AIR UNIVERSITY review

soldiers and scholars

*The nation that will insist on drawing a broad line of demarcation
between the fighting man and the thinking man is liable to find
its fighting done by fools and its thinking done by cowards.*

Sir William Francis Butler

In a recent article in *Armed Forces and Society*, Morris Janowitz observed that the social sciences have had little impact on our armed forces since World War II. Among the reasons Janowitz cites to explain this situation are the military's resistance to change and the poor quality of the research produced by some social scientists.

Another reason for this difficulty, I believe, is the rarity of true soldier-scholars, men like General Sir John Winthrop Hackett and Lieutenant Colonel John F. Guilmartin, Jr., the retiring editor of this journal. Ideally, the soldier-scholar has firsthand knowledge of combat, the essence of warfare, whether it comes from parachuting into Arnhem like Sir John or flying Jolly Greens on combat missions into North Vietnam and Laos as Guilmartin did. A genuine soldier-scholar is also a serious student of the military profession, and his published works attest to the rigorousness and quality of his inquiries. Works like Hackett's Lees Knowles lectures, published as *The Profession of Arms,* and Guilmartin's *Gunpowder and Galleys,* a classic study of the interaction between technology and warfare, not only testify to their authors' scholarly accomplishments but also teach others about the basics of the profession of arms.

Many who write about the military profession produce works of marginal value because all too often they forget that the fundamental raison d'être of military organizations is to wage war. Without this understanding and a thorough knowledge of war, studies dealing with military affairs tend to be sterile, academic, and of marginal utility. Producers of such studies resemble Sir Francis Bacon's description of the rationalists who did not ground their scientific work in experience; according to Bacon, they are like spiders spinning vast intellectual webs out of their own substance.

On the other hand, the soldier who would master his profession must make a lifetime study of war and be constantly alert for the appearance of ideas that may signal a major advance in human knowledge, an advance that may have important implications for the art and science of war. Without this sensitivity, the military man becomes a narrow-minded reactionary, prepared only to lose the next war by fighting it as he fought the last one.

Recognizing that the soldier-scholar is indeed a rare species, there must be forums where soldiers and scholars can speak to each other. When presenting his ideas in this forum, a scholar must recognize that those to whom he would speak have not had time in their busy careers to master specialized, discipline-oriented languages. When the soldier puts forward his ideas and describes some aspect of his profession, he must realize also that he is speaking to a wider audience than those who serve in his particular career field.

A journal that would serve as such a forum should have as its target audience the military generalist who is either in a position of high responsibility or aspires to such a position. Also, the journal must serve specialists who need a broad understanding of the military profession to perform their duties well. Such a journal would have two facets to its mission. First, it would publish articles that identify and define issues and then publish follow-on articles and commentaries debating those issues and offering solutions to problems embedded in these issues. Second, it would strive to educate the generalist. Certainly, articles debating key issues will tend to serve this function. But a professional military journal must also publish articles that explain specialized aspects of the Air Force, such as operational testing and evaluation, to the generalist.

Colonel Guilmartin succeeded in making the *Air University Review* such a forum. The soldier and the scholar will continue to meet on the pages of this journal as the *Review* continues to link scholars in the broader defense community with serving professionals in the United States Air Force.

D.R.B.

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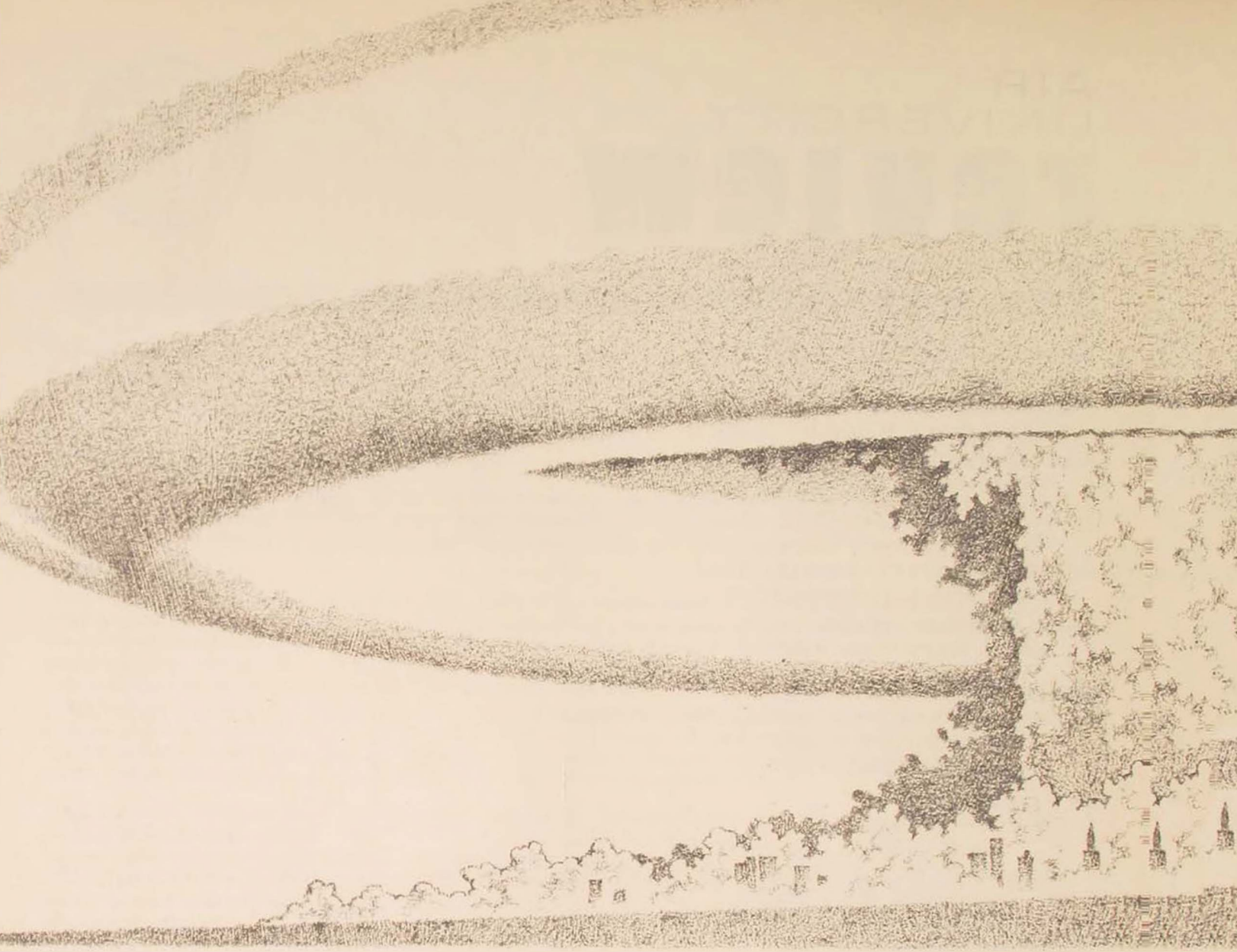
IMAGES OF THE NUCLEAR FUTURE

blending politics and technology

DR. BARRY J. SMERNOFF

Two roads diverged in a wood, and I—
I took the one less traveled by,
And that has made all the difference.

Robert Frost, "The Road Not Taken"

THE AMERICAN quest for an exit from the nuclear predicament has locked mankind into the very real possibility of unimaginable destruction if a general nuclear war
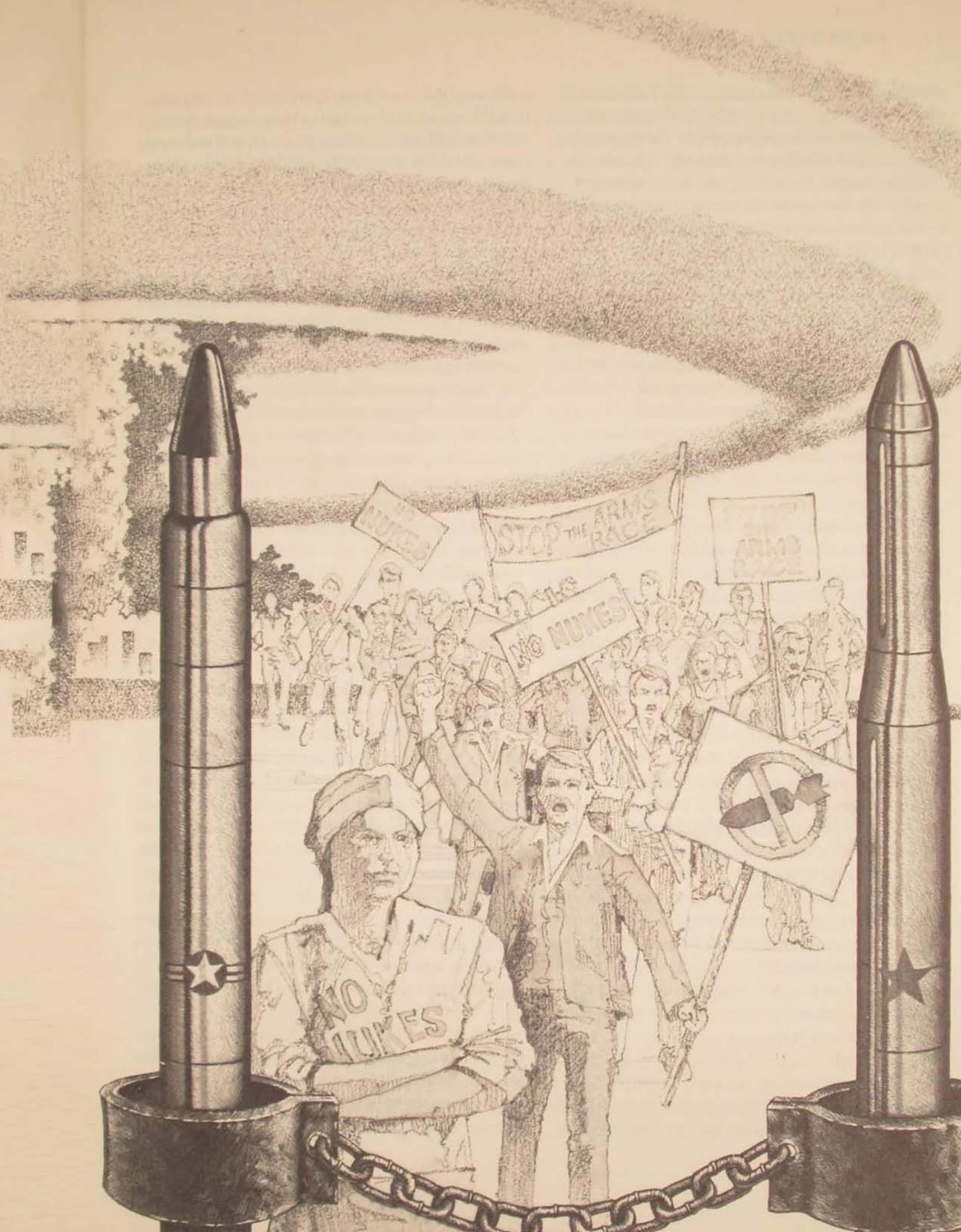
should occur. This is commonly characterized by a stark either/or choice of a kind suggested in Robert Frost's well-known poem: Two paths lie before us, one leading to death, the other to life.

What might be called nuclear business-as-usual is the historical approach in which we try to make ourselves feel safer by adding technically advanced nuclear weapons to bolster deterrence of Soviet attack and generate negotiating leverage for moving ahead on the arms control front. Standing in sharp contrast, increasingly popular freeze proposals are designed to stop the momentum of the arms race and set the stage for reversing it through deep bilateral reductions in nuclear force levels. The supporters of each approach for coping with the nuclear predicament believe that theirs is the path leading to life, as it were, while the other may produce unmitigated disaster.

The seemingly binary nature of this basic choice about which path to take into the nuclear future correlates strongly with the growing polarization of the public debate regarding what must be done to enhance U.S. national security and reduce the risk of nuclear war between the Soviet Union and the United States to an "acceptable" level. However, the range of alternative nuclear futures is actually much broader, going well beyond the traditional possibilities of nuclear business-as-usual and freeze/reduction disarmament. Unless these and other alternative images of the nuclear future are recognized as principal psychological factors shaping the unfolding debate on nuclear weapons and the arms race, the structure and dynamics of this debate will remain poorly understood. The definition and comparative analysis of five such images suggest the scope of this article, which is designed to explore the feasibility and desirability of a *third path*, involving a unique blend of diplomacy and technology, as a possible exit from the nuclear trap.

THE predominant image of the nuclear future contains numerous fireballs cov-

ering population centers. Through this uniquely impelling fear it entails, this image motivates most of the elemental emotion and political passion in the burgeoning public debate about nuclear weapons. Under the assumption that there has been a dangerous sequence of miscalculations or accidents, and/or that both diplomacy and deterrence have failed, this image of general nuclear war contains untold human agony and perhaps even the extinction of the human species in some "final epidemic," as the awful price of man's inhumanity to man in the nuclear age. While no one of sound mind wants this image to be realized, the unfortunate irony is that the steady accumulation of nuclear weapons that might actually produce this holocaust is spurred by the strong desire to prevent it, in a nuclear Catch-22 trap.

Accordingly, nuclear business-as-usual corresponds to an image of the future in which nuclear weapons and deterrence remain the essential foundation of U.S. national security by preventing war between the superpowers. The existing policy of using nuclear weapons first to defend Western Europe against any Soviet conventional assault that cannot be stopped by conventional means is a central element in this image, explaining much of the disarray in the Atlantic alliance over scheduled deployment of American missiles in Europe and the growth of the so-called peace movement there. In this image of the nuclear future, both intermediate-range (theater) and long-range (strategic) nuclear forces would be modernized to cope with the unrelenting Soviet military buildup. Arms control would continue to play a secondary role, with the goal of deep reductions in nuclear force levels seen as neither terribly urgent nor practical in the absence of major changes in the structure of Soviet policy or politics and in the health of U.S.-Soviet relations.

The radically different image of a frozen nuclear future has attracted widespread public appeal, largely because it would halt and eventually reverse the arms race that has created the nuclear predicament in the first place. A bilat-

eral and verifiable freeze on the testing, production, and deployment of nuclear weapon systems would set the political stage for deep cuts in nuclear forces already deployed, with the implicit end point of minimal deterrents and a correspondingly sharp reduction of the dangerously coercive role that nuclear weapons play in American foreign policy and world politics. Unfortunately, most proponents of the generic nuclear freeze offer no credible strategies whatsoever for creating enough leverage on the Soviet Union to obtain a negotiated agreement that sharply reduces the levels of nuclear forces. This fact explains the key difference between the Kennedy-Hatfield approach (freeze now, negotiate later) and the Jackson-Warner approach (build MX and other high-technology offensive systems to produce Soviet incentives for negotiating now, freeze later at equal and reduced levels). And even if the levels of U.S. and Soviet nuclear forces could be cut by 90 percent to reach a situation with minimal nuclear deterrents containing several hundreds—not thousands— of delivery vehicles (the SALT II Treaty would have "limited" each side to 2250), the so-called delicate balance of terror would persist in holding large civilian populations as innocent hostages, and the risk of nuclear war might decrease only at the margin. From the perspective of disarmament advocates, this deep-cut transition would reduce the level of nuclear "overkill" by a significant amount; from the vantage point of those desiring to restore more credible deterrence through the development of nuclear war-fighting capabilities, targeting flexibility would be reduced sharply. In any case, the stability of the nuclear balance in a freeze/reduction regime may not be much better than that of the current balance. Moreover, the fundamental threat of nuclear holocaust (and hazard of human extinction) would be largely unchanged—at least until the levels of nuclear forces could be reduced by yet another order of magnitude from hundreds to tens on each side, which is not seriously considered as feasible by most true believers in nuclear disarmament.

Given the lack of potential in the freeze/reduction approach for reducing the risk of nuclear war to acceptably low levels—a point conveniently ignored by virtually all freeze proponents—and the historical failure of conventional arms control efforts, which the *Encyclopaedia Britannica* calls "spectacularly unsuccessful," two additional images of the nuclear future are required to complete the set of five addressed in this article. These last two images would take the world beyond nuclear weapons toward a long-term nonnuclear future where the risk of large-scale nuclear devastation could become quite small. The first, recently articulated by Jonathan Schell in *The Fate of the Earth*, involves global nuclear and nonnuclear disarmament and shriveling of the nation-state system of sovereignty, amounting to the wholesale reinvention of world politics in an increasingly nonviolent setting. The second, which is considerably less utopian than any distant Schellian future, centers on a strategic transition from nuclear offense to nonnuclear defense in which the legitimate right of national self-defense can be achieved much more benignly through the development of new types of modern long-range weapons, such as space-based lasers, which are both nonnuclear and defensive in nature. Getting from the here of nuclear business-as-usual to such a defensive-emphasis future would require a judicious combination of technological hardware to obtain credibly effective air and ballistic-missile defense systems for coping with decreasing levels of nuclear forces and powerful diplomatic software to contain the anticipated pressures toward a renewed offense-defense arms race that dramatic defensive developments would undoubtedly prompt.

Hence the five images of the nuclear future are available for framing the ensuing discussion. The fireball image of general nuclear war is the principal motivating factor for the intensifying search to get out from under the fearsome nuclear threat. Nuclear business-as-usual emphasizing offensive nuclear weapon technology extrapolates current politico-military trends

into the indefinite future and does little to reduce the unacceptable risk of nuclear war. The freeze/reduction image is well-intentioned, probably tough to negotiate, and would not lower nuclear risks very much. Unilateral American disarmament carried out with the (illusioned?) hope of Soviet reciprocity would surely not resolve the nuclear predicament. The Schellian dream of global nonviolence is quite difficult to achieve unless political miracles emerge, and although the new millenium is only 17 years off, one should not count on them. Transition toward defensive emphasis may be the most desirable and feasible path leading away from the nuclear trap if the instabilities it entails can be contained by unconventional and untested arms control techniques (specifically, some version of freeze/reduction disarmament enjoying broad-based public support in both the U.S. *and* the U.S.S.R.).

This set of images of the nuclear future is certainly not exhaustive, nor is it intended to be. But it does contain the most essential kinds of nuclear images as a departure point for beginning to understand that the nuclear choice, most definitely, is *not* a straightforward garden-variety either/or question of life vice death, politics vice technology. The dismal nuclear choice facing us is a complex venture into a most difficult type of human problem that mixes fundamental issues of morality, psychology, and politics with the technological domain of modern weapons. The choice of which path he decides to travel into the nuclear future—guided by one or more of the images described—will be a reflection of man's character and surely determine whether nuclear war(s) will foul his planetary nest, perhaps beyond recognition.

THE essence of nuclear deterrence is the sustained credibility of the American commitment, as perceived by the Soviet Union, to carry out its part of the mutual suicide pact linking the nuclear-armed superpowers in a proverbial two-scorpions-in-the-bottle embrace.

On the other hand, perhaps the single most important element of the Judeo-Christian ethic is the sanctity of human life, created in the image of God. The indiscriminate killing of innocent people during warfare has consistently been condemned by every religious denomination represented in American society. Consequently, not only has the United States been forced into a nuclear suicide pact (or, somewhat more politely, a mutual hostage relationship) with the U.S.S.R.—admittedly a politically repressive nation whose official religion is atheism and most successful product seems to be militarism. But the dreaded consummation of this pact, embodied in the fireball image, would involve the most flagrant violation of the Judeo-Christian ethic that could be imagined. Indeed, the boundaries of moral imagination are supremely challenged by the possible breakdown of deterrence, itself designed to prevent nuclear holocaust—certainly a humane objective and the only rational one in the nuclear age.

Yet the legitimate right of self-defense cannot be denied, especially in the nuclear age, unless the idealistic goal of absolute pacifism and nonviolence could be achieved without undermining other basic values shared by Americans, such as political, economic, and religious freedom. The harsh realities of international politics will continue to force Americans to defend or lose their values in a turbulent and often Hobbesian world. The defense of truly vital national interests must be maintained, and the protection of America's people, institutions, and lands from foreign aggression is clearly the most vital of all. As long as the United States remains starkly vulnerable under the Soviet nuclear gun and the risks of nuclear war remain unacceptable, this protection cannot be achieved, and constitutional provision for the "common defense" is a sham.

