to our national security. A large portion of the world's population lives in lands whose shores are washed by the waters of the Indian Ocean, and it is a population whose poverty and undeveloped economies tend to make it hostile to an affluent America. It is unfortunate that the energy lines of communication (LOCs) of both our major allies, the NATO nations and Japan, run through the ocean. Both are utterly dependent on them, and there is little hope of developing adequate alternate routes. As Alvin Cottrell and Walter Hahn point out, the growing dependence of the West on the petroleum of the Middle East and the ability of the U.S.S.R. to project power into the Indian Ocean basin by land make our interest in the free use of the sea lanes there much more vital than is that of Russia. They further argue that this asymmetric vulnerability makes it imperative that we do not allow the adversary to swing the pendulum against us by the diplomatic means of a naval limitation treaty. George Thomson's view is that a political vacuum cannot exist in the area. This would permit only two outcomes: dominion of the place by one of the superpowers or condominium by the multitude of states in the region in cooperation with both the superpowers. The implication is that the U.S. cannot dominate the ocean because of distance and domestic factors and that Russian domination would be inimical to the local powers. Thus, Thomson's advice to his own country (Singapore), the other regional states, and Japan is that they should strive for a condominium. Whatever the case for them, it seems clear to this author that there can be little argument about U.S. policy: the oil must get through.

Not only must fuel get through to Japan but she is also dependent on the sea for most of the other inputs to her great industrial machine. She is so vulnerable that peace and stability are even more vital to her than they are to the rest of us. There is a good deal of consensus between the two NSIC books on Japan: *Japanese Policy and Nuclear Arms* and *The Asian Alliance: Japan and United States Policy*. Both go through a process of elimination in analyzing the various Japanese foreign policy options to arrive at the conclusion that her foreign policy must remain pretty much as it has been for a long time. Japan is so vulnerable at sea that she cannot hope to go it alone. The record of the League of Nations and the United Nations is such that reliance on a system of collective security would be a precarious undertaking. Cultural, historical, and strategic factors inhibit an alliance with either side of the Sino-Soviet dispute. The construction of an alliance with the Third World powers of the region would be allying one's self with weakness. Thus, as far as Japan is concerned, the pendulum still seems to favor the interest of the United States. Nevertheless, the Japanese recognize that the Vietnam verdict means that the U.S. nuclear umbrella is no longer as reliable as it once was and that Japan herself will have to pick up a greater share of the security bill. The NSIC scholars do not think there is much immediate prospect of Japan's going nuclear, but neither is there much hope that she will endorse the Non-Proliferation Treaty. The risks and social costs inhibit the former; the absence of real rewards prevent the latter. Still, if she does decide to build a nuclear capability in the future, it is well within her technical and economic competence. Jay Sorenson and Bill Francis feel that the U.S. should neither oppose nor encourage such a development. The problem is only hypothetical, for the social inhibitions to the acquisition of nuclear weapons in Japan are very strong and will not be quickly overcome.

The security of the oil LOC to Japan is only part of the security problem. The stability of the source is equally important, and the problems there are even more complex than they are in the Indian Ocean. *Seven Tracks to Peace in the Middle East* is a provocative little pamphlet that presents some imaginative ideas for solutions to those problems. First, there is the underlying assumption that stability in the Middle East and the health of NATO are vital interests for the United States, and no price is too great for the protection of those interests. Barnett proposes solutions that would capitalize on one area, technology, in which the pendulum is still firmly on the American side of things—the technology of agriculture and, to a lesser degree, the technology of military security. He would have us use this advantage to build Israeli defensive systems that would assure their physical security in a way that diplomatic guarantees never could and use it to remove some of the base causes of the timeless conflict. Here he makes an assumption, it appears, that the chief roots of the problem are economic, an assumption that doubtless is partially correct but questionable to many. He would use technology to turn the Middle East into a garden that would support all and have us develop a kind of a peaceful foreign legion/Civilian Conservation Corps (CCC) to go to the Middle East and get between the antagonists. Through technology, sociology, and just plain brotherhood, the eternal struggle would be eliminated. Doubtless some conservatives will look on these ideas as visionary—yet, perhaps radical solutions are now in order since nothing else seems to have had more than temporary effect.

All in all, the political works of NSIC are an impressive group of books. They take the middle ground. No longer can a sneeze in Washington make the whole world tremble, but to write the American story as "The Decline and Fall of the United States" would be decidedly premature. Those desiring a balanced survey of our present status in relation to the rest of the world would be well advised to use these studies.

Military Affairs and National Policy

Eleven of the NSIC books and pamphlets have to do with the military aspect of things.† Taken collectively, these works seem to say that the military pendulum is swinging against America even more clearly

†W. A. C. Aide, *Oil, Politics, and Seapower: The Indian Ocean Vortex* (New York: Crane, Russak, 1975, $2.95), 98 pages.

Frank R. Barnett, et al., *The Military Unbalance: Is the US Becoming a Second-Class Power?* (New York: NSIC, 1971, $1.00), 65 pages.