Sharp reductions of nuclear force levels to hundreds of delivery vehicles on each side (constituting a minimum deterrent posture) would leave unaltered the fundamental vulnerability of American society to Soviet nuclear attack and

preserve the searing psychological reality of the fireball image with its acute distortion of moral sensibilities. General and nearly complete disarmament in which nuclear force levels are reduced to tens of launchers on each side would virtually remove the nuclear threat from both the United States and the Soviet Union yet permit the retention of small residual nuclear deterrents for ceremonial purposes and last-resort circumstances. But even the seemingly bold freeze/reduction image of the nuclear future does not dare conceive of such massive cuts in nuclear force levels; President Carter's 1977 proposal for rather *modest* reductions in strategic nuclear delivery vehicles, from the 2400 agreed on at Vladivostok in 1974 to 1800-2000, is now often remembered as the first serious deep-cut proposal! From the frame of reference provided by traditional arms control, which has had very few real successes, such cuts are unthinkable unless world politics is altered so radically that even the Schellian image of global nonviolence becomes plausible.

The third path into the nuclear future is based on the need to move outside conventional arms control approaches, find fresh ones, and clearly recognize that the ABM Treaty of 1972—the sole product of the SALT process, often touted as the most successful outcome of nuclear arms control—is the exact antithesis of what is necessary to break out of the nuclear predicament. Both the Soviet Union and the United States need to protect themselves from mutual assured destruction (MAD) and other nuclear threats, not guarantee their open-ended vulnerability in a mutual hostage relationship that is so utterly inconsistent with Judeo-Christian morality and plain common sense. Locked into a mutual hostage relationship based on the morally intolerable posture of mutual assured destruction, the two superpowers make strange and dangerous bedfellows indeed in what has become a MAD world. No wonder that the fireball image has stimulated such strong antinuclear movements in both Europe and the United States, given the clear fact that even a relatively stable nuclear balance would be susceptible to breakdown from sufficiently large political perturbations; examples abound in the history of crises.

The third path consists of a cautious yet daring transition from nuclear offense, and the morally intolerable and psychologically unacceptable circumstances that surround the MAD hostage relationship based on nuclear offense, toward defensive emphasis involving nonnuclear weapons which can protect each superpower from the other—without, it is hoped, introducing profound instabilities into the strategic balance. As Michael Nacht has written recently, few doubt that both nations would benefit enormously if they could smoothly make the transition to a defense-dominated world in which both were reasonably confident about defending their homelands effectively against nuclear attack. Furthermore, few would argue that defenses can dominate only if offenses are strictly controlled (to avert a pernicious offense-defense arms race) and if a fundamental technological breakthrough materializes to make possible credibly effective defensive systems. However, controversy enters concerning whether these conditions will occur in the foreseeable future. Those who believe not tend to argue, like Nacht, that any transition toward defensive emphasis would be an illusion and that the third path corresponds to an unrealistic image of the nuclear future.

The third path would involve a bilateral drawdown of nuclear offensive force levels and concomitant buildup of nonnuclear defenses. The latter, which would not be credibly effective against thousands of nuclear delivery vehicles, might achieve acceptably low leakage for protecting U.S. population centers when faced with (only!) hundreds, if advanced technologies such as space-based lasers are moved forward with vigor to meet the military requirements imposed by such a prospective strategic policy of defensive emphasis.* In essence, then, the soft-

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*See Barry J. Smernoff, "The Strategic Value of Space-Based Laser Weapons," *Air University Review*, March-April 1982, pp. 2-17.

ware of arms control diplomacy would be used to facilitate the bilateral reduction of nuclear force levels (which would be required in any case to meet the goals of all images of the nuclear future, other than that of MAD-based business-as-usual) while the hardware of advanced ABM technologies would be used to accomplish the buildup of nonnuclear defensive shields that (for a change) could protect both Americans and Russians from each other—at significantly lower levels of nuclear threat. In the right-thinking American spirit that it is better to be neither red nor dead, this third path would put emphasis on preserving both life and other fundamental values. Technical and postural details of the offensive drawdowns and defensive deployments would be open to U.S.-Soviet negotiation, the outcome of which could be embodied in a radically new ABM treaty overturning the immoral thrust of the 1972 version that codified mutual nuclear vulnerability in the historic pretense that this state of affairs was "healthy" for the superpowers and world peace.

To understand how the third path blending time-phased politics and technology could serve as a possible exit to the nuclear trap over the long haul, it is first necessary to recognize that the history of arms control and disarmament efforts during the twentieth century is filled with frustration and futility. The first postwar treaty dealing with nuclear weapons was negotiated in 1963 and did little more than drive nuclear tests underground, and none of the disarmament negotiations and conferences held since the first use of nuclear weapons at Hiroshima in 1945 has achieved the elimination of a single nuclear weapon. As John Stoessinger states in *Why Nations Go to War*, "the most intensive disarmament efforts in Western history have therefore been virtual failures." More recently, Barbara Tuchman writes that "persistent failure of an endeavor should cause it to be re-examined, not continued forever in the same manner" and quotes the Spanish philosopher and League of Nations disarmament leader Salvador de Madariaga: "to want disarmament

before a minimum of common agreement on fundamentals is as absurd as to want people to go undressed in winter." Indeed, the "minimum of common agreement on fundamentals" that is an essential prelude to meaningful nuclear disarmament is that survival in the nuclear age is an imperative and common goal for *all* nations and individuals, regardless of political and cultural predispositions. The rub comes in asking *how* to prevent nuclear war without creating endless controversy; fluoridation of public water supplies became highly controversial even though all Americans agreed that the prevention of tooth decay is unambiguously desirable.

IF traditional forms of arms control have been so fruitless in the past, how can serious students of the problem of controlling nuclear weapons continue to urge that we reduce our expectations and narrow the agenda for arms control to embrace much more modest goals, arguing that what is badly needed now are tangible results and we must therefore think small and take the next steps in careful increments? Granted that Paul Warnke was correct in stating that arms control is "an unnatural act," the uncommonly stark nature of nuclear risks compels civilized human beings to seek, with all due vigor, whatever durable long-term solutions may become available in order to mitigate these stark risks, and not only at the margin. Following Barbara Tuchman's line of thinking, why should we keep faith in increasingly more modest arms control approaches when faced with a long history of prior failures? A nuclearized world is no place for timid souls, and least of all for timid approaches to begin controlling weapons of mass destruction whose large-scale use could make the Nazi holocaust seem small by comparison.

In his elegant memoir, *Disturbing the Universe* (1979), Freeman Dyson—he this year will enter his fourth decade at Princeton's Institute for Advanced Study—writes about his long search for a middle ground between the "gospel

of nonviolence" and the morally intolerable strategy of mutual assured destruction. His description of the Rush-Bagot agreement (of 1817), limiting Canadian and American naval armaments on the Great Lakes, sets the stage for an intriguing prospective view, written in the spirit of Martin Luther King, of a durable arms control agreement based on a third-path approach:

> I have a dream that a hundred and sixty years from now, some professor of physics will be looking back on the history of the treaty between the United States and the Soviet Union prohibiting deployment of bombers and missiles with nuclear warheads. He will, if all goes well, be explaining how the technological defects of the treaty did not prove to be fatal. He will explain how the treaty was technically violated by each of the great powers in turn during the turbulent first half of the twenty-first century. And how, in spite of flagrant violations, the treaty remained in force. And how, after the first demonstration of a cheap and effective non-nuclear antiballistic missile system by the Japanese, strategic offensive weapons gradually became obsolete and were retained only in small numbers for ceremonial purposes. That is, if we are as wise as Rush and Bagot. And if all goes well.

Dyson's positive image of the (barely nuclear) future demonstrates the power such images can wield over actions and decisions which, more likely than not, must be taken to ensure that the fireball image is not realized on this planet. The lack of timidity is unmistakable, and the judicious blend of diplomacy and technology—the software and hardware of the nuclear age—is clear. Moreover, there is no unrealistic hint that getting from here to there would be quick and painless.

To paraphrase Grover Cleveland, who said that "the way to begin is to begin," the way to get on the third path toward a nonnuclear future, in which true defense is emphasized instead of defense masquerading as deterrence in a MAD world, is simply to get on it.* The freeze/reduction image of a nuclear future contains half of the proper approach. But once thousands

of nuclear delivery vehicles had been cut down to hundreds by diplomatic negotiation, the endgame problem emerges. At these admittedly much-lower levels of nuclear arms, the MADness of the world would not have been eliminated, and nuclear risks would only be slightly lower, at best. Indeed, if the most vulnerable and/or destabilizing weapons are not removed in the arms reduction process, the intermediate outcome at hundreds of nuclear launchers per side might even be more dangerous than the original starting point in terms of crisis stability. Chinese, British, French, and other nuclear forces would become much more significant as soon as superpower nuclear arsenals were reduced sharply, and conventional military balances would also take on new importance as the politico-military role of nuclear weapons waned.

It is at this intermediate point in the long-term progressive disarmament process when the conventional wisdom about the destabilizing and ineffective characteristics of civil, air, and ballistic missile defense systems must be reevaluated. Then, rather than believe dogmatically, as Bernard Feld and others evidently do, that

> there is absolutely nothing either side can do ... to prevent nuclear genocide should the military and political decision be made to do so. ... These are unalterable facts of the nuclear age. There is no way out. ...

and disparaging the possibility that advanced weapons based in space would waste large amounts of money and be destabilizing, Dyson's dream about reducing high residual nuclear threats with defensive systems should be given serious consideration. There is nothing to preclude some forms of cooperation among Americans, Japanese, and even Russians on the hardware development necessary to bring advanced defensive weapons such as space-based lasers into being, just as similar sustained cooperation in the diplomatic arena will be needed to make the transit on the third path in the first place.*

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*President Reagan recently announced his intention to do just that, see Lou Cannon, "President Seeks Futuristic Defense against Missiles," *Washington Post*, March 24, 1983, p. A1.

*Arms control *is* an unnatural act because it is a complex form of cooperation with adversaries. There is no reason to limit its scope to the purely diplomatic dimension of the problem.

Consequently, instead of suppressing those non-nuclear technologies that could facilitate such a cooperative transit toward a low-risk nuclear future, we are morally obligated to pursue a vigorous search for them to complement our diplomatic quest for successful approaches to nuclear arms control.

True enough, mankind's transit down the third path may involve novel and serious risks, but nothing ventured, nothing gained. Certainly the nuclear risks facing us are large enough that the time for dithering with modest arms control agendas is long past. We must get down to the essence of the problem, and this implies that we must see the essential nature of this problem through to the end of the nuclear disarmament process when deep arms reductions have exhausted their potential and something *entirely new* is required. Just as it took the original abolitionists 30 years of railing against the immorality of slavery until this issue—perhaps the most divisive in American history—was decided in the Civil War, it may take the new antinuclear abolitionists another 30 years or more to preach against the immorality of nuclear deterrence and nuclear war. And in this modern instance, everyone hopes that the nuclear issue will not require a war to bring sensible action into focus.

P EACE will not break spontaneously to rid mankind of the potential for self-destruction and thus constitute a final solution of the nuclear problem. Barbara Tuchman, who is consciously skeptical of peace, also searches for a middle ground:

> Peace has not figured among the notable achievements of mankind. It is the most talked of and least practiced of all social endeavors. Men—and in this case I mean the male gender, not the species—are always saying they hate war and war is hell and so forth, and have continued to engage in it lustily, aggressively and ceaselessly since the beginning of recorded history, and doubtless before. . . . Peace is brief, as fragile and transitory as apple blossoms in spring. Moreover, because it engages deep feelings, it produces sentimentalizing and distance from realism. Somewhere between the [nuclear] strategists and the peace movement, we must find an area for creative thinking.[1]

Indeed, the third path into a defense-dominated future provides an overarching framework in which creative thought and action, in the twin spheres of software (politics) and hardware (technology), can begin to move mankind off the nuclear dime toward a world safe for future generations of Homo sapiens and homo faber— not perfectly safe, but safe enough. We are not *fated* to live forever in a MAD world.

*Briarcliff Manor, New York*

Note

1. Barbara Tuchman, "The Alternative to Arms Control," *New York Times Magazine*, April 18, 1982, pp. 44-45.

PARADOX AND FALSE ECONOMY
military reform and high technology

CAPTAIN FORREST E. WALLER, JR.

TO PEOPLE outside the national defense community, the efficacy of technological advancement must seem like an article of faith among those on the inside, and the American military must resemble high priests. In American military circles, it has become commonplace to hear the enthusiastic prediction that technological advances will have thoroughly transformed the armed services by the turn of the century. In the context in which these predictions most often occur, at conferences to explain to laymen where military high technology has already sped, one could hardly predict otherwise. However, in a context sensitive to domestic political forces, one might make this prediction: By the turn of the century, domestic political pressure will have thoroughly reformed the armed services. This prediction, like the former,
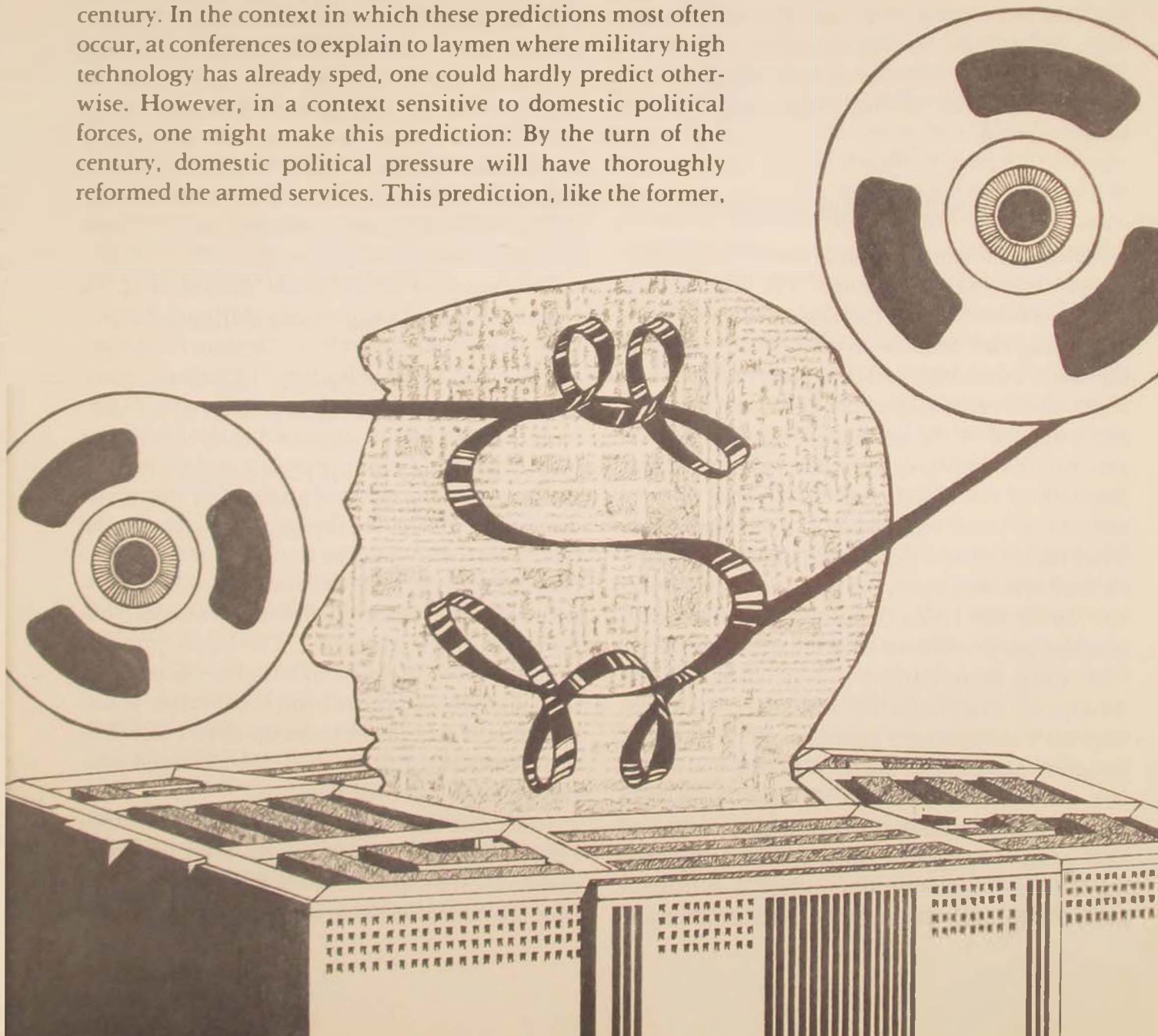
can be based on events and trends already evident, including the appearance in American politics of a military reform movement committed to substantial change. Military reform criticisms respecting military high technology form the critical core of this movement and are likely to have strong influence on military affairs in the future. Their influence is affecting those affairs now. So, the relevant questions are not whether or when these criticisms will be felt but rather what criticisms will be most effective and how they will influence high technology in the armed forces. This article outlines an answer to these questions by identifying the military reformers, their themes and proposals; by rehearsing and evaluating their case against military high technology; and by describing the influence the military reform movement has had and is likely to have on high technology in the armed services.

The Military Reformers

Military reform became a serious enterprise approximately five years ago. The architects of the movement were a handful of defense analysts who had become disenchanted with the methods, mind-sets, and programs of the American military establishment. Their criticism was not confined to the uniformed services, but in general they emphasized military programs and policy and the military itself. That they were able to criticize with authority seemed clear. They had extensive experience in defense analysis and practical experience in the military service. In the late 1970s, this small group began to produce an assortment of briefings and articles cataloging their criticism. This criticism was timely and, in some circles, well-received. It subsequently attracted the attention of a handful of congressmen in both parties who formed a caucus on military reform. This criticism also attracted the attention of other analysts who had professional sympathy for the reformers' arguments and the attention of several Washington journalists who digested the criticism for the public. The military reform movement is an amalgam of these three elements: the original analysts, the Congressional Military Reform Caucus, and the sympathizers.

The expression *military reform movement* is misleading in two respects. First, the expression suggests an organization that does not really exist. The military reform movement is not a political movement in the sense that the antiwar movement was in the 1970s or the civil rights movement in the 1960s. The military reform movement has fewer members, less direction, and certainly less popular appeal than the major political movements of the last 20 years. There is no permanent organization associated with the movement, yet. The Military Reform Caucus has an executive committee, but it has no staff and no budget. Second, *military reform movement* implies a degree of consensus among reformers that does not exist. Military reform encompasses so much that there has been scant consensus on an agenda. As one member of the Military Reform Caucus has described it, "There are fifty caucus members and fifty different opinions of what the goals should be."[1] In March 1982, the Congressional Military Reform Caucus circulated a draft of "Options for Action on the FY 83 Defense Budget." "Options" was a document with limited programmatic objectives that can best be described as the least common denominator of the caucus and perhaps of the movement. It was not an exciting consensus document; however, this was not totally the fault of the authors. The fault was partly due to the nature of the reform issues themselves. Military reform issues are complex and remote from most people's experience. The issues provoke differences among persons whose goals are identical and whose information is the same. When one adds to these differences the effects of political partisanship, it is easy to understand why consensus has proved difficult.

When one considers the military reform movement's size, organization, and level of agreement, one may question whether this is in reality a movement capable of significant influence

in debates concerning military policy. To attribute to the movement significant influence at present clearly concedes military reformers too much; however, it is also possible at present to concede them too little. The members of the military reform movement are, in great part, also members of an educational, economic, and political elite with important privileges in American society. They are a group whose opinions, harmonious or not, regularly find access to Op-Ed pages, magazines, and official documents. This movement is an elite one, not a movement of aggrieved, dispossessed persons. Consequently, these reformers will exert influence greater than their numbers, organization, or agreement should permit. Military reform criticisms must be taken seriously.

Critical Themes

The military reform movement criticizes the national military community for no longer addressing the relevant security interests of the United States. The movement's criticism embodies three interrelated themes:

- National defense has become too theoretical;
- War is, and preparations for war are, distinct from other enterprises and should receive distinctive treatment; and
- Resource expenditure is a poor method by which to measure our progress in solving national security problems.[2]

Military reformers insist that national defense has become too theoretical and that practical military experience carries too little weight in force planning, weapons procurement, and tactics. This theoretical inclination is most pronounced, they say, in planning and procurement of forces for intercontinental nuclear conflict. According to reformers, weapons acquisition, deployment, and employment concepts are based on untried theories of deterrence or nuclear war fighting and calculations of relative strength that do not account for the uncertainties in an unprecedented kind of war fought with technology that has never had a realistic operational test.[3] Theoretical inclinations influence other areas, too, ranging from the way the armed services size forces to the military high technology they introduce among conventional forces as "force multipliers."

The second theme, related to the first concerning theory, is that military matters are distinct from other enterprises and should be treated as such. One aspect of this theme is the professional judgment that military service is a calling, not just another job. Senior military officers share this judgment, but many junior officers do not. Junior officers are more likely to view military service as an occupation.[4] Military reformers accuse the services themselves with having created this occupational attitude by emphasizing skill in management as the preeminent quality of good officership. This emphasis allegedly spreads in the officer corps a management ethic which, at the cutting edge of the military, acknowledges only one war style: attrition.[5] Attrition, reformers contend, is an invalid war style for the United States because, having opted for expensive high technology, the United States can no longer afford the material superiority attrition warfare requires.[6] Reformers believe a war style based on maneuver is far more appropriate to the material circumstances of the United States.

The armed services' emphasis on management also spreads in the officer corps a managerial logic that confuses efficiency and military effectiveness, they say. This confusion leads to high-technology weapons that are efficient in laboratory tests but ineffective in combat. Managerial logic also leads to efficient fixed force posture and the demand from the services for more efficient high-technology weapons when that force posture does not plausibly meet our military requirements.[7]

The final theme, resource expenditure as an index of progress in addressing military problems, is more than a condemnation of the most popular standard by which we compare our mil-

itary effort with that of the Soviet Union. It is an invitation to reconsider the defense effort the nation can afford. The first defense reality of the 1980s, according to reformer James Fallows, is that the American economy cannot easily support substantial increases in defense expenditure. The government sector is already as large as is politically feasible, short of an emergency requiring rationing and forced savings. Those who attempt to readjust the budget allocations within the government sector will be confronted with the difficult problems of reducing entitlement programs and of reducing the purview within which the federal government has operated for nearly two generations. Therefore, defense spending is not likely to account for more than its present budget share, and the economy itself will not support greater defense spending until it recovers from its fundamental problems of low productivity growth and low investment.[8] This argument gives rise to another condemnation of high technology. The only reasonable solution to military equipment procurement and an acceptable defense budget under these circumstances, Fallows believes, is to squeeze as much value out of defense spending as is possible by "stopping the progression toward ever more costly and complex weapons." These weapons take a long time to develop and deploy and a long time to pay for. Until we learn to buy austere weaponry, he asserts that weapons costs and complexity will reduce military preparedness and impose an unsupportable economic burden.[9] Other reformers agree.

In July 1980, Senator Gary Hart, a military reformer, acknowledged the existence of a consensus on defense in the U.S. Senate, but he wondered whether "the new defense consensus brings with it a certain danger."[10] The danger, as he saw it, was concentration on process rather than product.

> Spending is only one component of increased military effectiveness. More spending will only provide a better defense if the money is spent on the right things. It is quite possible to spend for defense, and achieve nothing. History suggests it is

possible to spend great sums and actually weaken defense. The French spent billions of francs on the Maginot Line, yet all they bought was a false sense of security. . . .[11]

The Maginot Line contains a policy lesson with powerful charm to military reformers, as it illustrates the point that a high price tag and technological sophistication are not the equivalents of military effectiveness. Even so, they are acutely sensitive to the charge that their real interest extends no further than saving money. Saving money is not the point of their criticism or the term of reference for the debate.

> The real debate is between two different definitions of quality. The Pentagon defines quality in technical terms: High technology equals quality. The military reform movement defines quality tactically, in terms of the characteristics that are most important in actual combat. That definition leads the reformers to emphasize such characteristics as: Small size . . . Reliability . . . Rapid effect . . . Numbers. . . . The same characteristics that give a weapon tactical quality . . . also tend to make it cheaper. Thus, the practical choice is not between quality and quantity but between technological quality in small numbers and tactical quality in large numbers.[12]

Proposals for Reform

From these critical themes, military reformers derive proposals for change. Assembled, these proposals reveal that the military reform movement has impressive ambitions not only in respect of military high technology but generally in military affairs. However, one can be misled by collecting these proposals in a single list. The proposals do not constitute a reform program endorsed by the movement or any of its components. On the contrary, there is considerable diversity, and even inconsistency, within the military reform movement concerning what program to propose.

With that caveat in mind, the military reformers offer the following proposals:

• Change the way the armed forces identify, educate, promote, and honor officers.

• Create for officers new professional special-

ties, career paths, and new organizations to absorb the new specialists.

• Change the way of assigning and reassigning officers and enlisted men to combat units in order to take advantage of the bonding processes that lead to unit cohesion and respect between the commissioned and enlisted ranks.

• Change the cycle of combat and rest that American forces have followed since the beginning of World War II.

• Adopt a new style of warfare emphasizing maneuver, strategic mobility, and equipment with tactical quality.

• Recommend that the United States come to grips with the defense budget by recommending thirty-five ways to save money in the Department of Defense, thirty of which involve cancellation of high technology weapon programs or substitution of modest weapons for advanced ones.[13]

• Alter the structure of the Department of Defense to expunge the "high technology culture."

• Replace the Joint Chiefs of Staff with an American general staff system.

• Provide new conventional strategies for NATO and a more realistic force structure for nuclear deterrence.

• Recommend that our allies bear a greater portion of the West's defense burden; and finally

• Propose a new geopolitical strategy to secure our worldwide interests.

In spite of the military reform movement's wide-ranging interest in military reform, the thread uniting its themes and dominating its proposals is military high technology. It is necessary, therefore, to be more specific concerning the reform movement's case against military high technology.

The Case against Military High Technology

Military high technology is a special target for military reformers' criticism. They argue that a peculiar preference for sophistication among the Pentagon's technologists places an unreasonable burden of risk on our combatants and an unreasonable economic burden on the nation.

The extra increment of performance that advanced technology provides costs a disproportionate share of the cost of a new weapon system and a great deal of money, reformers say. This technology, when deployed in one form or another throughout an entire force posture, constitutes a heavy financial burden for the nation. Externalities associated with deficit spending and opportunity costs to other sectors of the economy aggravate the social burden of this technology.[14] The burden might be reasonable, reformers imply, if it offered a plausible hope for success on the battlefield. Unfortunately, high technology promises no such success.

On the contrary, military reformers believe that the complexity of military high technology produces insidious effects. First, it increases the vulnerability of our forces. The technologists' infatuation with "gold-plating" combat vehicles with the latest technology has the pernicious effect of increasing their size and weight while reducing their agility. Moreover, high technology is sometimes inconsistent with good human factors and requires our soldiers to expose themselves to danger unreasonably. Second, high technology reduces our readiness. Sophisticated American equipment is so expensive that our combat units cannot train as much as they need. American weapons are too expensive to shoot, too fragile to use regularly at levels of peak performance, or too complex to maintain. And most important, the expense of high technology weaponry causes American forces to be outnumbered. Military high technology is so expensive that the armed services are unable to buy all the weapons they need. The adverse numerical ratios between ourselves and our opponents stimulate the services to call for means to multiply the effect of their less numerous forces. In practice, this means that the services seek more high technology which exacer-

bates their numerical problem rather than relieving it.[15] These factors combine, in the opinion of some reformers, to create an unreasonable burden of risk for our soldiers. Reformers conclude that the military is infatuated with expensive high technology at precisely the wrong moment in our economic history and recommend that we forgo high technology in order to emphasize austere weapons in large numbers.

This is an important recommendation for at least three reasons. First, the recommendation is consequential. If the reformers' analysis is correct, their recommendation could dramatically strengthen our national security. On the other hand, it could just as dramatically injure our security if they are wrong. Second, the reformers have made the technology issue the centerpiece of the movement. This issue receives their heaviest documentation and, perhaps, enjoys the broadest public appeal. Therefore, it may be the reform movement's strongest recommendation analytically and politically. Last, the armed services have chosen to engage the reformers in debate primarily on this issue.

The military reform movement's critique of military high technology is uneven. The reformers deserve praise for warning that not every increment of performance is worth its price, that technological complexity can reduce readiness, that enemy numbers have a "quality" all their own, and that the United States may not be able to afford a military establishment equal to American commitments. However, the critique has flaws, too. The flaws concern the movement's assessment of the cost-effectiveness of military high technology, the peculiarity of the American reliance on high technology, and, most important, the economies military reformers expect to realize in austere weaponry.

assessing cost-effectiveness

Military reformers make an important mistake in the way they assess the cost-effectiveness of American high-technology weapons. They usually disregard performance factors. A deletion

such as this is inexplicable, particularly when one remembers that reformers consider "effectiveness" to receive an unfair hearing in military circles. Many reformers compound this mistake by comparing the cost of modern weapons with the cost of weapons forty years ago.

> In the years since World War II . . . the cost of a tank [has] gone up by a factor of ten, the cost of an airplane by a factor of 100, and the cost of anti-air weapons by a factor of 2000. . . . (calculated in constant dollars)[16]

A comparison like this is inherently unfair. From the very start, its relevance is questionable. No one proposes to exchange modern weapons for their World War II antecedents. In addition, the figures distort the cost of modern weapons. The "constant dollars" of the calculation almost certainly rely on an index called the gross national product (GNP) deflator. This index is one that measures price changes across the entire economy. Many agencies in the federal government use this index, including the Department of Defense. What reformers do not recognize is that the defense industry has become an increasingly specialized and increasingly small sector of the American economy since World War II. Inflation in defense industry has not followed the general pattern of inflation. DOD planners predict that the rate of inflation in defense industries over the next few years will be twice that of the general economy.[17] They make the prediction because this is the pattern of inflation established in the past. Comparisons of World War II and modern weapons will necessarily favor the earlier ones when the GNP deflator is used. More important, comparisons like the one above underestimate the difficulty of comparing the performance of weapons separated by several technological generations. The following example demonstrates this point.

The F-16 is a modern jet fighter-bomber similar in size and range to the B-17 of World War II. Comparing the cost of these aircraft reveals that the F-16 is 38 times more expensive. Adjust for inflation and the F-16 is three-to-four times more expensive than the B-17. Is the F-16 too

expensive? That ought to depend in part on what the F-16 can do. According to General Dynamics (which published this comparison), the F-16 requires only one-third the number of sorties to deliver comparable bomb loads. It is capable of three times the number of sorties per day. It can bomb six times more accurately and has a limited capacity to operate in foul weather. In a sustained, clear-weather operation, one F-16 could replace eight or nine B-17s and eighty or ninety aircrew members. The advanced technology in the F-16 makes it operationally simpler than the B-17, hence fewer aircraft and crews are required.[18] This is a simple comparison, but it suggests that the F-16, though expensive, is not too expensive. It conceivably might be twice as expensive and still be worth the price. The suspicion lingers, however, that this comparison is unreasonable. Is it really fair to compare a modern tactical fighter with a World War II strategic bomber that was obsolete before the war ended?

Someone will rejoin, "If one is going to compare today's fighters with Second World War strategic bombers, to what does one compare the B-1?" This is a legitimate question, and it illustrates how difficult it is to compare modern weapons to those of World War II. There were no airplanes in the Second World War remotely like the B-1 in performance or cost. Only aircraft carrier task forces matched the B-1's intercontinental range and, in the combined capabilites of their aircraft, a B-1's deliverable ordnance. Is this a fair comparison? If so, where does a fair comparison stop—with the aircraft carriers, airplanes, and men to operate them? Or should it also include escort ships and logistical infrastructure? How one answers these questions is largely the outcome of decisions one has already made about the merits of high technology. The fact is that there were no weapons in World War II like the B-1 or F-16 in capability or cost. The comparison itself is inherently unfair.

Assessing the relative cost-effectiveness of weapons is a critically important step in the introduction of high technology into the American armed services. In an ideal world, we would agree on the techniques to assess that cost, and our techniques would be relevant and fair. As a practical matter, all comparisons simplify reality. All have limitations and biases. Even in a practical world, however, one does not need to accept the biases in the military reformers' approach to assessing the cost-effectiveness of modern weapons.

A corollary of mistaken cost assessment is the belief among military reformers that expensive American technology is responsible for the Soviet numerical advantage in weapons. Having encouraged everyone to reconsider resource expenditure as a measure of defense progress, military reformers promptly forget that the Soviets spend twice as much as we do on military equipment procurement.[19] In reality, the Soviets procure twice as many weapons as we do, in spite of technology, not because of it. The level of difference in technological sophistication between American and Soviet weapons is almost indiscernible. In general, our latest technology becomes operational just as the same technology enters system test and evaluation in the Soviet Union. Military reformers interpret crude finish and low esteem for human factors as marks of modest technology in Soviet weapons. They are seriously mistaken. The better measure of technology relates to the factor military reformers are most reluctant to consider— weapon performance.

infatuation

The military reform movement is mistaken when it accuses the American military of having a peculiar preference for, or infatuation with, high technology. This is surely wrong. The Soviet Union's latest generation of combat planes, tanks, and ships benefits from the best technology of which the Soviets are capable. During the life span of this generation of basic weapon designs, we can expect to see expensive technological evolution. When present designs are no longer susceptible to evolutionary modification, we can predict newer and more costly

replacements. The Soviet approach to adopting military high technology differs in important ways from our own, but the Soviet interest in high technology is equally powerful. So is the interest of our allies and friends.

The military reformers who criticize the sophistication of tactical aircraft like the F-16 compared to the simplicity of its original design forget that four of our NATO allies, partners in the production and development of the F-16, asked for sophisticated technology and additional capability.[20] The Europeans required a multirole aircraft not the air combat fighter the F-16 was originally designed to be. Our allies accepted a substantial increase in cost for this technology and capability. Military reformers also forget that in the next few years the most advanced multirole tactical aircraft in Europe, the Panavia Tornado, will be European, not American. Even the British, who gently chide Americans concerning our technological solutions to military problems, speak proudly of the high technology they have so energetically applied to their own weapons, ships, and planes. As a result of the Anglo-Argentine War over the Falkland Islands, the Third World's interest in military high technology has become clear to all. In reality, the pursuit of high technology is endemic to the competition of modern military systems. There is nothing peculiarly American about it except our lead.

economies

The most important flaw in the military reform movement's case against military high technology is the recommendation to exchange it for more modest technology in large numbers. Reformers imply that this exchange is a solution for the military problem of adverse numerical ratios and a solution to the economic problem posed by high defense budgets. Their recommendation means more than the reconsideration of a few weapons; it urges substantial changes in conventional force posture.

Twenty years ago, defense planners were galvanized by a new defense strategy, Flexible Response, and undertook a study of conventional military requirements to assure American security interests. They identified military objectives in eleven theaters; they hypothesized campaigns to secure those objectives; they calculated the forces and material needed to campaign successfully; and they determined the contingencies American forces would need to meet simultaneously. The planners accounted for the contributions of allies and the resources of opponents. They scrutinized organizations and equipment. They considered the need for overseas deployments, strategic reserves, immediate reinforcements, and long-term support requirements. At the end of the study, the planners stated the need for a conventional force posture: 28 1/3 divisions, 41 fighter-attack wings, and 15 aircraft carrier task forces.[21] The military reformers' recommendation assaults this fixed force posture but without the benefit of systematic reappraisal. A systematic approach to assessing defense requirements is not an academic nicety. No other approach feasibly identifies how much military power is enough for a nation's security, reveals what kinds of military power are most necessary, and establishes what the comparative costs of force postures are.

At the reform movement's level of abstraction, no one can estimate how much military power is enough or what the cost of transition from high to modest technology will be. That transition will be costly seems clear. What is the nature of that cost? In order to think about that question, one must reduce the level of abstraction by putting words in reformers' mouths.

Were reformers to decide that American security objectives require general-purpose forces equal in number to those of the Soviet Union (a reasonable inference from their criticism), the United States would require an additional 800,000 soldiers in ground forces, 1300 tactical aircraft, 38,000 tanks, and 200 warships. A force expansion of this scale is the equivalent of nearly a two-fold increase in the number of personnel assigned to ground forces, a two-thirds

increase in the number of tactical air wings, a four-fold increase in the number of tanks, and a one-half increase in the number of warships. On balance, this level of force expansion represents an increase of 60 to 70 percent in the size of general-purpose forces. Expansion on this scale would stimulate enduring increases in military spending. Even if one assumes that so much austere weaponry could be acquired with the identical procurement expenditure needed for high technology arms, associated costs in other appropriations categories would be certain to rise. An increased operations and maintenance expenditure would be necessary for training, equipment, and facilities maintenance, war reserves, and readiness. Force expansion also implies greater expenditure for military construction, family housing, and management services. Eventually, it implies greater expenditure for retired pay. It certainly means a significant increase in military personnel expenditure, perhaps as much as $16 billion. The total cost of expanding general-purpose forces by 60-70 percent could be $40-$50 billion annually. Had the military reform movement recommended a force posture change of this magnitude in time for the FY83 defense budget, that budget might have been $300 billion instead of $258 billion. (Figures are based on the FY83 Defense Budget-Total Obligational Authority.) Obviously, this force posture would not be cheaper, easier to pay for, or any less of a mortgage on the future than the current one. No American administration has been willing to impose the cost of so large a conventional force posture on the economy or the American people in peacetime. Indeed, American presidents have encouraged, and sometimes forced, the military services to adopt high technology to reduce the need for larger conventional forces and allow smaller defense budgets.

Some will object to this analysis, contending that the exchange of high technology for more modest technology will result in savings in research and development (R&D), procurement, and operations and maintenance expenditures. These objections are unanswerable in the abstract, but several considerations suggest that such an exchange cannot generate savings if American general-purpose forces are numerically equal to those of the Soviet Union. First, R&D expenditure will need to remain at comparable levels. Without aggressive R&D, the United States would risk technological surprise. The military reform movement's argument respecting simpler equipment may have merit, but it has no merit as an argument for technological inferiority. Second, there may be no savings in procurement if the numerical requirements of expanded force posture oblige too many modest units. The amount of money the United States is prepared to spend for M-1 tanks cannot buy enough modern medium tanks to equal the Soviet inventory. No modern medium tank is so inexpensive. Similarly, the amount the United States is willing to spend on warships and tactical aircraft is probably too low to permit us to equal Soviet inventories. Last, the operations and maintenance efficiencies of simpler technology may not be great enough to provide savings if too many modest items are procured. For example, the F-15 costs twice as much to operate as the F-4 and is twice as expensive to procure.[22] At first glance, exchanging the F-15 for the F-4 would appear to offer impressive savings. This depends on how many F-4s are acquired. If the United States were to replace each of the 1000 F-15s in its inventory with two F-4s, no saving would follow either in operations or procurement expenses. The same amount of money would be spent from these accounts for a force twice as large. The total defense budget, however, would not be the same. The F-4 fleet would require twice as many maintenance personnel and four times as many aviators as the F-15 fleet. This personnel cost quickly constrains force expansion and sets in motion pressure to limit forces. Moreover, United States air strength would still be 300 tactical aircraft short of numerical equality with the Soviet Union. Coping with this shortfall would make the F-4 fleet even more expensive than the F-15 fleet it replaced.

Under the conditions we have hypothesized for force expansion—general-purpose forces equal in number to those of the Soviet Union—it is realistic to expect significant increases in the defense budget. Military reformers express no clear opinion regarding overall defense spending, but the thematic evidence in the movement's literature suggests that reformers do not relish significant real growth in the defense budget. If so, then military reformers will be forced to choose between buying all the equipment they want and permitting it to be unready for war or accepting numerical inferiority. No other choices hold the line on the defense budget.

Reformers have hinted about their choice. They roundly denounce the failure of the armed forces to become fully ready for war in spare parts, training, and war reserves. They have never recommended totally replacing expensive advanced weapons with fractionally less-expensive modest ones. They have never endorsed significant force expansion or explained what "greater numbers" of austere weapons really means. One can infer from their comments and judicious silence that military reformers will not object to a numerically inferior austere force.