J. Bowyer Bell, *The Horn of Africa: Strategic Magnet in the Seventies* (New York: Crane, Russak, 1973, $2.25), 55 pages.

Angus M. Fraser, *The People's Liberation Army: Communist China's Armed Forces* (New York: Crane, Russak, 1973, $2.45), 62 pages.

Wynfred Joshua, *Nuclear Weapons and the Atlantic Alliance* (New York: NSIC, 1976, $1.00), 60 pages.

Norman Polmar, *Soviet Naval Power: Challenge for the 1970s,* revised edition (New York: Crane, Russak, 1974, $2.95), 129 pages.

———, *Strategic Weapons: An Introduction* (New York: Crane, Russak, 1975, $3.95), 164 pages.

William Schneider, Jr., and Francis P. Hoeber, *Arms, Men, and Military Budgets, Issues for Fiscal Year 1977* (New York: Crane, Russak, 1976, price not given), 288 pages.

William F. Scott, *Soviet Sources of Military Doctrine and Strategy* (New York: Crane, Russak, 1975, $2.75), 72 pages.

than is the case in the political arena. The impression that emerges is that the United States is spending a lesser portion of her substance on defense than she has at any time since before the Cold War, and her will is seriously weakened. Yet the Russians are spending more in both relative and absolute terms than ever before, and they have not wavered in their ultimate goal of making the world safe for communism—by making it all Communist. Our scholars urge us to give immediate attention to the rebuilding of our defenses. In both strategic and naval weapons, the pendulum is swinging rapidly against the West. Our writers are not alarmists. The West still has important advantages, but it must recognize the danger and utilize them to reverse the swing.

If the reader is not moved to look at any other volume discussed in this essay, he should examine *Arms, Men, and Military Budgets.** He is not likely to find such an up-to-date treatment in book form nor one that covers the field in a more comprehensive and understandable way. The message is a grim one and, expressed in the simplest terms, the U.S. is spending but 5.4 percent of her large gross national product (GNP) on defense compared to the Russian expenditure of 13.5 to 14.5 percent of a smaller product. Even in absolute terms, the Russians are outspending America by a very substantial margin. Hoeber and Schneider also cite the asymmetrical effects of SALT I and recommend that the U.S. should definitely proceed with both the B-1 and Trident programs to compensate for the fact that the Russians can and are improving their position in MIRV technology as allowed by SALT while the U.S. can do nothing to overcome its limitations in numbers of missiles and throw-weight. They also point to the fact that the West has always relied on superior technology to overcome its disadvantage in numbers among the general purpose forces. Now, the Russians, while they maintain their numbers, are moving rapidly to eliminate their lag in technology. This is most apparent in naval affairs. Though the number of Russian ships has not increased substantially, the qualitative change has been dramatic. The vessels are bigger, have more sophisticated armaments, and greater range. It seems obvious that there has been a basic change in doctrine. The Russian navy used to be only a coast defense force. Now Schneider and Hoeber (and many others) hold that the scheme is to build a naval force capable of projecting Russian power overseas. What is to be done? *Arms, Men, and Military Budgets,* in addition to its B-1 and Trident recommendations, suggests that the West should be careful not to give away something for nothing. Especially important is the tendency to export technology to the Soviets. Here, America has a very substantial advantage but one that we are in danger of losing. The labor input to production in America is approximately 66 percent of that required in Russia. We must be careful not only to maintain but to increase that margin. We can do this by modernizing the management of our own research and development (R&D) so as to guarantee that we have the maximum number of new starts. This will ensure that we will be able to outproduce the Russians de-

*The NSIC is making this work a recurring feature of its program. Since the time of writing, the second annual version of this book has appeared as Francis P. Hoeber and William Schneider, Jr., editors, *Arms, Men, and Military Budgets, Issues for Fiscal Year 1978* (New York: Crane, Russak, 1977, $5.95), 354 pages. The message of this later work is basically the same, and it should be high on the reading list of every officer.

Frederick Seitz and Rodney W. Nichols, *Research and Development and the Prospects for International Security* (New York: Crane, Russak, 1973, price not given), 74 pages.

Lawrence L. Whetten, *The Soviet Presence in the Eastern Mediterranean* (New York: NSIC, 1971, $1.00), 50 pages.

spite our disadvantage in numbers.

Also suggested in *Arms, Men, and Military Budgets* are some major revisions to the personnel program designed to see us through the long haul. Generally, the idea is to change to a system of much longer initial enlistments with fewer re-enlistments. This would have the dual benefit of raising the experience level and reducing the retirement liability incurred. This is the one area of the book that seems suspicious to this author—too pat! The implications of it are far-reaching and certainly merit detailed study. Would that tend to make us a more mercenary force than we already are? What happens to professionalism under this system? Would it further aggravate the growing racial imbalance among the ground combat arms? Some career personnel may deplore the tendency here to express hardware costs in terms of declining portions of the GNP but to leave personnel costs in dollar figures and then conclude that the latter are getting out of hand! Yet, anyone who cares to compare the size of pay raises to the inflation rate since the coming of the All Volunteer Force must conclude that the latter has exceeded the former in every instance and that, consequently, the real take-home pay of all concerned has been going down, not up!