What, then, do the foregoing considerations do to the reformers' central criticism that military high technology keeps the United States from matching Soviet numbers and holding the defense budget within tolerable limits? Nothing, some reformers will say. Some will say that numerical equality is unnecessary. After all, we would probably fight the Soviet Union within the context of the North Atlantic alliance, not singly. This rebuttal reduces the military reform movement's recommendation to a logical absurdity. High technology cannot be bad for national security because it is too expensive to match Soviet numbers and modest technology good when the same is true for it. This is the logical equivalent of arguing that the chief benefit of modest technology, numbers, is unimportant. It is the practical equivalent of admit-

ting that the military reform movement has no solution to the interrelated problems of numerical imbalance, high defense budgets, and painful sacrifice for national defense.

The only escape from the sacrifice of high defense budgets requires coordinating the transition in technology with a reduction in military commitments. No recent administration has been willing to reduce our security commitments to our allies and friends. In fact, the military commitments of the United States have expanded over the past two administrations. The evolving military strategy of the Reagan administration foresees expanding military options further in a doctrine of protracted war. When one considers our commitments, the benefits of high technology, and the cost of transition to austere weaponry, one sees some merit in what one defense analyst has puckishly offered as *the* solution to the quality versus quantity debate, "What we need are force multipliers and lots of them."[23]

The conceptual and analytical flaws in the military reformers' critique of military high technology invalidate their recommendation; however, that is all it does. These flaws do not invalidate criticisms of specific weapons, old mistakes, or current practices. They do not prove that we are exhausting all avenues available to multiply the effects of our forces. They do not prove that our force posture is adequate to perform all the missions assigned to it. These flaws suggest only three things: First, military high technology is a legitimate resource to tap as we search for solutions to our military problems. Second, the economic and military advantages of exchanging quality for quantity remain to be demonstrated in a clear, systematic analysis. Last, any solution to our military problems we adopt will have negative consequences, too, and those consequences will usually be expensive.

The Influence of Military Reform

Several military reform issues have already influenced military and industrial circles. This

influence is preliminary to be sure, but it indicates which reform issues are most compelling and may reveal how military reform issues are likely to affect the military services in the future.

First, the Army recently revised a basic field manual to place more emphasis on maneuver and reportedly has plans for a significant doctrinal change in the future. One of the effects of this prospective change will be a requirement for fighting vehicles with substantially different tactical qualities.

Second, the Army has also increased the tour lengths for officers assigned to combat units in order to reduce personnel turnover in combat units and promote social integrity.[24]

Third, in March 1982, a National Guard task force published a plan to guide the Army and Air Guard for the rest of the century. It recommended a war style of maneuver and simpler weapons for the Guard.[25]

Fourth, the Air Force has begun Project Warrior "to encourage increased familiarity with war-fighting theories."[26]

Fifth, officials at General Dynamics are concerned that prospective avionics improvements in the F-16 will make their airplane unaffordable and that technical problems with these improvements will stain the F-16's reputation for reliability. Officers in the Tactical Air Command have reportedly recommended reducing the scope of these avionic improvements in order to buy more airplanes.[27]

The military reform issues that have been most influential so far are those which concern war styles, the social integrity of combat units, and simpler technology. Why have these issues been influential? Because military tradition, current trends, long-standing themes, or natural organizational interest recommend them. The military's interest in war styles and the social integrity of combat units is consistent with tradition and part of what appears to be a strengthening conservative trend in American military institutions. From 1950 to 1970, American military institutions increasingly resembled the civilian institutions surrounding them. Sociolo-

gists call this phenomenon "convergence," and they produced a small but interesting literature speculating into the social and political implications of structural isomorphism. (It may be that some of the concerns expressed in the reform movement's second theme have been informed by this literature.) In the early 1970s, however, sociologists began to detect evidence of increasing divergence between American military and civilian institutions following twenty years of increasing similarity.[28] The boundaries of divergence are still not completely clear, but the institutional interest of active and reserve forces in war styles and social integrity in combat is completely harmonious with this conservative trend toward greater contrast with civilian institutions.

The military interest in war styles is also consistent with the postwar theme of American military institutions which emphasizes force multiplication. Since the 1950s, the United States has sought means to multiply the effect of American military forces in order to cope with the threat posed by numerically superior Communist conventional military forces in Europe and Asia. Typically, the United States sought the answer to this problem in technology. However, according to at least one expert observer, technology may have yielded most of the answers it is going to give.[29] Consequently, to return to more traditional, nontechnological means to multiply the effects of forces is perfectly consistent with this postwar theme. The most influential military reformer has made the case for the maneuver war style precisely in terms of force multiplication.[30]

The ready interest of the National Guard in simpler technology is consistent with its natural organizational interest. During the past 15 years, active duty forces have called on the Guard for support more than ever before in peacetime. The Guard also has greater responsibility than ever before in future wars. Simple, easily maintained technology is what an organization like the Guard needs to preserve its missions. The organizational interest of aircraft companies

and Air Force major commands in holding down the cost of important aircraft programs is self-evident.

POLITICAL PRESSURE from the military reform movement seems unlikely to reform thoroughly the American armed services or to change significantly the role of high technology in them. In spite of the movement's critical themes and lengthy list of reform proposals, the most influential military reform issues are those that do not reform at all. Paradoxically, they support strong traditional interests and advance established trends and themes in the armed services. The implication of this paradox is that other reform issues may have influence only insofar as forces for the status quo recommend them. Many military reform issues are so recommended; thus, the military reform movement is likely to influence many minor and some important issues for the foreseeable future. For example, given the recent public interest in reforming the Joint Chiefs of Staff, military reformers might have an important contribution to make toward the examination of the JCS, which is sure to continue. The military reform recom-

mendation respecting military high technology is an exceptional case. The recommendation to forgo high technology bucks powerful contemporary trends evident in military establishments throughout the world. It also lacks thorough analysis and seriously misjudges the economies to be realized in exchanging high technology for modest technology. In the final analysis, this recommendation lacks authority because of the false economies it accepts. The recommendation is unlikely to succeed as stated or to enhance national security if it does. However, the privileged position of the reformers and the economic impact of high defense budgets virtually guarantee that the issue will remain a subject of attentive concern. This concern is unlikely to slow the pace of technological advance in the armed forces, but it may give rise to new perceptions and prescriptions regarding the technologies the armed services introduce. This is not reform precisely, but it may be an influence which, in the long run, the armed services will come to value as much as the technology itself.

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Notes

1. A. K. Marsh, "Military Reform Caucus Seeks Targets," *Aviation Week & Space Technology*, March 29, 1982.
2. James Fallows, *National Defense* (New York: Random House, 1981), "Introduction."
3. Ibid., Chapter 6.
4. F. R. Wood, "Air Force Officers: Changing Prestige and Civilianization," *Armed Forces and Society*, Spring 1980, pp. 483-506.
5. Gary Hart, "What's Wrong with the Military?" *New York Times Magazine*, February 14, 1982; J. Record, "The Fortunes of War," *Harper's*, April 1980; Military Reform Caucus "Options for Action on the FY83 Defense Budget"; Fallows, Chapter 5.
6. E. Luttwak, "The American Style of Warfare and the Military Balance," *Air Force*, August 1979.
7. Fallows, Chapter 2.
8. Ibid., pp. 4-11.
9. Ibid., pp. 173-76.
10. G. Hart, News Release, July 1, 1980, "FY 81 Defense Authorization," p. 1.
11. Ibid.
12. Hart, "What's Wrong with the Military?" p. 40.
13. J. Alter and P. Keisling, "35 Ways to Cut the Defense Budget," *Washington Monthly*, April 1982.
14. Fallows, pp. 4-11.

15. Fallows, Chapter 3; Hart, "What's Wrong with the Military?"; P. J. Bernstein, "Critics Debate Reagan's Naval Strategy," *Colorado Springs Gazette Telegraph*, March 7, 1982.
16. P. Sprey, Testimony before the Senate Armed Services Committee condensed in James Fallows's "Muscle-Bound Superpower," *The Atlantic*, October 1979, p. 64.
17. L. J. Korb, "Defense Decision-Making and the Defense Budget," presented at the Teaching National Security Workshop, Amelia Island Plantation, Florida, June 7, 1982.
18. K. Jackson, "Quality, Quantity and Technology—A Perspective on Fighter Development," SAE Technical Paper Series, Aerospace Congress and Exposition; Anaheim, California, October 5-8, 1981.
19. William D. Perry, "Fallows' Fallacies," *International Security*, Spring 1982.
20. Interview with Major General James A. Abrahamson, USAF, in a television documentary for PBS/WGBH Boston entitled "Inside Europe: F-16 Sale of the Century," 1979.
21. W. Kaufmann, *Planning Conventional Forces: 1950-80* (Washington: Brookings Institution, 1982).
22. F. C. Spinney, "Defense Facts of Life," (Staff Paper, OSD PA&E, 5 December 1980.)
23. Benjamin Lambeth, Faculty Seminar, USAF Academy, 18 February 1982.

24. J. Fialka, " 'Congressional Military Reform Caucus' Lacks a Budget but Has Power to Provoke the Pentagon," *Wall Street Journal*, April 13, 1982.

25. *Vista 1999: A Long-Range Look at the Future of the Army and Air National Guard*, March 1982.

26. General Lew Allen, Jr., Chief of Staff Bulletin to USAF Major Commands, February 1982.

27. W. Mossberg, "Costly Changes in F-16 Gear Drawing Fire," *Wall Street Journal*, April 12, 1982.

28. Charles Moskos, *The American Enlisted Man* (New York: Sage, 1970), p. 70.

29. Perry, "Fallows' Fallacies."

30. J. Boyd, "Patterns of Conflict," (briefing notes and graphics of three-hour presentation, September 1981).

coming . . .
in our July-August issue

- The People's Republic of China as a Western Security Asset
- Air Power in the Western Hemisphere
- Herbicides in Southeast Asia
- Rickover and the Cult of Personality

AIR FORCE FIGHTERS
simple or complex?

MAJOR HERBERT W. JOHNSON

OUR COMMITMENT to the pursuit of advanced technology and quality fighter-weapon systems is one of the boldest steps ever undertaken toward modernizing tactical air power. The U.S. Air Force has chosen to follow this course, aggressively exploiting rapidly expanding civilian technology. Lessons learned since the advent of air warfare and analyses based on threat assessment and requirements for force manageability allow no other alternative. Although some would disagree, proponents of sophisticated fighters making use of advanced technology state that technological improvements are imperative to ensure predictable lethality and prevent the recurrence of past mistakes in future combat.

Many proponents of a quantity force question the pursuit of sophistication, however bold and justifiable. They fear that fighter complexity has already eroded USAF credibility and readiness and may do so increasingly in the future. They suggest that a large force of simple, unsophisticated fighters would provide a more effective fighting force. This view is reflected in a report by the House Armed Services Committee:

> Instead of looking at aircraft that are more complex, more expensive, and more difficult to support and maintain, the committee believes the Air Force should expend some effort looking at less complex, less expensive aircraft concepts that will increase readiness and increase number. [1]

## Rationale for Sophisticated Fighters

The Vietnam conflict provided a test case for the cumulative knowledge of air power gained in World War II and Korea, and the lessons made a profound impact on future tactical
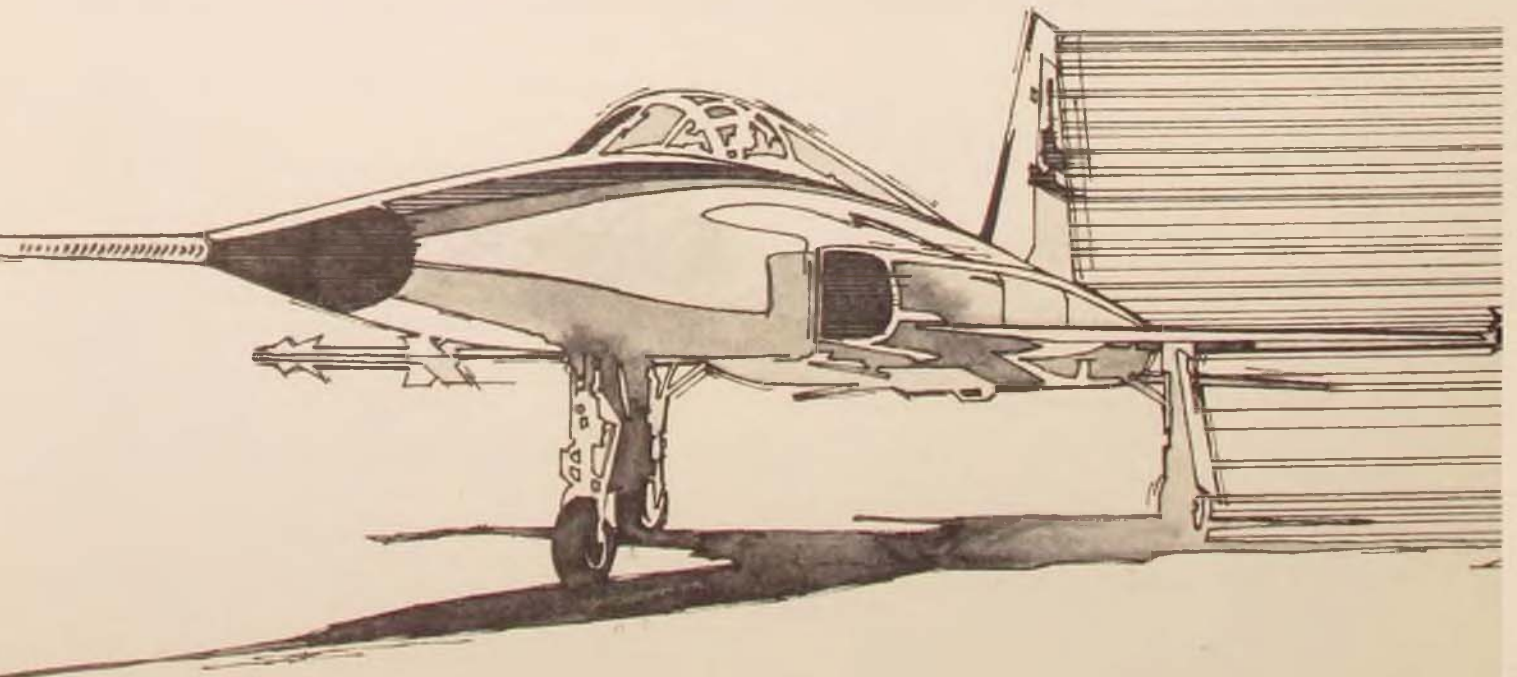
requirements. Planners labored throughout the conflict with constraints imposed by adverse weather and limitations in U.S. fighter-weapon systems. In the air-to-ground role, American fighters initially lacked all-weather/night capability to ensure round-the-clock interdiction of vital targets (the Navy's A-6 Intruder attack aircraft was an exception that underlined the benefits of all-weather capability). Particularly in the Hanoi area, visual acquisition of vital targets was limited to approximately five days during the northeast monsoon. Similar problems were experienced during night interdiction missions because U.S. fighters lacked the radar target definition required for precise bombing. Generally, the only way to conduct vital interdiction missions during adverse weather and at night was to operate below overcasts and in flare-lit skies. Moreover, excessively large numbers of fighters were necessary to destroy critical targets, such as bridges, with unguided munitions. To achieve acceptable accuracy, pilots had to bomb at low altitudes and within predictable weapon release parameters, both undesirable from the standpoint of survivability. In air-to-air engagements, pilots normally could not rely on electronic identification systems (IFF) or precise ground radar control (GCI) to permit the use of long-range radar-guided missiles. As a result, rigid rules of engagement required positive visual identification before firing; this severely limited the use of the potent AIM-7 Sparrow missile. Statistics compiled by the USAF in 1962 reflected an unimpressive kill rate (enemy aircraft kills for missiles expended) of 10.6 percent and 12.9 percent for the AIM-7 Sparrow and AIM-9 Sidewinder missiles. Moreover, the relatively low ratio of enemy-to-U.S. fighter losses, approximately 2.2 to 1, was due, in part, to limited U.S. radar coverage in North Vietnam.[2] In both the air-to-air and air-to-ground roles, the lack of all-weather/night capability often constrained U.S. fighters in performance of their missions.

Another justification for sophisticated fighters is the nature of the potential threat. The growing numbers of Soviet aircraft showing greater sophistication and firepower constitute a potent argument for technologically advanced fighters. The Soviets have upgraded older fighters, such as the MiG-21 and early models of the MiG-23, with new engines, avionics, and weapon capabilities. Some sources speculate that the Foxhound will be able to track four targets simultaneously and, with the AA-9 missile, be able to shoot down penetrators as small as the
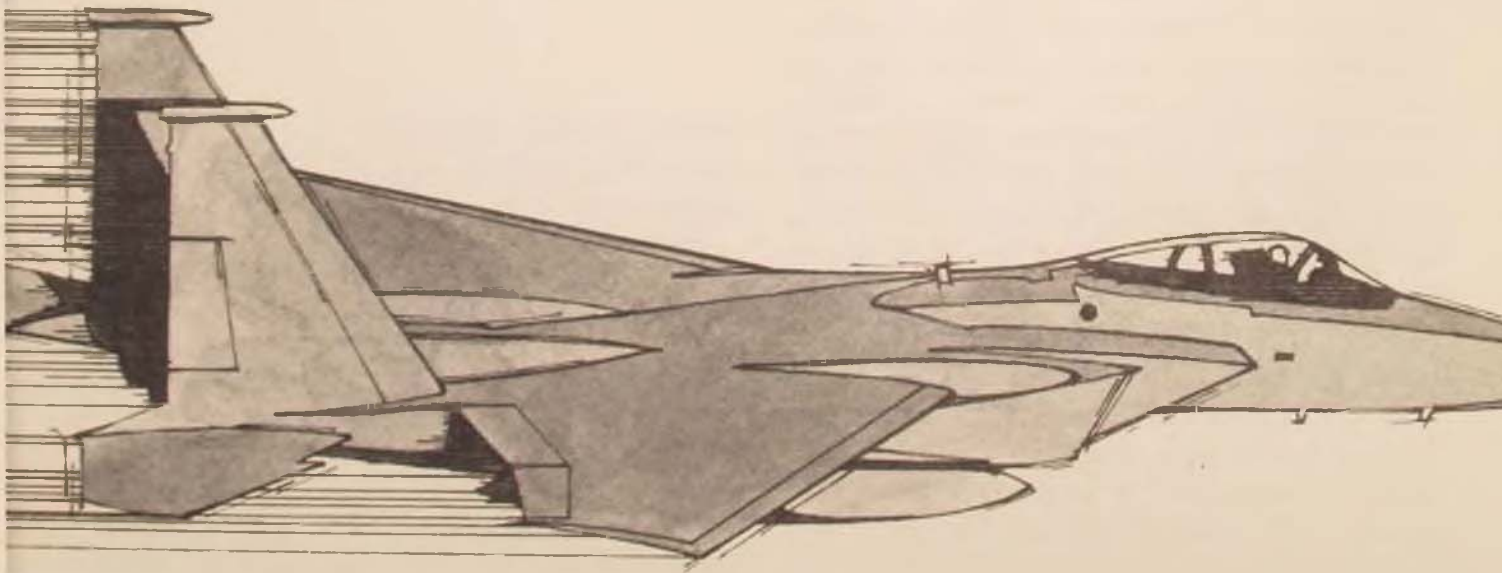
cruise missile. Predictions are that the Soviets will modernize their offensive aviation and air defense forces with 5800 new sophisticated aircraft by 1983.[3]

Included in the modernization effort are the Foxhound, an upgraded version of the Foxbat, formerly called Super Foxbat; MiG-29 Fulcrum, similar to the F-18; and the Su-25, a small ground-attack aircraft designed for close air support. Weapon systems and ordnance will probably include a look-down, shoot-down radar system on the Foxhound, and missiles in the AIM-7E or Sparrow category on the Fulcrum. The Soviets have evidently chosen complexity in their aircraft development programs and favor sophisticated, all-weather fighters. Furthermore, their new fighter weapon systems have significant growth potential.[4] Thus, one can argue logically that the growth potential of sophisticated American aircraft offers the greatest promise for lethality and air superiority in future conflicts.