One of the best studies in the NSIC series, *The Military Unbalance: Is the US Becoming a Second-Class Power?* handles the "intent" problem in analyzing the psychological bases of deterrence. The conclusion is that there is, and will continue to be, a strong streak of Russian thinking that impels them toward an aggressive, expansionist attitude toward the rest of the world. But for the fact that this is accompanied by a generous measure of caution, it would constitute a strong impulsion toward a first strike. However, caution motivates the Russians to an opportunistic policy: to take a step forward when possible and bide their time when it is not. But this whole calculus depends on the will to resist on the part of their capitalist adversary. And that is the rub for America—our problem is to maintain not only the capability to resist the strategic onslaught but also the will to do so. Only then will it be reasonable to hope that the onslaught will never come. In short, the essay by Professors Richard Pipes and Leonard Shapiro argues that it is the duty of all thinking Americans to educate their fellow citizens against the dangers of neoisolationism. Not only must this will to resist exist but it must also be perceived by the adversary.

One of the ways in which we can build the perception of our firm will is to make sacrifices in the acquisition of the tangible means of resistance. If it were possible to get the American public to make the sacrifice of slowing down from 65 mph to 55 mph, that would be tangible evidence that the nation possessed some resolution to defend itself through making its fuel supply more secure. If such a nation is also willing to defer spending on new color TV sets to field the B-1 weapon system, for example, that might be perceived as a go-slow signal among the adversary's opportunists. Frederick Seitz and Rodney Nichols cogently argue that military R&D spending has been going down while investment in civilian projects has been going up. The numbers of engineers and scientists employed in the private sector have not been declining as rapidly as in military enterprises. The authors say that this is especially serious when considered in light of what they see as higher personnel costs and the massive effort the Russians are making in R&D. The authors insist that the trend must be reversed. Costs can be reduced by new technological applications. Basic science research should be increased. This must be done not only for the sake of the greatest possible effectiveness (and cost effectiveness) for our own force but also to give us the capability to understand the threat and avoid technological surprise. Further, in view of the general reluctance of our NATO partners to increase

the sizes of their general purpose forces, technology is our best option for increasing the effectiveness of the West's deterrent power in Europe.

But the first step in eliminating the disarray of NATO, according to Wynfred Joshua, is not a matter of technology. It is more basic than that. The Vietnam trauma had its repercussions in Europe, and they were serious. The validity of the American nuclear umbrella has again been called into doubt. Consequently, the first step of the restoration process must be a political one: the restatement of the objectives of the alliance. And it must be done in the strongest possible terms in order to make the coupling of our nuclear deterrent to the military security of Western Europe as credible as possible. Once the political objectives are restated, then the strategy of the alliance needs to be re-examined. Some features of Joshua's revised strategy would be:

- A reaffirmation that there would be no quick or radical drawdown of American ground forces in Europe.
- MBFR (Mutual Balanced-Forced Reduction) cannot be achieved on a truly equitable basis and ought therefore be rejected.
- The coupling cited above should be made very perceptible in Moscow by tangible force disposition measures by the U.S.
- The nuclear threshold should be established at a low, but still uncertain, level.
- The U.S. should support the further development of the British and French nuclear deterrents.
- The addition of some missiles in place of the aerial portion of the U.S. deterrent in Europe would be permissible as long as it were done gradually and in a way that would avoid the appearance of decoupling.
- The enhancement of the defensive capabilities of all NATO forces through the massive deployment of the new technology—such as PGM (precision-guided munitions).
- Maintenance of strong naval forces on the NATO flanks.

Of course, many Americans will want to question some of those ideas. They all seem to point to an even greater strain on the American economy, and if Japan is to pick up a greater share of the common security bill, then a similar action in Europe would not be too much to ask. This is especially true since the nuclear deterrent to which the NATO defenses must be coupled weighs most heavily on the American economy.

The elements of that nuclear deterrent are explained by one of the most effective authors of the entire series, Norman Polmar, in *Strategic Weapons,* which was reviewed by Kenneth Werrell in our September-October 1976 issue. This book is a primer of the first order and should be read by all who are not directly involved in that part of our Air Force's work. Still, Polmar's long experience as a naval writer and as a member of the editorial staff of the U.S. Naval Institute *Proceedings* does seem to show through. He (correctly, I think) is worried about the growing strength of the Russian strategic forces and of the effects of SALT. Yet he understates the value of the high operational readiness rate and relatively low cost of the ICBM force, the recallability of the bomber force, the high yield of manned bomber weapons, the ability of the B-52 to seek out and destroy targets missed by missiles, and the importance of having reliability proved under combat conditions—specifically, and most recently, the significance of the Linebacker II operation is not fully appreciated. Still, there is no intent here to run down the book; it is a first-class handbook, useful to all but the experts on strategic weapons.