Air Force planners must also address force and support requirements. The probability of limited forward operating locations in future combat zones suggests that fewer aircraft incorporating the latest technological advances will offer significant operational advantages in at least three areas: Such aircraft will require less communications support from controllers (AWACS and GCI, for example) because of their long-range radars, electronic identification systems (IFF), and autonomous combat capability. The result will be less confusion, less direct and indirect jamming of radios, and a higher probability that communications problems will not compromise the mission. A smaller force of fighters will require less ground support, to include refueling, servicing, and rearming between sorties. Finally, smaller numbers of aircraft will entail fewer recoveries and launches at forward operating locations; this will be particularly important if airfield facilities and runways are damaged or lost and aircraft diversions become necessary. In other words, a small force of sophisticated fighter aircraft will, in a

Neither simple nor complex but good: the F-86 Sabrejet first flew nearly thirty-five years ago, and with well-trained pilots, it mastered MiG-15s over Korea. Today, various models of the F-86 serve in the air forces of Honduras, Venezuela, and the Republic of Korea.

number of important ways, be more manageable under austere battle conditions than a large force of simple aircraft.

current sophisticated fighters

Air Force planners have sought to procure weapon systems and fighters that will be lethal and effective throughout the full range of tactical employment and in all combat conditions. To offset the inaccuracies of unguided air-to-ground munitions, they draw from the smart-bomb technology used in Vietnam to develop
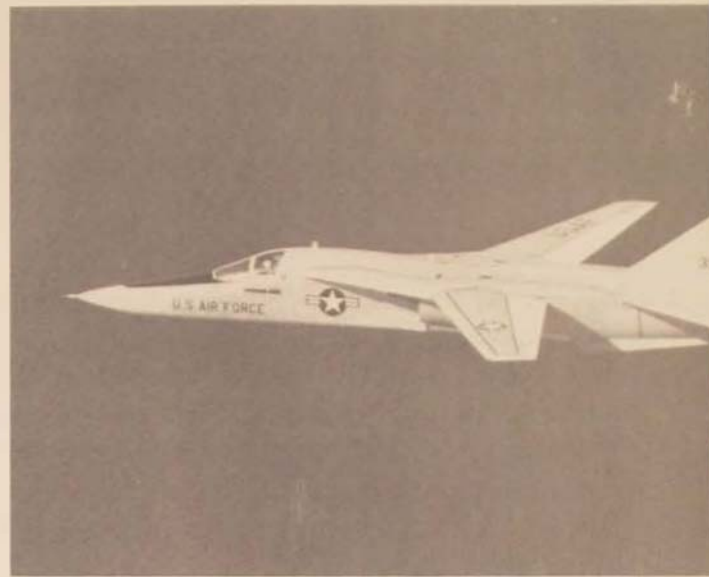
The simple and the complex: The F-5E (top), frontline equipment with many air forces, epitomizes the simple fighter. . . . The F-111A (above), more bomber than fighter, was developed in the early sixties as multimission combat aircraft for the U.S. Air Force and Navy.

and test more accurate precision-guided munitions, such as the IIR Maverick.[5] Improved delivery and accuracy of new air-to-ground munitions will severely hamper enemy freedom of action during adverse weather and night conditions. To offset enemy advantages in air-to-air combat, U.S. fighter technology emphasizes accurate and dependable IFF systems, nonjammable UHF radios, and dependable air-to-air homing missiles. These improvements will minimize enemy advantages in future conflicts and improve the survivability and lethality of our tactical forces. Technological improvements are paramount in the development of future weapons and fighters because superior accuracy improves chances of destroying ground and aerial targets and reduces exposure of friendly aircraft. Technological improvements also force the enemy to redress his own weaknesses and thus serve as powerful deterrents not only tactically but economically as well.

Both the F-15 and F-16 can accomplish almost all combat missions because they have the ability to adapt to changing air-to-air and air-to-ground scenarios. They can be used against enemy aircraft flying at virtually any altitude or

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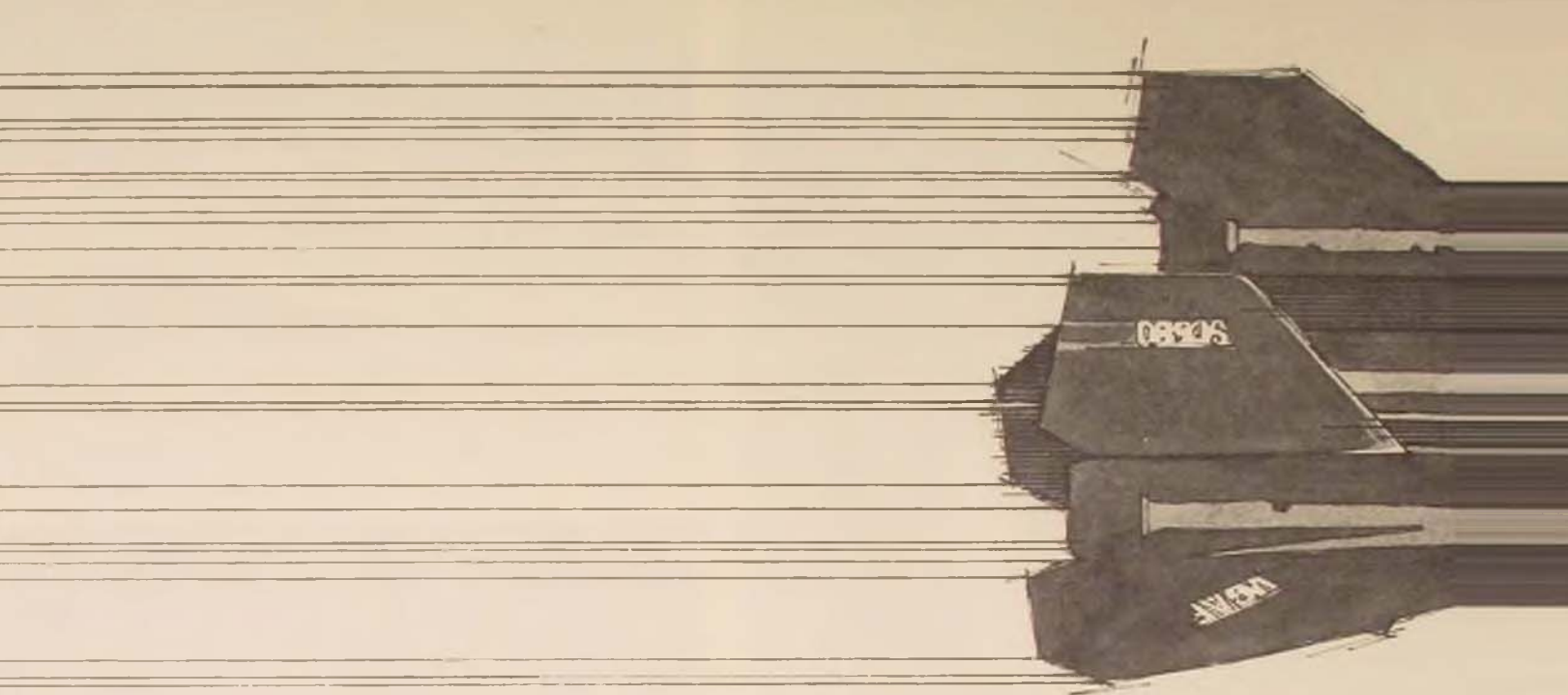
airspeed and in scenarios ranging from intercepts to high-G dogfights; software changes in their avionics allow for rapid and inexpensive improvements in response to new munitions requirements or hostile threats. Armed with advanced medium-range air-to-air missiles (AMRAAMs), these fighters will have a significant beyond-visual-range standoff capability.

The F-16 has proved that it is a formidable aircraft in the roles for which it was designed.[6] In one competition it achieved a 14:1 kill ratio against simulated adversaries and took first place in low-level bombing.[7] Pilots readily learn to apply its 9-G capability, high thrust-to-weight ratio, and point-and-shoot missile—the AIM-9L—to achieve quick and decisive results. These features, combined with relatively small size, excellent air-to-ground performance, and adaptability to modern software and ordnance, are vital capabilities against current and future threats.

The F-15 has achieved similarly impressive results in air-to-air combat and should be just as effective in other roles. The tradeoff for its large size is the radar and avionics capability to differentiate and neutralize enemy aircraft formations at extremely long ranges. Advanced long-range air-to-air missiles (ALRAAMs) promise significant improvements over the firepower predicted for AMRAAM. Some sources state that appropriate weapon technology will enable the F-15 to perform as a "satellite killer."[8] Such roles will optimize the advantages of its radar, missiles, propulsion, and airframe against future threats. A contractor-proposed air-to-ground variant (Strike Eagle) of the F-15 promises significant improvements in all-weather bombing. Its large stable platform and bombing computer should combine exceptional accuracy with exceptional weight-carrying capabilities. Its synthetic aperture radar (map display generated by radar) and highly capable bombing computer should enable the F-15 to employ unguided munitions at moving targets in almost all weather conditions.[9] Since the Strike Eagle computer incorporates turn and g-load factors, it will incorporate an enhanced ability to deliver ordnance in high-threat areas while maneuvering. Thus, the Strike Eagle's high-technology systems promise significant improvements in air-to-air and air-to-ground capabilities, representing simultaneous increases in both survivability and lethality.

problems of sophistication

The Air Force relies on technology to offset the Soviet advantage in numbers. However, some defense thinkers argue that complex weapon
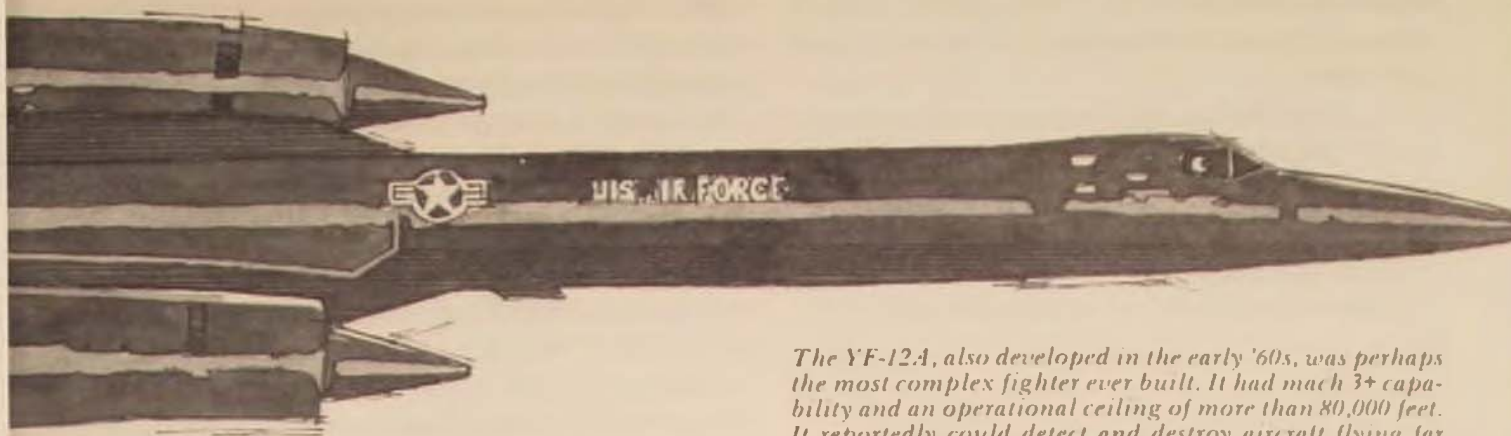
The YF-12A, also developed in the early '60s, was perhaps the most complex fighter ever built. It had mach 3+ capability and an operational ceiling of more than 80,000 feet. It reportedly could detect and destroy aircraft flying far below. Only now are the Soviets producing bombers that would require interceptors of the YF-12A's sophistication.

systems possess inherent disadvantages that abrogate their theoretical capabilities. There is some truth to these assertions; reliability has undoubtedly suffered to a degree because of maintenance problems in areas where avionics, airframe components, engines, and weapon systems have been pushed to the limits of technological capability. In the words of one critic:

> Designers have pushed technology as the solution to American military problems, without distinguishing between . . . innovations that simply breed extra layers of complexity and those that represent dramatic steps toward simplicity and effectiveness.[10]

Furthermore, complex support equipment required to maintain sophisticated aircraft also requires complex repairs. Complex aircraft have more expensive spare parts, and problems in reliability have led to lower mission-capable rates and more maintenance man-hours per sortie. The result at least initially, a point not lost on critics of technologically advanced weaponry, has been decreased sortie rates and a degradation in overall combat readiness.[11]

Despite problems in managing the complex maintenance and support tasks associated with sophisticated fighters, recent improvements in readiness and sortie rates are evident, particularly in the F-15 fleet. For example, innovative

management and emphasis on spare parts acquisition have brought tangible improvements in the combat readiness of F-15s at Bitburg, Germany. The core and turbine blades of the Pratt & Whitney F100 engine used in the F-15 posed a critical problem, but recent improvements have led to a compressor stall rate of less than one per 1000 hours of operation. Cannibalization rates declined from 18.3 percent in 1980 to 11.4 percent in May 1981, and fully mission-capable rates averaged 72.4 percent during August 1981. F-15s elsewhere have shown similar improvements in readiness indicators: fully mission-capable rates have steadily improved from roughly 50 percent in 1979 to 53 percent in 1980 and 58 percent in 1981.[12] Sortie rates have also shown a steady rise, and, at current levels, they are competitive with the rates of less sophisticated aircraft, such as F-5s. During a deployment to Europe, F-15s flying under the constraints of daylight hours imposed by host countries still averaged more than three sorties per day over a ten-day surge.[13]

Continuing improvements in sortie rates and other quantitative indicators of combat readiness are ample evidence of improved reliability. This trend should continue as breakage patterns are established and adequate spare parts stocks and black-box replacements become available.[14]

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Major General John T. Chain, Jr., Director of Operations and Readiness, stated in August 1980 that:

> . . . the Air Force has had to choose between buying entirely new weapon systems . . . or buying sufficient spare parts to maintain the ones it already had. We couldn't buy both. We made a conscious decision to buy the new airplane . . . We made a conscious decision to put more money into spare parts in the current and projected budgets.[15]

Despite continuing problems with the F-15, determined management and an improved supply system have resolved many difficulties.

Rationale for Simple Fighters

Simple aircraft offer the advantages of low cost, high maneuverability, small size, and lethality based on the AIM-9L missile. These advantages favor use of simple aircraft in a "pure" air superiority role because they suffer from all-weather munitions limitations in the air-to-ground role compared with the F-16, F-4, F-111, and A-7 aircraft. In addition, however, they do have the capability to augment combat forces under conditions that would limit the effectiveness of large sophisticated aircraft. Such conditions will occur when positive visual identification of aircraft is a prerequisite to firing missiles and when the merging of large forces of enemy and friendly aircraft or other factors inhibit reliance on IFF capabilities for aircraft identification. Under these conditions, small fighters armed with potent AIM-9L heat-seeking missiles would offer three advantages: First, they would allow F-15s to concentrate firepower on long-range threats entering the battle arena; second, they would allow us to withhold F-15s from areas where their size might threaten survivability; and, third, smaller, less visible fighters could maintain firepower against enemy air-to-air threats in dogfights involving a number of F-15s and other allied aircraft.

Evidence seems to indicate that one aircraft, the F-5G, might be ideally suited for this air-to-air role. It promises significant improvement over the older F-5E/F models, including pro-

jected higher reliability, greater thrust, and improved avionics. In the air superiority configuration, it might carry as many as six AIM-9 missiles and, with its improved radar, should be ideal for augmenting the existing F-15 air-to-air mission and providing a potent air-to-air threat of its own.[16] The older F-5s have achieved remarkable air-to-air records in such large-scale exercises as Red Flag, Maple Flag, and AIM-VAL/ACEVAL. Because of their small size and excellent maneuverability, even large forces of F-5s are extremely difficult to acquire and track. And since they concentrate only on the air-to-air mission—in part an inherent limitation of the aircraft—F-5 pilots consistently receive excellent training. They also have the benefit of highly trained and extremely competent GCI controllers to compensate for the F-5's limited radar capability. These factors argue for the utility of simple aircraft in conditions that do not permit use of long-range missiles.

If one assumes that simple fighters have a vital air-to-air mission, what would their future impact be? The mission of simple aircraft would depend for success on at least two factors: adequate AWACS and/or GCI support and clear weather. Without AWACS or GCI support to identify enemy aircraft entering the battle area, simple aircraft would be forced to rely on visual methods—of limited use against small MiG-21 class aircraft—and their limited radar systems. In ideal circumstances (AWACS, GCI, visual, and on-board radar capabilities), simple aircraft could achieve successful results because of their size, high maneuverability, and the AIM-9L missile. But if communications jamming or other enemy countermeasures impaired AWACS and GCI capabilities, they would be operating at a severe handicap. Additionally, adverse weather severely limits the usefulness of these fighters. Since they are not equipped with radar missiles, F-5-class aircraft cannot perform their mission in thick multilayered clouds, and substantial cloud buildups that prevail during the winter in Europe would present a problem.

In coping with future threats, simple fighters

will be at a disadvantage because they lack a long-range air-to-air missile capability. This may not be a factor after large numbers of enemy and friendly aircraft have merged, when positive visual identification is established. But prior to the merge, advanced Soviet fighters, like the Foxhound with its AA-9 missiles, will be able to engage our less sophisticated fighters without having to worry about the threat that F-15s and F-16s with AMRAAM or other radar-guided missiles would pose.

In the area of force manageability, additional communications and ground support required by a large force of simple aircraft could easily result in confusion during large-scale scenarios. Without long-range radar capability, simple aircraft would depend heavily on AWACS and GCI support and require a proportionally higher share of information on enemy aircraft formations. This requirement could cause degraded communications as several aircraft "wait in line" for radio frequencies to transmit and receive vital information. In extreme instances, it could seriously impede the missions of other air-to-air and air-to-ground aircraft.

Problems inherent in the supply and maintenance of greater quantities of simple aircraft would not be insurmountable. However, the advantages of predicted higher reliability, fewer aircraft systems, and less complex maintenance must be weighted against the disadvantages of increases in maintenance, supply, and servicing transactions at base level. As in AWACS and GCI support, the use of large numbers of simple aircraft might contribute to a significant deterioration in turnaround capability, particularly in combat conditions; smaller quantities are always more manageable. Also, runway utilization and shelter requirements favor limited quantities of fighters. For example, additions of fighter aircraft to European bases will require construction of more facilities and structures, particularly shelters. Thus, in terms of force manageability, one reaches the inescapable conclusion that small, rather than large, increases would be better for the tactical force structure.

This conclusion is based in part on the inherently limited communication capabilities and support facilities at forward bases. But even more significant are the implications of a cost analysis conducted by the BDM Corporation.

In response to a congressional request for "less complex, less expensive aircraft concepts that will increase readiness and increase numbers," the company examined the affordability of pursuing this course. The objectives of the study were to:

> estimate the numbers of aircraft that could be obtained by making trade-offs among procurement costs, personnel costs, and maintenance costs, considering historical budget constraints and assess the implications that increased numbers of aircraft could have in planning future forces.[17]

The study was concerned with the number of A-10s (low complexity) or F-16s (medium complexity) that could have been procured, operated, and manned with the money spent on the F-15 (high complexity). It considered options of equal procurement costs, equal life-cycle costs, and constrained manpower to illustrate the effects of trading complexity for simplicity. For purposes of the analysis, the A-10, a specialized attack plane, was treated as a low-complexity general-purpose fighter.

equal procurement costs

With constant procurement costs, the study found that 72 A-10 squadrons or 48 F-16 squadrons could have been procured for the cost of 24 F-15 squadrons, a 3:2:1 ratio. These larger forces of simpler fighters would increase total requirements for manpower by 22,000 for the A-10 and 12,000 for the F-16; the number of pilots required would increase by 1600 for the A-10 and 760 for the F-16. Thus, the money saved in initial procurement costs would be more than consumed by the growth in total life-cycle costs in operations, support, and manpower.[18]

equal life-cycle costs

The study next held the total life-cycle cost con-

stant to determine the quantity of fighters of low- or medium-complexity that could be procured and operated for the total life-cycle cost of the F-15. In absolute terms, $7 or $4 billion, respectively, would shift from research and development to operations and support, and manpower requirements would still exceed the requirements of the F-15 by 12,000 and 7000 extra authorizations, respectively, for the A-10 and F-16. In this option, a significant reduction would occur in the numbers of squadrons: A-10 squadrons would be reduced from 72 to 54, and F-16 squadrons would be reduced from 48 to 39. Thus, when the total life-cycle costs were held

constant, manpower would still increase, and the ratio of simple and medium aircraft would drop significantly from 3:2:1 to 2.25:1.63:1.

constrained manpower

The study next considered modest reductions (seven or three percent) in squadron manpower to determine how many squadrons of low- or medium-complexity fighters could be manned with the manpower limits of the F-15. Under this option, pilot authorizations would still increase by 240 for the A-10 and 117 for the F-16. Substantial reductions would occur in the num-

The F-16 Electric Jet or Fighting Falcon is less complex than the F-15 and provides the low end of the "high-low" mix. Yet it cannot be called a simple fighter and is far more capable than the F-4, which it replaces.

bers of squadrons: A-10 squadrons would be reduced to 30, and F-16 squadrons would be reduced to 27. Thus, when manpower was constrained, the ratio of aircraft of low- and medium-complexity would be reduced from 3:2:1 to 1.25:1.13:1.