SO FAR, our discussion has been mainly concerned with one-half of the

forces acting on the strategic pendulum, the American and friendly ones trying to swing things our way. We turn now to that other set of forces, those of the potential adversaries.

The most fundamental factor governing a nation's organization for and conduct of war is not its raw material supply or its human resources. Rather, it is the body of ideas that guides the marshaling of these material and human assets into an effective organization. Consequently, an analysis of a potential adversary's war capability should start with an examination of his military thought. Colonel William F. Scott, USAF (Retired), one of the few military scholars who have written works for NSIC, has provided an authoritative tool that will facilitate this examination: *Soviet Sources in Military Doctrine and Strategy.* When Major General Pavel A. Zhilin, Director of the Soviet Institute for Military History, visited West Point a few years ago, he remarked that our military history program was very impressive but that it did not give enough attention to Soviet military affairs. Colonel Scott would certainly agree that Soviet military thinking is insufficiently known in America, but he contends that it is certainly not unknowable. He argues that one of the main channels of communications that the Soviet leaders use for the dissemination of strategic doctrine to the lower levels is the published literature, a good part of which can be found in English translation. Scott's book amounts to a guide to that literature from the early 1960s onward. No student of Russian military affairs should allow this book to escape his notice.

Norman Polmar's fine book on strategic forces was discussed in our analysis of the military situation of the West. Of course, important parts of it are devoted to the nature of Russian strategic forces as well. He brings his special expertise and fine writing style to bear in an even more impressive work *Soviet Naval Power: Challenge for the 1970s.* There might be a strong tendency among Air Force officers to see an element of alarmism in any work of this sort, but I must admit that Polmar exercises a good bit of reserve, and I am convinced that the Soviet naval threat is a real one. Polmar shows that we clearly outclass the Russians in one major area, attack carriers. Some argue that this gives us a decisive advantage at sea, but he cites a train of thought that discounts these carriers as being no longer as decisive as they were in the Pacific War. In terms of SLBMs he implies that it is difficult to come up with a definitive statement, but that it seems that neither side is radically ahead. We have a technical lead; the Russians have the numbers. But the thing that worries Polmar most (and rightfully so, I think) is the growing power of the Soviet surface forces. Given the disaster along Battleship Row on 7 December 1941 and the fates of the *Repulse* and the *Prince of Wales,* this is an ironic twist of fate. According to Polmar, the worrisome thing is the potential advantage the Russians may derive from their lead in ship-to-ship missiles. Some think that the Soviets might be able to wreak havoc among our carriers with missiles from their surface forces before our ships could steam to a point close enough to launch an air strike. Given the new interest in the Air Force's collateral mission to aid the Navy in sea control, it would behoove all of our readers to look over this book. One wishes the author had explained why the Russians have not built greater numbers of nuclear attack submarines for use against our highly vulnerable energy LOC and, also, that he had given greater attention to the naval forces of NATO and the Warsaw Pact powers. That might have modified his argument a bit.

Lawrence Whetten, writing on a related subject, demonstrates something of the perishable nature of NSIC's work. His essay was written in 1971 before the October War and the ensuing energy crisis. He has, therefore, underestimated the importance of the oil resources of the Middle East, the Arab military

prowess, and the Arab capacity for unified action. He concluded that the Soviet presence in the eastern Mediterranean was but a limited threat. The constraints that made it so, according to Whetten, included the lack of good allies, the route of the Soviet line of communication through the Dardanelles where it can be easily interdicted, the lack of tactical air support (now modified by the appearance of the Kiev class carriers and their VSTOL fighters), fewer numbers of combatants on station than those of the NATO allies, and a doctrine that is not fully proved in war. Though this writer believes that Whetten has underestimated the threat a bit, the experience of trying to succor Malta in World War II showed that sailing about the Mediterranean without air cover is likely to be a pretty dangerous proposition.

The Indian Ocean is much bigger and less restricted by land masses than the Mediterranean. Here, the Russian LOC for its naval combatants is longer and must pass through yet another of Mahan's narrow seas, Suez, or at least around the Cape of Good Hope. It is highly vulnerable. Still, the stakes are so high and our lines to the same area are so long and must also pass through the narrow seas that we cannot afford to be complacent about it.

W. A. C. Aide's work goes farther than it should in saying that the hullabaloo about a naval confrontation in the Indian Ocean is blown out of proportion. The routes to the Persian Gulf from Japan and Europe are so vital that we must keep an especially watchful eye on them. Aide, an Australian, warns his countrymen that the fall of Saigon is not the end of the world and that it would be premature to throw themselves at the feet of Peking or Moscow because of it. The greater part of NSIC's attention is given to Soviet problems, but the Indian Ocean is an area where both the Russians and the Chinese have interests. Aide does point to Chinese activities in Central Africa but sees that as only a very limited threat. Not only is the Chinese power to project overseas rather weak but the nations there are insufficiently developed to constitute a crucial factor in international politics. J. Bowyer Bell paints a similar picture of the states around the Horn of Africa: they are so undeveloped and poverty-stricken that their chief importance is their location close to the exit of the Persian Gulf.

Another soldier-scholar, Colonel Angus M. Fraser, USMC (Retired), surveys a different part of the potential adversaries' military forces in *The People's Liberation Army: Communist China's Armed Forces.* Because it was written in 1973, it needs some updating, but the bulk of the study remains current. According to Fraser, the Chinese Communist army is good and is developing at a decent rate. The air forces are respectable when operating above the home turf. The navy is more or less a coastal defense force that does not even have the capability of projecting across the Straits of Taiwan. Industry in China is concentrated and soft, and internal communications are improved since the Korean War but still vulnerable. Nuclear capability is progressing but destined to remain useful only in a defensive role for a long time. The guerrilla doctrine is certainly an asset, but not in areas where the cause could not be painted as a defensive one. One advantage the Chinese do have is that the eastern provinces of the U.S.S.R. are still sort of a hostage in that they are at the far end of the (so far) single-roadbed Trans-Siberian Railroad—and subject to incursion from the south. In short, Fraser's message is that the People's Republic is not a fearsome threat away from its own backyard but that it is ready, and probably willing, to fill any political vacuums around its borders.

THE WORKS of the NSIC having to do with the military instruments of national power form an impressive collec-

tion. Their general tone will meet with little criticism from most military officers. It is one of concern, but one that avoids alarmism. Most of the authors come from outside the military establishment; yet, their technical competence seems quite good. Though the goal is to educate the general public to the need for preparedness, there is a good deal within these volumes for the professional officer whatever his specialization. The NSIC has so far left one area of interest uncovered. At first glance, one would think that the subject of tactics is beyond the realm of the organization. Yet, there have been a few times in the past where tactical trends have had an unexpected and profound effect on strategy, grand strategy, and national policy. Much of Napoleon's success lay in his audacity, his willingness to move quickly and take the offensive. In those days, the slow rate of fire and inaccuracy of infantry weapons and artillery made a cavalry charge or a head-on infantry thrust a reasonable proposition. The ineffective musket made it possible for the attackers to be upon the foe before the latter were ready for the second volley. Technical change ruined all of that. The coming of the long-range minié ball weapon, the repeating rifle, breechloading artillery, machine guns, and barbed wire greatly enhanced the power of the defensive.

By 1914, the new power of the defensive had been amply demonstrated in the American Civil War and the Russo-Japanese War. Yet, French doctrine and, consequently, their strategy had not yet appreciated that fact. The plan was to make a Napoleonic thrust through the very rough terrain on the southern end of the border. The result was defeat and then the grinding stalemate on the Western Front. Later the pendulum swung the other way, but this time the cycle was much shorter. The tank, airplanes to serve as flying artillery, motorized transport, and soft-spot tactics all reversed the swing back in the direction of offensive warfare. The losers of the Great War were watching that pendulum swing, and the result was a series of smashing victories for blitzkrieg tactics in 1939, 1940, and 1941, which ruined the defensive strategy of the Allies.

The question before us now is whether the pendulum has swung again. The implications of this question are profound. If, as some periodical writers are saying, the "lessons" of the last phases of the Vietnam struggle and the October War are that technology of the PGM and all sorts of restricted-visibility sensors have made anything that moves on the battlefield a dead duck, what does that mean for the Russian blitzkrieg strategy—and the NATO counterstrategy? If the heat-seeking, portable antiaircraft missile and the wire-guided antitank missiles have made it impossible for the air and armored elements of the blitzkrieg to live, what does that mean for European strategies and force structures? If mininukes delivered with precision at any hour and in any weather can prohibit the massing of forces for the offensive, what are the implications for the strategy-makers of NATO?

Of course, the position of the pendulum is not clear. Some are saying that the October War cannot be definitive. The European weather is much worse than it is in the Middle East, and, after all, the Israelis did contrive to make some impressive advances before political factors shut down their operations. Still, if the pendulum has swung back to favor the defensive, it may be a ray of light. The ratio required to mount a successful offensive in the Great War was something like 3 or 4 to one. As the ratio of forces is something like 700,000 for NATO to 900,000 for the adversary and if the 1914 calculus were applied, then the future would be much brighter than it has seemed for a long time—but we would have to go to work to provide the equipment and tactical doctrine that would guarantee us the advantages of the defensive. The question is a crucial one,

and perhaps it would be a good thing were NSIC to marshal some scholars to help us toward an answer.

But some would argue that a brilliant answer to that question would be of no avail without the economic bases to provide the requisite equipment and manpower. Accordingly, we now turn to NSIC's analysis of the situation with the economic instruments of national power.