If the cost of a simple, unsophisticated fighter proposed by quantity advocates approximates the cost of an A-10, one can reasonably assume that a ratio of approximately 1.3 simple fighters to one F-15 could be procured, operated, and manned within congressional budgetary constraints and authorized manpower levels.[19] Although this option could save $15 billion, the

The F-15 Eagle (right), "the finest fighter ever built," combines sophisticated technology with usable weaponry.... The YF-17 (below), rejected by the Air Force in 1974 in favor of the F-16, has been developed by the United States Navy into the F A-18 fighter-bomber, becoming another plane that could hardly be called "simple."

obvious disadvantage is the small number of "simple" fighter squadrons: approximately 30 versus 24 F-15 squadrons.

IN LIGHT of this study, the idea of procuring a large force of simple fighter squadrons loses much of its attractiveness and validity. Under the option of equal life-cycle procurement costs, drastic increases in the budget and in manpower would be necessary to procure and operate an adequate number of simple fighters to match the potential of the F-15; and we are not even considering the operational problems posed by increased servicing and command and cargo support requirements noted earlier. The life-cycle option shows a substantial reduction in simple fighter squadrons, and manpower requirements would still be well above authorized levels. And under the option of constrained manpower, simple fighter squadrons would be reduced to such a low level that, despite the saving of $15 billion, tactical credibility would be a significant problem.

One might still argue that a small increase in simple aircraft to augment the current tactical force structure would be better than no increase. But would it? Despite certain advantages inherent in the F-5G, for example, one particular disadvantage stands out: it will probably lack long-range radar and AMRAAM capability. Therefore, pilots flying the F-5G would be at a serious disadvantage fighting planes like the Foxbat and Foxhound equipped with AA-9 missiles.[20]

Future wars will certainly require that our aircraft be capable of destroying enemy air and ground forces during adverse weather and night conditions. A force of sophisticated aircraft will assure the capability fo inflict heavy damages on the enemy and deny him the advantage of choosing combat conditions that preclude use of simple aircraft. Once in the combat arena, his forces will be vulnerable to sophisticated U.S. aircraft employing all-weather, long-range, standoff weapons in the air-to-air and air-to-ground roles. Obviously, simple aircraft will be vulnerable to the most advanced Soviet fighters (and advanced fighters produced in other countries and sold to potential enemies, such as the French Dassault Mirage 2000), which the enemy employs under engagement conditions that he can, to a large degree, select. Conversely, the simple fighters would lack both the lethality and survivability to function effectively in the totally modern combat environment in absolute terms, let alone in terms of dollar for dollar effectiveness, to justify turning our back on sophisticated, high technology fighters. The highest probability for achieving our tactical goals, therefore, rests with employing the full capabilities of sophisticated aircraft able to operate throughout the full spectrum of the combat arena with only minimal quantitative supplementation in several critical categories.

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Notes

1. Extracted from "House Armed Services Committee Report, 96-166," 15 May 1979, p. 87.

2. General William W. Momyer, USAF, *Air Power in Three Wars* (Washington: Government Printing Office, 1978), pp. 948-80. Many different bombing methods were tried in Vietnam, including long-range radio navigation system (LORAN) and radar bomb directing central (MSQ). Others included F-111 all-weather, low-level strikes, B-52 saturation bombing, and numerous "smart" weapons, such as laser munitions. The MSQ system, in particular, caused strike aircraft to be "extremely vulnerable" to antiaircraft artillery and enemy SAMs because of predictable run-in headings and altitudes. Often, U.S. pilots turned their identification, friend, or foe systems off to avoid detection by enemy ground radar, with the result that friendly aircraft could not identify each other.

3. Clarence A. Robinson, "Soviets to Field 3 New Fighters in Aviation Modernization Drive," *Aviation Week & Space Technology*, March 26, 1979, p. 14; and John W. R. Taylor, editor, *Jane's All the World's Aircraft 1981-82* (New York: Jane's Incorporated, 1982), pp. 206 and 220.

4. "Industry Observer," *Aviation Week & Space Technology*, May 3, 1982, p. 9.

5. "Maverick Scores Seven Bullseyes, One Miss," *Defense Week*, August 17, 1981, p. 2. During the first phase of testing, the Maverick scored direct hits in seven of eight firings. One miss was blamed on

loading error. The IIR Maverick (AGM-65D) is an imaging infrared (IIR), air-to-ground munition "that senses a thermal image of a target area and projects a television-like picture on a cockpit display." The aircrew simply locks the seeker head on the selected target and fires.

6. Erwin J. Bulban, "F-16s Deployed to Norway for Environmental Tests," *Aviation Week & Space Technology*, May 11, 1981, p. 69. During the Coronet Falcon deployment to Norway by 12 F-16s of the 4th Tactical Fighter Squadron, Hill AFB, Utah, high sortie rates were achieved and a high degree of weapon accuracy was maintained throughout the deployment. Of 268 sorties, only six were aborted prior to takeoff for mechanical reasons.

7. "U.S. F-16 Wing Captures Bombing Crown in Scotland," *Defense Week*, June 29, 1981, p. 11. The 388th Tactical Fighter Wing, Hill AFB, Utah, scored more than 1000 points in bombing ahead of Jaguars, Buccaneers, and F-111s at Lossiemouth, Scotland. Air-to-air competition was flown against F-4s and British Lightning interceptors.

8. See "Launch Pylon for Antisatellite System Tested," *Aviation Week & Space Technology*, January 18, 1982, p. 19. A modified F-15 will be used to launch a two-stage missile in an antisatellite role.

9. Hughes Aircraft Company estimates that, in conjunction with the advanced long-range AN/APG-63 radar, the Strike Eagle equipped with synthetic aperture radar and other modifications for navigation, target acquisition, and weapon delivery could operate about 95 percent of the time in a central European winter.

10. James Fallows, "America's High-Tech Weaponry," *Atlantic Monthly*, May 1981, pp. 21-33.

11. Major Earl H. Tilford, Jr., "The Limits of Superiority: Air Power in Vietnam," lecture to the Air Command and Staff College, Maxwell AFB, Alabama, 10 February 1982.

12. David R. Griffiths, "F-15 Pilots Cite Need for New Air-to-Air," *Aviation Week & Space Technology*, November 2, 1981, p. 52; Information was also extracted from a USAF paper entitled "Request for Backup Information for the Defense Science Board 1981 Summer Study Panel" and other USAF point papers.

13. Coronet Eagle Executive Summary, USAF Point Paper from "Backup Information." The Coronet Eagle deployment of F-15s from Eglin AFB, Florida, to Bremgarten AB, Germany, achieved the following objectives: The AIS averaged 94.7 percent fully mission-capable, and at no time during the deployment was an aircraft grounded because of a lack of intermediate avionics support. A 3.0 sortie rate was sustained for 10 days. The readiness rate of 79.4 percent (MC) during Coronet Eagle was greater than the FY80 home-station performance of 69.3 percent (MC). All goals were exceeded.

14. Caspar W. Weinberger, "Where We Must Build—And Where We Must Cut," *Defense 81*, December, pp. 2-10; General Lew Allen, "The Premium on Quality," *Air Force*, September 1980, p. 82.

15. See John Ginovsky, "Chain: Spare Parts Getting Higher Priority," *Air Force Times*, August 25, 1980, p. 4.

16. Richard Barnard, "Paris Air Show, *Defense Week*, June 8, 1981, p. 8. The F-5G will be powered by a single General Electric F-404 engine, allowing for a thrust-to-weight ratio of 1.06 to 1.

17. BDM/W-80-847-TR, prepared by the BDM Corporation of McLean, Virginia, in response to House Armed Services Committee Report, 96-166, p. 5.

18. Ibid., p. 36.

19. Ibid., p. 66. The trend in personnel has been a gradual reduction in pilots from 42,000 to 25,000 since 1968. BDM concluded that the 1800 to 3600 additional pilots required to support the equal procurement and life-cycle options would "constitute a significant increase in the current and projected UPT rates" reviewed annually by Congress and that "it appears that manpower has been constrained and will remain so."

20. Griffiths, p. 52. Bitburg pilots are concerned about Soviet MiG-21/23/27 fighters and the capability of the current radar missile, the AIM-7F. The AIM-7F requires F-15 pilots to remain predictable for as long as 25 seconds after firing. In contrast, AMRAAM radar missiles will permit longer-range, "launch-and-leave"-type tactics in all-weather and night combat conditions.

When a more "capable" plane like the F-15 was matched one-on-one against a simpler plane, the F-15 almost always won. But when the match-ups were four-on-four, the differences between the planes essentially washed out. With eight planes in the sky, things moved too quickly and chaotically for the avionics to be of much use. When surrounded by enemies, a pilot who took eight or ten seconds to get a computer "lock" on another plane to target his missile gave other pilots an opportunity to lock on to him.

James Fallows, *National Defense*, pp. 46-47

For an air superiority fighter, you need something that can identify things way out: the F-15 can do that at 75-80 miles; shoot at 20-25 miles head on. While F-5 type aircraft are still coming into the battle happy and joyous without long-range radar, the F-15 can fire and hit. The F-15 can hide in the clouds, but the F-5 with only a heat-seeking missile and its gun can't fire and shoot into a cloud. I just can't *imagine* anybody wanting to go to war in the "simple" force.

Lieutenant General John T. Chain, Jr., quoted
in *Armed Forces Journal International*, March 1981, p. 20

WAR-FIGHTING DETERRENCE
forces and doctrines in U.S. policy

Dr. Stephen J. Cimbala

FOR MOST of the nuclear age, deterrence and war fighting have been treated as separate issues by soldiers and scholars. Recent changes in declaratory and employment policies have brought strategic nuclear deterrence and war fighting closer together. It is an uneasy coexistence, however, involving some mismatched expectations and strategic and political anomalies.

This article explores the requirements of credible war-fighting deterrence and compares those requirements with the actual development of American declaratory and employment policies in the 1970s. What came to be called the "coun-

tervailing strategy" by the end of the Carter administration allowed gaps between declaratory and employment policies that continued to plague the Reagan administration. Not only inconsistencies but omissions in policy also created a shortfall between war-fighting deterrence requirements and capabilities.

A later article will develop the implications of war-fighting deterrence for alliance cohesion in NATO. It will suggest that the more successfully American leaders fulfill the requirements of credible war-fighting deterrence, the more jeopardized will be our leadership within the alliance on important military and political

issues. War-fighting deterrence to the Europeans implies regionalized nuclear war, decoupling of the American nuclear umbrella from the Central Front, and political recklessness in Washington. The politics of war-fighting deterrence could work to the advantage of the Soviet Union if it makes NATO consensus more difficult to obtain and prevents us from exploiting political disunity within the Eastern European satellites.

War-Fighting Deterrence in Theory and Practice

The inevitability of war-fighting deterrence became apparent to American decision-makers as the Soviets approached strategic parity with the United States and as their refusal to acknowledge American deterrence concepts became clear to even the most determined advocates of détente. The Soviets will not initiate a nuclear exchange over a trivial issue, but they do recognize that crises can get out of hand. The possibility of strategic preemption is not foreclosed. Thus, their leaders and principal military theorists have maintained consistently that the Soviet Union should be prepared to fight and survive any war, including a nuclear exchange. War survival is an important element in Soviet nuclear strategy, as Leon Gouré and others have pointed out for many years.[1]

The Soviets draw little distinction between deterrence and war fighting as applied to nuclear strategy. They do not minimize the cost of a nuclear exchange, but they have refused to take the absolutist position against damage limitation that became official American policy from the McNamara assured destruction pronouncements until the limited nuclear option (LNO) amendments of James R. Schlesinger.[2] The Schlesinger LNO amendments recognized the convergence of deterrence and war fighting in the abstract, due to the emerging technologies of the 1970s and 1980s and the implications of U.S.-Soviet strategic parity. But U.S. force postures did not provide the weaponry or the strategic command, control, communications, and intelligence (C^3I) necessary to implement the Schlesinger Doctrine.[3] We acknowledged that the virginity of mutual assured destruction (MAD) had been violated by the technologies of war fighting and tried to reassure the Europeans that a decoupling of the strategic and theater nuclear deterrents would not occur as a result of parity. These technologies of war fighting included the MIRVing (multiple independently targetable reentry vehicle) and potential MaRVing (maneuverable reentry vehicle) of intercontinental ballistic missiles (ICBMs) and submarine-launched ballistic missiles (SLBMs) and the dramatic improvements in inertial and stellar guidance made possible by research and

Glossary

ASAT	antisatellite (weapon or system)		LNO	limited nuclear option
BMD	ballistic missile defense		LRTNF	long-range theater nuclear force
C^3I	command, control, communications, and intelligence		MAD	mutual assured destruction
			MaRV	maneuverable reentry vehicle
GLCM	ground-launched cruise missile		MIRV	multiple independently targetable reentry vehicle
GPS	global positioning system		NATO	North Atlantic Treaty Organization
ICBM	intercontinental ballistic missile		SALT	Strategic Arms Limitation Talks
INF	intermediate nuclear force		SAM	surface-to-air missile
IONDS	integrated operational nuclear detection system		SLBM	sea-launched or submarine-launched ballistic missile

development breakthroughs that are already apparent or imminent.

The Carter administration amended the Schlesinger amendments by adding "countervailing strategy" to the lexicon of politico-strategic doctrine—a restatement of the Schlesinger principle in another guise. It suffered the same credibility gap. The forces did not exist (and would not exist given the Carter changes in the proposed Nixon-Ford strategic programs) to implement countervailing strategy. The countervailing doctrine implied a capability for selective, calibrated strategic nuclear warfare under conditions of extremely survivable retaliatory forces, protracted conflict, and intrawar deterrence.[4] A truly credible war-fighting strategy would require all of the following components: highly survivable C^3I, which will not be available until the latter 1980s, against the Soviet threat of even the later 1970s; a notion of targeting priorities that corresponds to some coherent hierarchy of political objectives; some capacity to defend the American population from the effects of nuclear war, including ballistic missile defense and civil defense; and some scheme for war termination under the assumption that a doctrine for limited strategic warfare envisions a conflict that stops short of uninhibited counter-city destruction.

Survivable Command and Control

In fact, the Carter administration provided for few of these essential components of any credible war-fighting deterrent. Declaratory policy and forces remained disjointed. By 1980 this was most apparent in the area of C^3I, the "brain" of the strategic retaliatory forces.[5] Recognizing this, the Reagan administration has attempted to upgrade strategic C^3I capabilities and provide more secure command and control for postattack reconnaissance and targeting. Improved C^3I capabilities will be available in the latter 1980s.

The case for survivable C^3I against the bolt-out-of-the-blue attack or its preemptive cousin—

a Soviet attack motivated by fear that we are about to launch one—is not disputed. But the development of improved space-based C^3I, allowing postattack reconnaissance and retargeting, is both stabilizing and destabilizing in its implications for deterrence. Such is the potential, for example, of the Navstar global positioning system (GPS) combined with the integrated operational nuclear detection system (IONDS) scheduled for deployment in the late 1980s. IONDS technology will make possible the precise determination of the location of nuclear explosions anywhere on earth, a vital component of successful war fighting.[6] The Navstar system will most certainly provoke a Soviet effort to develop a comparable capability and work toward countermeasures such as antisatellite (ASAT). Thus, a "C^3I race" is quite conceivable in which the ASAT capability (and space-based counter-ASAT defenses) are deployed to provide or preclude destruction by real-time postattack retargeting. The technologies of the 1980s make possible the declaratory policies of 1974-80.

Targeting

The second necessary component of a war-fighting strategy is a coherent targeting philosophy. Are the targeting priorities to be counter-societal, counterpolitical, or countercombatant once war begins? Countersocietal targeting emphasizes retaliatory damage to the opponent's economy, population, and homeland. Counterpolitical targeting emphasizes the effort to destroy the opponent's state; in the case of the Soviet Union, this implies the leadership of the party, military and political leaders other than party officials, the KGB, and the C^3I of the Soviet system.[7] Countercombatant targeting placed priorities on elimination of the opponent's strategic retaliatory forces, enforcing a kind of nuclear disarmament prefatory to political coercion. Attacks on C^3I have both countercombatant and counterpolitical facets.

Advocates of mutual assured destruction have

espoused countersocietal targeting in principle although not always or exclusively in practice. It promises the most vengeful societal retaliation as punishment for having initiated the conflict. Critics of MAD regard the punishment as militarily irrelevant and morally dubious. In a situation of strategic parity, a second countersocietal strike would invite brutal retaliation against the American homeland in a Soviet third strike. Invulnerable Soviet submarines not used in their first strike would be available for the third strike.

Counterpolitical targeting threatens the values presumed most important to the Soviet leadership: its own preservation, the survival of the Communist system of rule, and the integrity of the Soviet Empire. Again there are problems of implementation. The destruction of the Soviet state will involve collateral damage to millions of Soviet citizens. Moreover, if the political and military leadership is unable to continue to rule, who will negotiate the terms of war termination (the fourth missing ingredient of credible war-fighting scenarios)? The counterpolitical targeting emphasis may be injurious to our political priorities if they include ending the war on some terms acceptable to our own leaders.

The countercombatant targeting emphasis is most consistent with the purist model of controlled strategic war fighting.[8] The ideal of protracted, limited strategic warfare is compromised in practice by several factors: the absence of survivable U.S. C^3I providing real-time retargeting; the destruction of at least one "hemisphere" of the Soviet "brain" due to the contiguity of military leadership and military command centers; and the interactive effects of crippled Soviet C^3I and pre-IONDS American C^3I which would be an impediment to war termination. All this pertains to countercombatant targeting, which is assumed to follow the initiation of war by the opponent, with the implication that the opponent is predisposed to begin such a conflict with the *intention* of limiting it in specific and clearly communicated ways. If the hypothetical "opponent" is the Soviet

Union, this flies in the face of their doctrine.[9] If the countercombatant targeting is supposed to occur while applying the flexible response doctrine to NATO Europe, it should not be proclaimed too loudly to the Europeans. To them it sounds suspiciously like nuclear decoupling. (More will be said about the implications of war-fighting deterrence for European politics in a forthcoming article.)

Damage Limitation

The third component of a truly credible war-fighting strategy involves a capacity for damage limitation through active and passive defenses. Strategic defense includes air defense of the traditional sort: interceptors, surface-to-air missiles (SAMs), and ballistic missile defense (BMD). Civil defense for populations can be accomplished by crisis relocation of urban populations to safer "host" areas, provided sufficient warning is available and the conflict is less than total.[10] Civil defense also emphasizes preparedness for postattack societal and economic recovery. During the 1970s, as a result of SALT and the arms control philosophies on which SALT was predicated, the United States disregarded strategic defense and civil defense as components of deterrence. No example of the erroneously perceived dichotomy between deterrence and war fighting is more illustrative than this failure to seek any significant damage limitation against the effects of nuclear war should deterrence fail.