The Economic Sinews of National Security

The present generation could hardly escape the notion that the economic pendulum has swung heavily against us. The National Strategy Information Center has four works in print on the subject.† The prophets of gloom tell us that the era of plenty is gone and we will soon be victims of a merciless age of poverty. The collective theme of our economic studies is that the idea has a measure of merit, of course, but America has some assets in the coming struggle. She has a superior technology, the prospect for some alternate fuels and fuel sources, a very strong agricultural base, and a population growth rate that is less than that of many other nations. What is required is the will and intelligence to use these assets, and others, to try to guarantee the security and prosperity of ourselves—and the rest of the world.

The most crucial raw material is oil. Klaus Knorr, in *Toward a US Energy Policy,* argues that the situation is serious here, but not hopeless. The OPEC cartel has a very powerful weapon. Not only is the embargo capable of killing the economies of the western industrial nations but even a significant price rise can have a disastrous effect. The United States is better off than her European allies and Japan because she has some domestic supplies and large beds of coal. If one assumes that the struggle is lost without the allies, then their vulnerability is our vulnerability. We made just that assumption in both the World Wars. Still, there are some things that the West can do to strengthen its position. The basis for any effective energy policy, according to Knorr, must be conservation through a petroleum price rise. Not only would this hold down consumption but it would also encourage exploration for new sources as well as research to develop alternative fuels. The problem must be overcome through domestic measures and diplomacy because Knorr feels that military coercion is out of the question or almost so. Diplomatic solutions are not altogether hopeless. The Arabs seem to realize that there is little hope of regaining their land through confrontation, and only the U.S. has sufficient leverage on Israel to affect her policy in significant ways. Whatever the diplomatic prospects, Knorr's cogent pamphlet argues that there is an urgent need to develop a coherent and effective energy policy in the United States.

Oil is not the only problem. Since World War II, according to Yuan-li Wu in his essay *Raw Material Supply in a Multipolar World* and many others, the raw materials suppliers have come to enjoy a seller's market. For a long time, they did not take full advantage of

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†Klaus Knorr, *Toward a US Energy Policy* (New York: NSIC, 1975, $2.00), 45 pages.

William Schneider, Jr., *Can We Avert Economic Warfare in Raw Materials? US Agriculture as a Blue Chip* (New York: NSIC, 1974, $2.00), 46 pages.

———, *Food, Foreign Policy, and Raw Materials Cartels* (New York: Crane, Russak, 1976, $2.95), 122 pages.

Yuan-li Wu, *Raw Material Supply in a Multipolar World* (New York: Crane, Russak, 1973, $2.45), 50 pages.

their leverage, but they are beginning to learn some things from OPEC. But several factors make the raw materials situation slightly less threatening than it is with petroleum. Often, we use overseas suppliers only because it would be more expensive to extract the same resources from our own soil —in a pinch, we can go back to using the more expensive domestic materials. A goodly portion of our ore supplies are to be found in the Western Hemisphere or Australia where the threat of interdiction is less than it is with the oil supplies of the Middle East. Synthetic substitutes, such as the case with rubber, can be used in many applications even if they are less efficient. Oil is a consumable commodity; the other raw materials tend to be made up into more durable products, and many of them, like tin and iron, are recyclable. Even though the situation with other raw materials is not quite as critical as it is with energy, our position is especially weak in iron ore, bauxite, manganese, zinc, copper, and lead. This is particularly true in terms relative to the Russians who are nearly self-sufficient in all raw materials. There are some things we can do. We can employ our technological advantage in a variety of ways. Methods might be discovered to recover metals more efficiently from ores that are of marginal quality—and this would become increasingly promising as the prices of foreign materials go up. Research should be continued and expanded to find substitute materials for those in short supply. In some cases, alternate sources and lines of supply can be developed. Wu also argues that positive steps should be taken to aid less developed countries in their development plans. This could not only have the effect of increasing world stability but will also increase the market for U.S. goods, technology, and services, to offset the inevitable rise in raw material prices. Finally, stockpiling can provide a hedge, at least for the short term, against crises.

William Schneider's two essays are essentially the same. They provide additional data on raw materials and suggest another solution: the manipulation of our strength in food supplies to overcome our weaknesses in energy. One of the problems with air interdiction tactics in our last two wars was that the experience at Normandy led the American public to expect too much of it. So, too, according to Schneider, we have given economic warfare a bad name because we have set its objectives too high. He argues that it can be a valuable supplement to the other instruments of foreign policy even if it is seldom capable of carrying the day unassisted. Schneider would have us buy up the surplus in our food crop to create a strategic reserve. This reserve would be used for two kinds of emergencies: humanitarian aid in the case of natural disasters and as a lever to counter the coercion attempted by any of our raw material suppliers. He says that we have a practical monopoly in conjunction with Canada and one or two other countries in the Western camp. This practical monopoly will increase because the rate of growth of our food crop will continue to exceed that of our population, but the reverse will be true of our raw material suppliers. And, he states that we can find substitutes for Middle Eastern oil more quickly and cheaply than the petroleum suppliers can develop alternative food supplies.