The neglect of damage limitation was only partially induced by SALT. MIRV was counted on by policymakers to compensate for the absence of a damage limitation capability. A more terrible retaliatory threat would obviate the need for any damage limitation (other than that accomplished by strategic *offensive* forces, it was assumed).[11] Improved accuracy, married to multiple warheads, was the "assured destruction" that guaranteed against failures of deterrence.

But the guarantee soon proved dubious for several reasons.

• First, the Soviets began to deploy their "fourth generation" ICBMs and threaten the United States Minuteman force with a possible successful Soviet first strike (by calculations of American pessimists).

• Second, the MIRV accuracy combination provided little in the way of extended deterrence against higher probability but lower cost threats, such as those against Western Europe.

The extended deterrence umbrella was a leaky sieve, and the Europeans knew it; as Robert Art has pointed out, it was they rather than we who demanded steps toward long-range theater nuclear force (LRTNF) modernization in the latter 1970s.[12] Thus, NATO took the "572" decision to modernize its intermediate nuclear forces (INFs) in December 1979 by eventual deployment of 108 Pershing IIs and 464 ground-launched cruise missiles (GLCMs) in Western Europe. This step was qualified by an insistence that on a separate and bilateral track, the Americans and the Soviets pursue INF reductions. This has led to reciprocal volleys of arms control proposals, each providing a disclaimer of the other side's good faith. The INF proposals seemed unavoidable in a military sense, since the Soviet deployments of the multiple-warheaded and mobile SS-20 exceeded 330 by February 1983.

But extended deterrence remains inadequate without any capacity to defend the American homeland. We have little room for escalation in crises that expand from local situations to broader conflicts. The reasons for this loss of "escalation dominance" are strategic parity and asymmetry in theater systems, nuclear and conventional, favoring the Warsaw Pact. In such military circumstances, asking the American population to assume the roles of hostages for European societies, when American society has no credible nuclear civil protection, is asking a great deal.

Some deterrence theorists have artificially separated deterrence from war fighting, with especially unfortunate implications for civil defense. Civil defense has been paired with first-strike intentions or inadvertent signaling of

such intentions, despite every indication that the Soviets do not share these views of civil defense.[13] Nor do they share the assumption made by some theorists that strategic defense is provocative and therefore threatening to arms control or crisis stability.

War Termination

The fourth component of a credible war-fighting posture is a plan for war termination. That such a plan is implied by any strategy which aims at some concept of "victory" (or the avoidance of some state defined as defeat) is part of what makes war-fighting deterrence objectionable to mutual vulnerability theorists.[14] They prefer to avoid the issue of war termination, assuming either that it will be a planetary holocaust as a result of the futility of damage limitation, or that communications between adversaries in a U.S.-Soviet nuclear conflict will be disrupted, thus preventing meaningful agreements in war termination. The Soviets speak of victory in war, including nuclear war, as a necessary goal of a Marxist state; the empirical conditions for postnuclear victory are variously defined.[15]

The lack of experience with nuclear war is the biggest obstacle to defining the essence of victory, but that lack of experience should prompt the most thorough initiatives to do so. We have already witnessed two nuclear detonations in anger in this century that might have been prevented had the United States and its World War II Allies had a clear concept of victory other than "unconditional surrender." Peace overtures to the Japanese which might have brought about surrender on terms not requiring the devastation of Hiroshima or Nagasaki were misunderstood by the Japanese because the terms were wrongly assumed to imply the removal of the emperor as the symbolic head of state and society. The Allies were never able to communicate effectively the difference between military surrender and political humiliation before the decision to drop the atomic bomb faced Presi-

dent Harry S. Truman. (There were other reasons for dropping the bomb, of course.)

It is ironic that the persons most likely to object to war termination studies as a component of war-fighting deterrent strategies will be persons favoring arms control and disarmament. Their absolutist perspective on the effects of nuclear war, once deterrence fails, allows little room for gradations between acknowledgment of military defeat and societal obliteration.

Yet this is precisely the most important line that we can draw in prewar planning, and it is for reasons both military and moral, the latter being the more important. To have a war termination strategy is to consider self-consciously the matter of political values. To define the conditions of American victory (or surrender, for that matter, an exercise as necessary for planning purposes as it sounds unpatriotic to Congress) is to spell out as unambiguously as possible what we are willing to fight for and at what cost. If we cannot or are unwilling to do this, we have no strategy. Certainly there is room for disagreement among proposals for definitions of victory and defeat in nuclear war, and undoubtedly any planning calls for anticipation of the need for improvisation during war itself.

The certainty of diverse proposals and political disagreements is a sign of a healthy democratic society; unwillingness to face the issue is an indicator of immaturity in thinking about war and peace issues.

IN THE FINAL ANALYSIS, attaining consensus on war termination may be more elusive than reaching agreement on targeting priorities, adequate C^3I, and an active or passive societal defense. All of these matters defy easy resolution. Even if these imposing technical problems are resolved, the political problems will remain.

The political problems will force our decision-makers to choose more explicitly. Piecemeal approaches to strategic questions are more typical of our policy process. Declaratory policy, employment policy, and weapons development proceed on different agendas, a luxury in an era of war-fighting deterrence.

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Notes

1. Leon Gouré, *War Survival in Soviet Strategy: USSR Civil Defense* (Miami, Florida: University of Miami, Center for Advanced International Studies, 1976), pp. 5-8.

2. "Flexible Strategic Options and Deterrence," excerpts from the Press Conference of U.S. Secretary of Defense James R. Schlesinger, 10 January 1974, *Survival*, March/April 1974, pp. 86-90. Colin Gray notes that the Nixon *and* Carter deviations from essentially apocalyptic and technological views of deterrence are "trivial": see Colin S. Gray, "Arms Control in Soviet Policy," *Air Force*, March 1980, p. 68.

3. Desmond J. Ball, *Can Nuclear War Be Controlled?* Adelphi Paper No. 169 (London: International Institute for Strategic Studies, 1981), cites the Command Data Buffer System FOC: 1977 as an example of a significant improvement in C^3I affecting our retargeting capability for Minuteman III, according to Secretary Schlesinger. This was, as Ball indicates, an upgrading of an idea first proposed in the 1960s in a different context, p. 8.

4. Address by Harold Brown, U.S. Secretary of Defense, 10 August 1980 in *Survival*, November/December 1980, pp. 167-270. See also Louis René Beres, "Tilting toward Thanatos: America's 'Countervailing' Nuclear Strategy," *World Politics*, October 1981,

pp. 25-46; Leon Gouré, "The U.S. 'Countervailing Strategy' in Soviet Perception," *Strategic Review*, Fall 1981, pp. 51-64.

5. John Steinbruner, "Nuclear Decapitation," *Foreign Policy*, Winter 1981-82, pp. 16-28.

6. Desmond J. Ball in *Can Nuclear War Be Controlled?* refers to better stellar navigation for SLBM targeting. See also his "The Counterforce Potential of American SLBM Systems," *Journal of Peace Research*, no. 1, vol. XIV, 1977, pp. 23-40. Ball suggests that United States efforts to equip the Poseidon system with a hard target counterforce capability can be dated back as far as 1964 and that Secretary Schlesinger attempted to incorporate the fleet ballistic missile system into his "limited nuclear options" targeting doctrine, p. 26. See also Joel S. Wit, "American SLBM: Counterforce Options and Strategic Implications," *Survival*, July/August 1982, pp. 163-74.

7. Colin S. Gray and Keith Payne, "Victory Is Possible," *Foreign Policy*, Summer 1980, pp. 14-27, discuss some of the implications of what is called *counterpolitical* targeting. Selective targeting of the Soviet great Russian population and related fears of losing party control are discussed by Gary L. Guertner, "Strategic Vulnerability of a Multinational State: Defeating the Soviet Union," *Political*

Science Quarterly, Summer 1981, pp. 209-23, and John M. Weinstein, "Soviet Civil Defense and the U.S. Deterrent," *Parameters,* March 1982, p. 79.

8. Bruce M. Russett, "A Countercombatant Deterrent? Feasibility, Morality, and Arms Control," in Sam C. Sarkesian, editor, *The Military-Industrial Complex: A Reassessment* (Beverly Hills, California: Sage, 1972), pp. 201-42. Russett suggests that Soviet reciprocity for such a strategy would not be necessary for deterrence but essential for restraints during war itself, p. 223. This has sobering implications for intrawar deterrence, given Soviet doctrine. See L. S. Semeyko, "New Forms, but The Same Content," *Selected Soviet Military Writings, 1970-75* (Washington: U.S. Government Printing Office, 1976), pp. 56-59. Russett's countercombatant strategy also targets internal security forces, military bases, and troop transport facilities, p. 218.

9. See Vasiliy I. Zemskov, "Characteristic Features of Modern War and Possible Methods of Conducting Them," in Harriet Fast Scott and William Scott, *The Soviet Art of War* (Boulder, Colorado: Westview, 1982), pp. 211-15.

10. Carsten M. Haaland and Conrad V. Chester, "Will Technology Make Shelters Obsolete?" *Orbis,* Fall 1981, pp. 771-94. See also Federal Emergency Management Agency, Civil Defense Program Overview, FY 1983-89, 12 March 1982. Improvements in the survivability of C^3I as related to the Reagan administration's civil defense program are discussed by Edgar E. Ulsamer, "Civil Defense in a Nuclear War," *Air Force,* June 1982, p. 73.

11. The influence of this logic on SALT negotiators is made clear by Strobe Talbott, *Endgame: The Inside Story of SALT II* (New York: Harper Colophon, 1980). See also Ted Greenwood, *Making the MIRV: A Study of Defense Decision Making* (Cambridge, Massachusetts: Ballinger, 1975), p. 101.

12. Robert J. Art, "The United States and NATO: Managing the Unsolvable," in *The 1980s: Decade of Confrontation?* Proceedings, Eighth National Security Affairs Conference, 1981, p. 166.

13. See Gouré, *War Survival in Soviet Strategy,* p. 8; *Civil Defense: A Soviet View* (Oak Ridge National Laboratory, United States Air Force, 1970).

14. Keith Payne, *Nuclear Deterrence in the U.S.-Soviet Relations* (Boulder, Colorado: Westview, 1982), suggests the term *mutual vulnerability* to apply to mutual assured destruction theorists who amend their views to accommodate "flexible targeting" options such as LNO and countervailing strategy.

15. Richard B. Foster and Francis P. Hoeber attempt to specify the Soviet strategy for "recuperation, reconstitution, and recovery"; see Foster and Hoeber "Ideology and Economic Analysis: The Case of Soviet Civil Defense," *Comparative Strategy,* vol. 1, no. 4, 1977, pp. 405-24. Hoeber notes elsewhere that the *calculation of outcomes,* expressed as a comparison of reserve forces *after* the correlation of forces has been altered by initial Soviet moves, is important for some Soviet military writers.

The record of history is clear: citizens of the United States resort to force reluctantly, and only when they must. We struggled to defend freedom and democracy. We were never the aggressors. America's strength and, yes, her military power have been a force for peace, not conquest; for democracy, not despotism; for freedom, not tyranny.

Ronald Reagan, United Nations, June 1982

COMPUTERS—
AMERICA'S ACHILLES' HEEL?

COLONEL THOMAS L. VOLKMANN

COMPUTER technology has permeated every facet of the public and private sectors of the United States. The benefits of this technology are well known, and its sophisticated applications are so commonplace that they have generated an attitude of expected availability among the people who use them. This confidence in the availability of computer support has provided a fertile environment for expanding the technology and its associated application. The proliferation of applied computer technology has brought with it, however, a dependency that may prove to be America's Achilles' heel. The more dependent we become on computer support for accomplishing our daily affairs, the more vulnerable we become to the chaos that would ensue if we were denied such support. The nature of this vulnerability and the potential threat that could capitalize on it should be considered as well as aspects of computer technology that can substantially reduce the vulnerability.

IT IS readily evident that computer technology has eliminated the need for many skills that were once used in the management of this nation's business affairs. I use the term *business affairs* in its broadest sense to represent the daily routines that in the aggregate comprise activities associated with business and industry in both the private and public sectors. The computer has replaced the stubby pencil that was used in the collection, manipulation, and analysis of information essential to the successful conduct of business affairs. Consequently, the
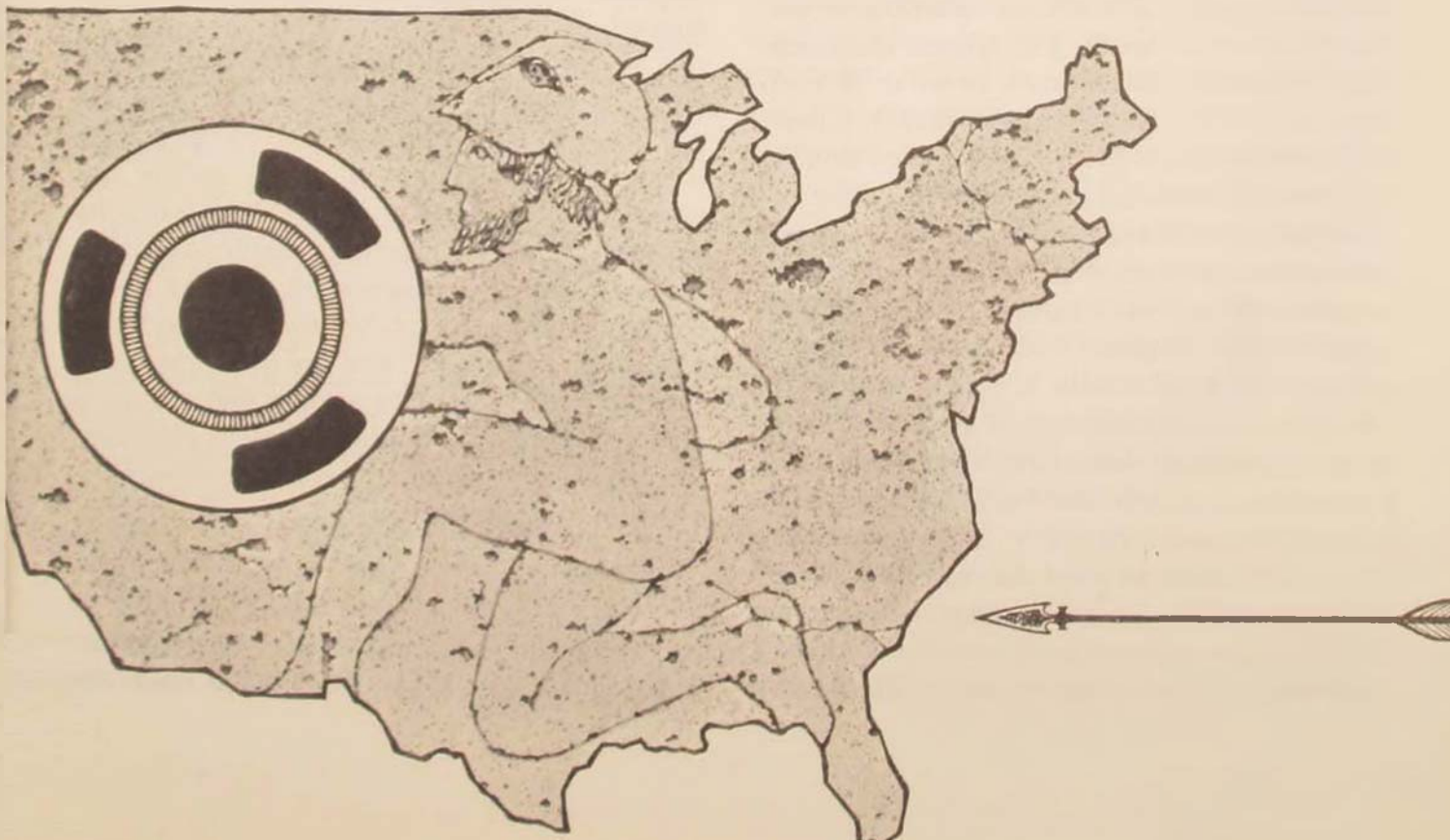
number of people whose skills and knowledge were used in these processes is diminishing rapidly. Presumably, the skills will diminish to a point from which they can no longer be recovered without a substantial investment in time and effort. Under normal, peacetime conditions, this situation would be of little consequence. To assume that such conditions will prevail without interruption is to underestimate the intent and resolve of the forces that oppose our free capitalistic society.

To fully comprehend the significance of our vulnerability, look briefly at two historical events in which an aggressor exploited technology to gain a substantial military advantage. These two events involve the Maginot Line and Pearl Harbor.

Following World War I, French military leaders were determined to be well prepared for hostilities should they erupt again between Germany and France. They analyzed the deficiencies of World War I trenches and designed and constructed a massive fortification, the Maginot Line, that stretched along the French eastern frontier; they felt secure that it was impenetrable. In May 1940, the Germans, in a combined tank, artillery, and aircraft attack, dashed through the Forest of Ardennes to surprise the French Army. The Germans concentrated their tanks on a narrow front; the French dispersed theirs. In essence, the French "used" their tanks and were overwhelmed; the Germans "exploited" tanks and achieved victory.

In December of the following year, exploitation versus use was demonstrated even more emphatically at Pearl Harbor. As early as 1921, General Billy Mitchell had demonstrated that aircraft could use bombs to sink a battleship. The Japanese exploitation of aerial bombardment succeeded in destroying a large part of the United States fleet in the Pacific. Interestingly enough, the War Department, and especially the Navy, had earlier rejected the concept. A Pearl Harbor mentality is, in some ways, worse than a Maginot Line mentality. The latter addresses the problem, however inadequately. The former

does not even recognize that there is a problem—until it is too late. Such historic irony should not be ignored. Computer technology, despite its recognized benefits, can be exploited to our detriment.

The object of citing the Maginot Line and Pearl Harbor episodes is not to draw a parallel with today's situation but to illustrate a very important lesson. With astute analysis and planning, an aggressor can exploit his opponent's apparent strength to his own advantage. The superior computer technology of this country must be judged as one of its strengths. Embedded in this strength, however, is a weakness that can be exploited—our dependence on the computer.

vulnerability

For an aggressor to exploit our consolidated computer facilities, he would need to know what facilities are important to our conduct of affairs and where these facilities are located. Fortunately for the aggressor, the innovators of computer technology in this country have an enormous sense of pride. They rush to publishers who help them spread news of their achievements to anyone willing to read. Interestingly enough, Russia ships tons of business periodicals and professional journals from the United States to their analysts each month. Nor are publications of this type limited to the private sector alone; every public sector activity has access to a publication in which to extol its genius. Not only is access available, contributions are strongly encouraged. Articles about efficiencies through applied computer technology make good copy and are welcomed. An aggressor who is willing to plan and execute a military operation should have little difficulty identifying his targets if he considers computer facilities high on his list.

threat

An aggressor needs more than information about his prospective targets. He also needs the

opportunity and ability to destroy them. Again, centralized facilities work to his advantage. Although access to such facilities is tightly controlled, few installations are hardened to withstand the effects of a well-placed high-explosive detonation. Although thousands of facilities would have to be destroyed simultaneously, it is not beyond the imagination to develop a scheme that could work. Thousands of illegal aliens enter this country without detection. Not all of these aliens need to be unfortunate refugees fleeing to the land of opportunity. Many such people could be well-trained, well-equipped, well-financed urban guerrillas who blend into the mainstream of our urban business society while awaiting further instructions. During this wait, they could study their targets down to the last detail. Freedom of movement throughout this country and Americans' willingness to talk shop enhance their mission accomplishment.

Assuming that such a plan could be developed and executed, the consequences would be devastating. Not only would a crippling segment of our commerce, manufacturing, transportation, and banking industries cease to function, critical military functions would be disrupted to the point of ineffectiveness—in short, complete chaos would prevail. At that point the aggressor would be unidentified and intact while this country floundered. The aggressor would have exploited our computer strength and generated a military advantage from which we might have too little time to recover.