Schneider's arguments are very attractive. However, others have said that in an all-out confrontation the West will run out of oil more rapidly than the Middle East will run out of food and that cultural factors within the United States will prevent a sufficiently ruthless use of the food weapon. Schneider did anticipate one of these criticisms in saying that the food instrument had its best prospects as a middle or long-term measure.

In the end, the message that emerges from the NSIC essays on economics is that our situation is worrisome but that there are

many things that we can do to overcome the problem. The days of plenty are gone, but we are not at the end of our rope. The measures necessary to achieve solutions demand will power. The question that now needs to be asked is not an economic one. It is a moral problem. Can the American will be restored, or did it disappear forever in the swamps of affluence and the paddies of Vietnam? The books considered herein suggest many ways in which we *could* give an optimistic answer to that question. Perhaps the best starting place would be the formulation of a rational and vigorous energy policy.

FEW Air Force members will have the time to read all of the Strategy Papers, Agenda Papers, and other publications of the National Strategy Information Center. But the mere fact that so many distinguished civilian scholars have taken the time to write responsible papers on threats to our national security is a hopeful sign to all in the military. Some of the volumes are worthy of the special attention of the Air Force generalist. The Schneider and Hoeber work, *Arms, Men, and Military Budgets* is a handbook that is extremely competent, timely, and relevant for practically every officer in the service. Frank Barnett's *Alternatives to Détente* is a concise, well-written pamphlet that gives a fine summary of our national security situation. Norman Polmar's *Strategic Weapons: An Introduction* is a splendid primer for the intelligent layman, and his *Soviet Naval Power* will alert the reader to the hard facts about the contest on the high seas. Our generalist might gain some valuable insights on the energy problem from Klaus Knorr's 1975 *Toward a US Energy Policy.*

If America is to survive and prosper in a world full of potential threats, it will not be because of her numbers or material riches. If those factors are to be decisive, she could only lose! Only the strength of her ideas will see her through—and that is one of the beauties of her system: she is blessed with a multitude of sources of new ideas. In the realm of thought on national security, *Air University Review* has previously pointed to the U.S. Strategic Institute, the Inter-University Seminar on Armed Forces and Society, and others as the sources of wealth of ideas. To these, I would add the National Strategy Information Center; I commend it to your attention.

Maxwell AFB, Alabama

POTPOURRI

Memoirs of My Services in the World War, 1917–1918 by George C. Marshall. (Foreword and Notes by Brigadier General James L. Collins, Jr.) Boston: Houghton-Mifflin, 1976, 268 pages, $10.00.

It is not difficult to understand why George C. Marshall achieved the status he did during World War II and after in a succession of distinguished military and diplomatic posts. This volume, reminiscent of his service in World War I, discloses his proclivity to recognize great events and people and his ability to associate himself with them, a trait that persisted throughout his life.

This little volume was one of his first authorial attempts. It is based on what passed for a diary or

journal that he kept and on information gleaned from his letters home during his overseas service from 1917–1919. Marshall attempted unsuccessfully to have it published in the 1920s, shelved it, and the manuscript subsequently reappeared following his death. Thanks to his biographer, Dr. Forrest Pogue, and Brigadier General James L. Collins, Jr., (Chief of Military History, U.S. Army), it has now been published for the benefit of that legion of Marshall fans.

Marshall's style is forthright and informative; and while not a literary masterpiece, *Memoirs of My Services* does provide some compelling insights into the character and ambitions of a young officer in the formative years of his career. Captain Marshall was an aide-de-camp to General Franklin Bell in 1917 when the Department of War elected to send the 1st U.S. Division to France. General Bell gracefully released Marshall to the new division in the capacity of operations staff officer, where he quickly became an associate of a number of fellow officers destined for big things, in France and after: Frank Coe, William Cruikshank, Lesley McNair, and others. Young Marshall, recounting his official and social activities in France, displays an affability and bonhomie that might surprise readers more accustomed to the reserved senior officer of later decades. He seemed quite at home in a social environment and displayed a more-than-casual affinity for concerts, dances, and the theater available in Europe at the end of hostilities. He was also quick to adapt to the rigors of a combat environment and displayed an early tolerance for the shortcomings of others that may seem somewhat uncharacteristic compared with the high standard of integrity in his later life.

After the war, Marshall made several visits to the recent battlefields with General John J. Pershing and provides us with some interesting firsthand accounts of Pershing's friendly but correct relations with his former allies.

Memoirs of My Services in the World War, 1917–1918 moves rapidly and avoids lengthy discourses or analyses of events, probably due to its having been written so soon after they occurred and before Marshall began to take a more philosophical view of events. We gain no new knowledge of the American Expeditionary Force or its role in the Great War from this account. However, for Marshall devotees, the book does provide a fresh view of the earlier life of that admirable figure.

Colonel James Barron Agnew
Carlisle Barracks, Pennsylvania

Post-Revolutionary Cuba in a Changing World by Edward Gonzalez and David Ronfeldt. Santa Monica, California: Rand Corporation, December 1975, 78 pages, Public Document.

In less than 100 pages the authors present an incisive report on Castro's attempts to keep Cuba front and center on the international stage. Although completed before the Angolan intervention and the convocation of the First Party Congress in Havana, the study succeeds in providing a valuable insight into the institutionalized process occurring in Cuba from 1970 to 1975 as it affected foreign policy perspectives vis-à-vis the United States, Latin America, the Soviet Union, and the Third World.

According to the authors, the failure of Castro's projected 10-million-ton sugar harvest in 1970 opened the door to institutionalization and depersonalization of the Cuban regime and, paradoxically, by 1975 resulted in an apparent recovery of the *fidelista* power stance in Havana. How did this happen? The *líder máximo* brought into the ruling coalition friendly civil-military elites who might have developed into an effective opposition in the years ahead. At the same time, popularity with the Cuban masses was enhanced through consumer benefits derived from improved economic management as a result of institutionalization. Despite increased Soviet constraints, Castro has emerged with "more flexibility and leverage in his foreign policy than at any time since the late 1960s," according to the authors.

Yet, the enhancement of Castro's control over foreign policy initiatives has been restrained by Cuban economic dependence on the Soviet Union and increased economic vulnerability from abroad. The expansion of trade relations and the achievement of a scientific and technological base are suggested as the panacea. In moving from insular tutelage, Cuba must plot a foreign policy course in the uncertain seas of global interdependence. Insofar as foreign policy objectives are concerned, this would entail increased Cuban commitments to Third World nations, acquisition of sophisticated Western technology, and reduction of its client status with the U.S.S.R. to obtain the best of both worlds, Castro would project the achievement of these objectives under the umbrella of Cuban–U.S. détente.

Prepared for the Department of Defense as part of a long-range study on U.S.–Soviet competition, this report should be of particular interest to Cubanologists and Latin Americanists. In addition, the study serves to update previous Rand

reports on Cuba by the present authors and others.

Finally, *Post-Revolutionary Cuba in a Changing World* represents a valuable contribution to the study of Cuban policy objectives in an atmosphere of détente. In the event of a return to Cold War confrontations in the decades ahead, one cannot help wondering if the new generation of *fidelistas* could be effectively restrained from acting independently in the perceived national interest to the detriment of world peace and security.

Dr. Bynum E. Weathers, Jr.
Documentary Research Directorate
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The Cooling: Has the Next Ice Age already Begun? Can We Survive It? by Lowell Ponte. Englewood Cliffs, New Jersey: Prentice-Hall, 1976, index, xvi + 306 pages, $8.95.

There is little unanimity among scientific researchers as to the nature of current weather trends, and climatic change will probably remain a controversial subject until the next ice age. Lowell Ponte's *The Cooling* does little to resolve this controversy, but one point that comes through with great clarity in this interesting and well-written book is that past climatic changes, about which there is no doubt, have had profound and dramatic consequences for man and his lifestyle.

Operating from a broad, though sometimes sketchy, data base, climatic changes are traced through to their influences on human values, ideas, and actions. The rise and fall of civilizations and vast nomadic migrations may all have had their origins in subtle, if not minute, climatic variations. Although many of Ponte's arguments are pervasive, many also fall into the realm of conjecture. Of particular speculative interest was the thought that the American fight for independence had its foundations in a "little ice age" that chilled Europe in the late 1700s and compelled Britain to import more food than usual and tax her colonies more heavily.

In the assessment of future climate, the natural variability of weather may have to take a back seat to the increasing influence of industrialized, energy-consuming man on nature. Since the topic of the book is "cooling," there appears a bias in favor of the view that increasing manmade pollution will reflect sunlight back into space and precipitate another ice age, rather than the also popular and well-supported theory that increasing carbon dioxide pollution levels are sending us headlong into a greenhouse effect which will turn the planet into a tropical jungle. Whichever course, if either, prevails, man's growing power to alter the climate on even a local level will surely have political and military repercussions, and "weather warfare" may become a very real weapon.

An important perspective for a military man to gain from this book is that times do change, and the awesome power of the environment can quickly upset the best of plans, whether it be by earthquake, drought, deluge, or ice age. What course would the United States follow if the Northeast were suddenly covered by a "snow blitz" that left a permanent layer hundreds of feet thick? While seemingly the subject for a grade B horror movie, such an occurrence may not be without scientific basis. Would the U.S. turn its military might in search of a more temperate climate or merely accept its fate as a weak arctic nation? I hope this is a decision I don't have to help make.

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AWARD

The Air University Review Awards Committee has selected "The Energy Problem in a Global Setting" by The Honorable John Patrick Walsh, Air University, as the outstanding article in the July-August 1977 issue of *Air University Review*.

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