The intent of the preceding scenario is to generate an awareness of a serious vulnerability rather than to present a description of how that vulnerability might be exploited by an aggressor at the outset of a full-scale military offensive. Similar vulnerabilities have been exploited in the past. Fortunately, there was sufficient time to recover from the consequences. Technology has eroded the recovery time, and failure to minimize or eliminate this present vulnerability might prove fatal to our national survival. The opportunity to minimize it lies within our advances in computer technology and man-agement skills related to the application of this technology. Corrective measures depend not so much on innovation as on a redirection of current equipment configuration strategies and management concerns.

corrective measures

The development of micro and miniprocessors affords the most significant opportunity to minimize our vulnerability. These small computers no longer require the rigid environmental controls that are required by the large-scale computers. Consequently, there is no longer a need to concentrate the equipment within the confines of a data processing installation. The centralized facilities presently in use provide for economies in floor space, interconnectivity of peripheral equipment, and supervision of operating personnel. These economies might prove to be superficial if destruction of the facility eliminates computer support at a time when it is most needed.

Dispersal. Dispersal of small computers that are linked together through networking would provide similar processing support and lessen the opportunity for an aggressor to deny the dependent activity its lifeline. Migrating existing data processing systems off of the large-scale computers would be prohibitively expensive and time-consuming. The development of replacement systems, as they become necessary, under an architecture of dispersed processors would be a reasonable alternative to wholesale migration. The dispersal of processors would in itself be insufficient in reducing vulnerability.

Critical systems. Not all processing now being performed within the military community would be critical to the conduct of war. Consequently, the preservation of total processing capability is unnecessary. Each system should be analyzed to determine precisely how critical it would be. The criticality of some systems is so obvious that measures have already been taken to ensure their protection. Systems related to strategic targeting are included in this category. A broad spectrum

of systems related to financial, logistics, personnel, and resource management is neither arranged by priorities nor adequately protected. Although some effort has been made to establish priorities, few such efforts are given sufficient emphasis. Once the priorities are set, critical systems and the computers on which they are processed should be further analyzed.

Risk analysis. Measures necessary to preserve the computers on which critical systems are processed depend on the degree of protection already afforded the facility. The same concerns that apply to natural and peacetime disasters are relevant to a wartime environment. The difference is that in peacetime a disaster that occurs at one installation is unlikely to happen elsewhere. Consequently, facility managers gear their contingency plans to the ready availability of adequate backup facilities. Under wartime conditions described earlier, backup facilities would not be readily available. Each installation should be evaluated on the risk that exists under the current configuration. This risk analysis should concentrate as such on deliberate destruction as it does on destruction from natural or accidental causes. Where critical systems are considered to be at risk, deliberate action can be taken to reduce that risk.

Software portability. If computer processing is dispersed and some systems are left at risk, every opportunity should be taken to ensure that surviving computers are compatible. Software designed for one system should be operable on other computers. Much of the advantage gained by operating on small computers would be lost if software portability is not an inherent feature of the processors selected for support of critical systems.

Secure backup data storage. Comprehensive risk analysis should be applied to offsite storage of backup data. Nearly every facility has provisions for storing backup data at a location separate from the facility itself. Selection of the site is often based on the likelihood that a natural or accidental disaster would not engulf both the facility and the storage site. Risk analysis should also include an assessment of the survivability of the storage site if the building or complex of buidings in which the computers are housed should be deliberately destroyed. Backup storage too close to the computers should be relocated. Attention should also be given to the security protection afforded the backup data storage site.

Physical security. Physical security is possibly the most essential and least costly element in the protection of computer resources. Elaborate methods are employed to limit access to centralized computer facilities. As computers become dispersed among the offices that are supported, personnel access to those offices must be tightened. Penetration of a military installation would not be difficult during periods of rush hour traffic. In today's environment, people who have penetrated an installation would have almost unlimited access to offices in which small computers are located. Although some people might be inconvenienced, controlled access should be enforced in any building in which a small computer is used for processing a critical system. Visitors to such buildings should be escorted at all times, and regular employees should wear identification badges. Measures should be taken to enable us to arm key personnel when circumstances warrant. A vigorous security awareness program should be initiated and maintained so that all assigned people within an office are aware of and alert to anyone new in the area.

Contingency planning. All measures suggested thus far are likely to prove inadequate unless contingency planning is developed and exercised. Contingency planning today centers primarily on the ability of the computer facility manager to restore interrupted support to the dependent offices. Planning should be expanded to prepare for widespread loss of computer resources through the use of alternative means of performing critical activities in the event computer support is denied for prolonged periods. Exercises must include functions that are dependent on computers and the people who

perform these functions. Exercises, to be effective, must be more than a simulation of situations and responses. They should be real-world, real-time experiences on which competent alternatives can be built.

THE IDEAS expressed here are admittedly brief and incomplete. This article is not intended to serve as a critical analysis or research study. It is intended to stimulate concern for our growing dependence on automated data processing, the computers on which it is accomplished, and the vulnerability of these computers to a well-planned, large-scale attack. An imaginative aggressor could exploit this vulnerability without warning and without disclosing his identity or whereabouts. Such a tactic could paralyze large segments of the private and public sectors, including the military. The aggressor could capitalize on the ensuing chaos to gain a significant and perhaps fatal military advantage over this country.

The threat can be reduced by minimizing the vulnerability, and the opportunity to minimize the vulnerability lies within the evolving technology and management practices. Unlike many aspects of our national defense, the solution to this problem does not depend on innovation. It depends on a logical redirection of hardware configuration architecture toward dispersed facilities and on strengthened security

measures and contingency plans. To be effective, impetus for such a program should come from the Air Staff. The following recommendations come to mind:

• That Headquarters Air Force Directorate of Computer Resources (AF/ACD), in cooperation with the Air Force Inspector General and the Air Force Audit Agency, conduct a special study on a representative sample of data processing installations to ascertain their vulnerability to destruction by the detonation of high-explosive charges placed in an area of unrestricted access near the installations.

• That AF/ACD, in cooperation with the Air Force Office of Special Investigation and the Federal Bureau of Investigation, examine the potential for the establishment of a covert strike force capable of destroying several thousand data processing installations nationwide, almost simultaneously.

• And, if the vulnerability and the threat prove to be significant, that AF/ACD develop and initiate a program leading to the reduction of vulnerability of Air Force computer resources.

Simultaneously, a task force of leaders in the public and private sector data processing community should be convened to determine effective measures for safeguarding computer resources nationwide.

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# THOSE DAMNED COMPUTERS

MAJOR H. WAYNE WOLFE

The phone rings in Major Jones's office. His secretary buzzes him on the intercom and informs him that it's his career advisor from the Military Personnel Center (MPC). His heartbeat quickens; he becomes intensely alert; and he wonders to himself, "What does the voice of destiny want now?" The voice informs Major Jones that he has been reviewing some computer-generated printouts and that the name of a Major Jones is near the top of the list for an unaccompanied remote tour. Major Jones hangs up the phone in disbelief and wonders why he was selected for that terrible job. He calls his boss and advises him that his career advisor just called and said that the MPC computer had selected him for a remote tour. They mumble in disgust, "Those damned computers—they're running the Air Force."

BOTH Major Jones and his boss shared the perception that the MPC computer had made his assignment. After all, his career advisor stated that the computer selected him from the list of eligibles. But the advisor did not tell him that the computer had been programmed to furnish a list of officers for assignment based on their Air Force specialty code, time in service, time on station, date of last service overseas, and overseas volunteer status. However, the people in this brief scenario found it easier to blame the computer for the Air Force requirement to staff unpopular bases than to hold MPC personnel responsible for it. The computer only expedited the search and selection process previously performed by specially trained personnel, but the MPC staff determined the logic of selection and made the actual decision.

Computers have been accused of almost everything during the last two decades, from fostering unemployment to invasion of privacy in both government and industry. Alexander Solzhenitsyn recently placed the rights-of-privacy issue in proper perspective:

> As every man goes through life, he fills in a number of forms for the record, each containing a number of questions. There are thus hundreds of little threads radiating from each man, millions of threads in all. If these threads were suddenly to become visible, people would lose all ability to move.[1]
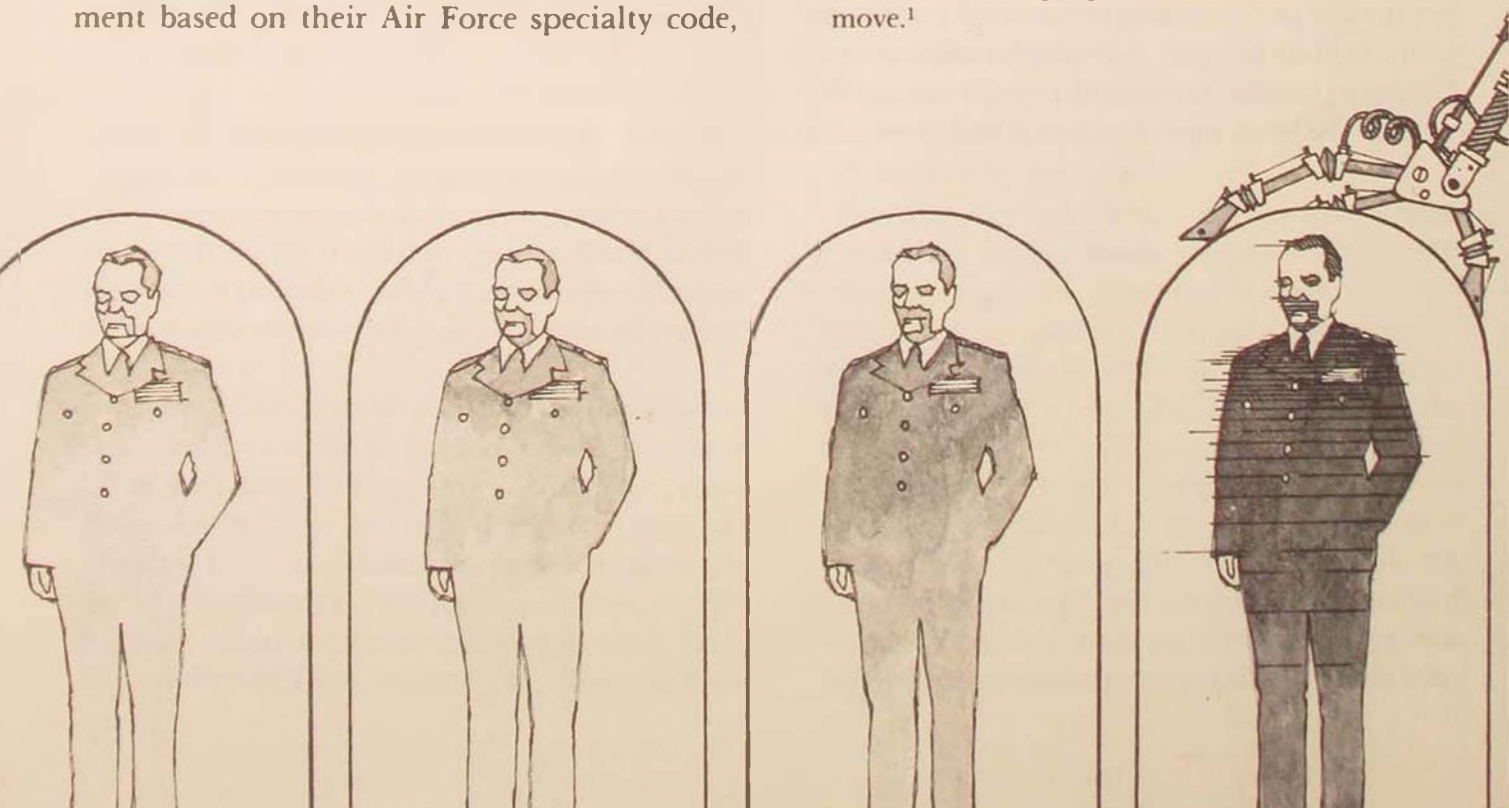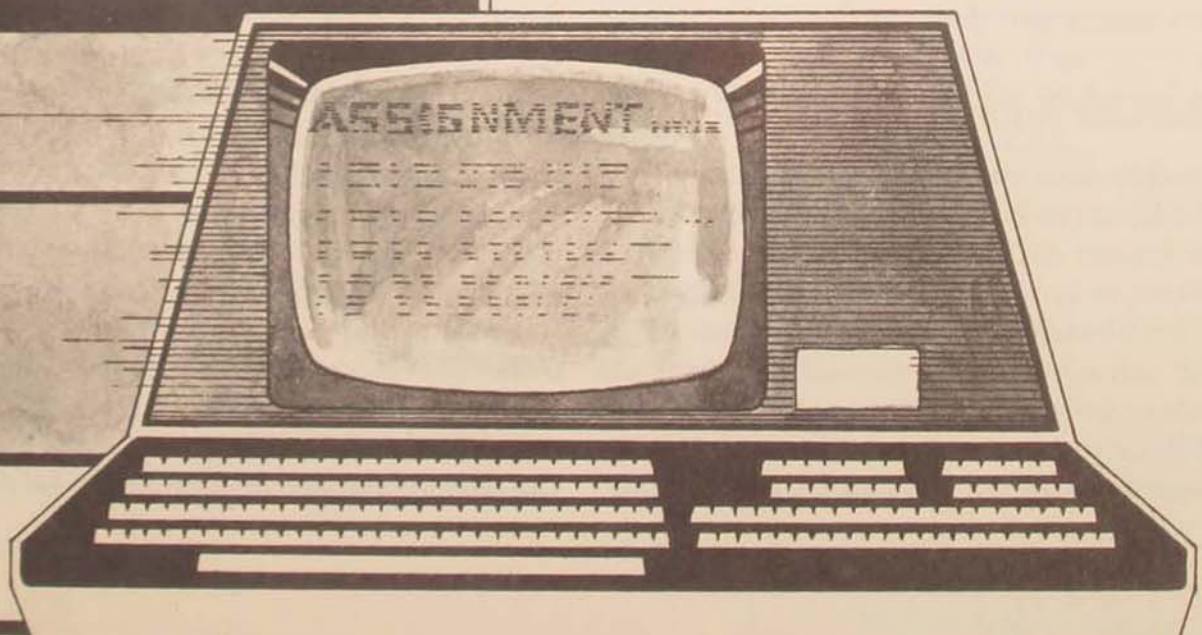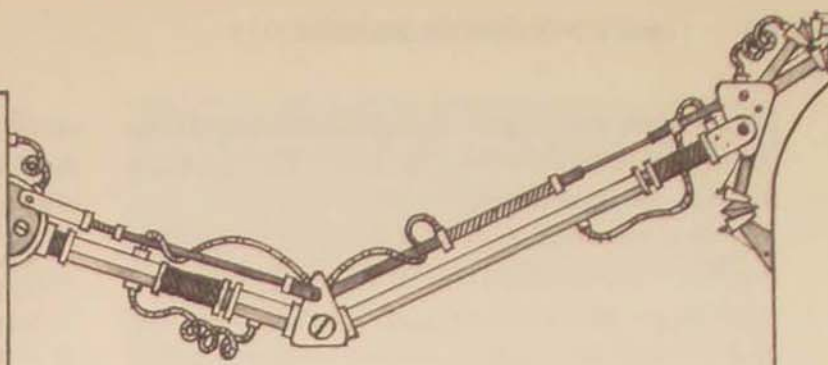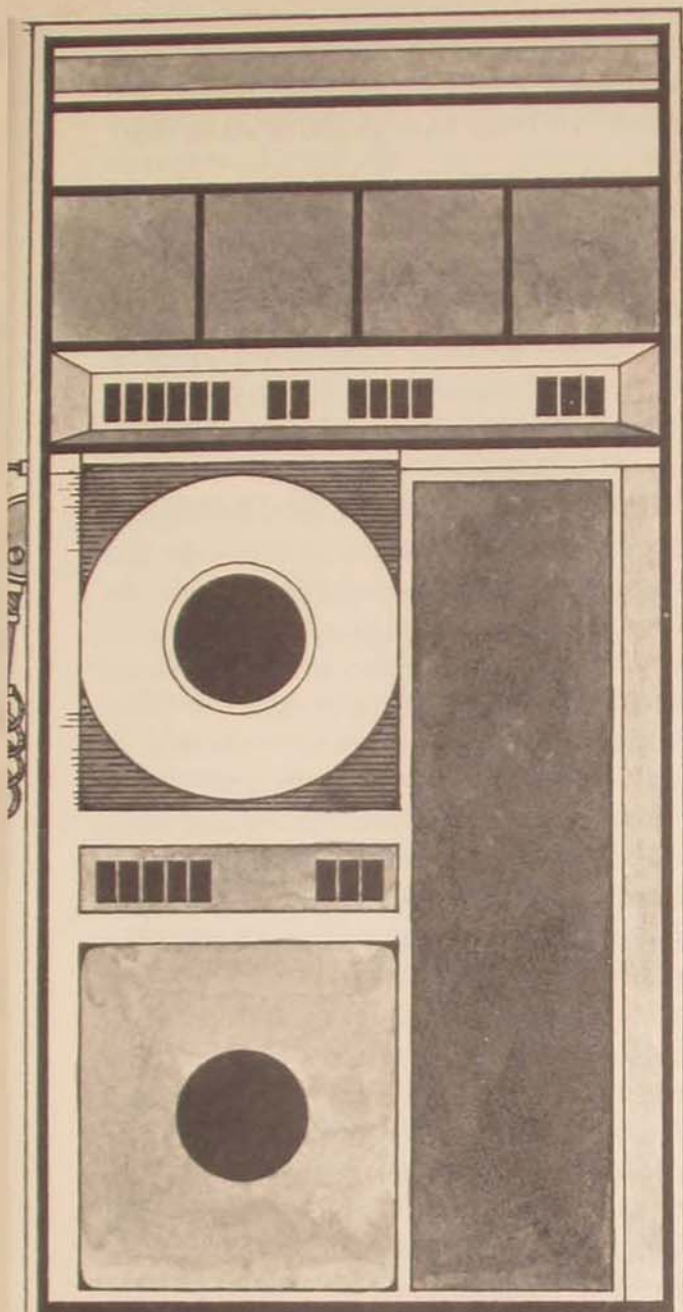
Computers are indeed capable of tying those "threads" together, but man must first instruct them to perform the task.

Many contemporary military leaders suggest that the proliferation and misuse of computer systems are root causes of the perceived decline in Air Force leadership. I label this perception that computers control human destiny as the "Those Damned Computers" syndrome.

Air Force leaders at all levels must accept a basic truth that the use of embedded and general-purpose computers is widespread throughout the Air Force. Embedded computers are normally mini- or microcomputers that function as integral parts of larger systems (e.g., an on-board minicomputer providing radar data to an AWACS aircraft). General-purpose computers are normally "stand alone" systems characterized by management information systems, on-line data bases, and interactive terminals (e.g., the Burroughs B3500 computer located at virtually every Air Force base throughout the world).

Many Air Force computer systems have been misdefined, misdeveloped, and misapplied during the formative years of automation in the Air Force. On the other hand, many Air Force functional systems could not survive without the use of computers; ICBMs, satellites, payroll, etc., come immediately to mind. The purpose of this discussion is to examine the use and misuse of computers in the Air Force, analyze the failures and successes of Air Force automation, and show how effective use of computers can help leaders accomplish their mission.

Quest for Information and Control

A major motivation for computerization of the Air Force has been the perpetual quest by Air Force leaders for information and control of processes to facilitate the accomplishment of their missions. Information is a major source of power and a key to effective decision-making and control of processes. Computerized process control includes everything from controlling laser-guided weapon systems to robotic spot welders. Computers can facilitate executive decision-making if they are properly directed and controlled. Air Force basic doctrine states that:

> The very large quantity of data acquired by our command and control systems demands many forms of data processing, so that the right information will be given to the right commander at the right time.[2]

The quest for decision-making information came early in Air Force history, and the quest for process control evolved with advances in weapon system technology.

Air Force leaders used computers for logistic support as early as the Berlin airlift in the late 1940s, and they have evolved steadily over the past 30 or more years. Each phase of the computer evolution was driven either by a leader's conscious or subconscious requirement for more decision-making information and control of processes. Requests for computer capabilities to provide information or process control have taken a number of forms: Data automation requirements (DARs) for information system computers, computer resources integrated support plans (CRISPs) for weapon systems computers, or specific tasking from higher headquarters for either. Each document requesting computer power had the same basic theme: a leader either needed to acquire information or control a process in a timely manner.

Its major requirement for information and process control makes the Air Force the largest single user of computers in the federal government. In FY 82, the Department of Defense alone spent an estimated $3.6 billion on computers while all the rest of the federal government combined spends only $5 billion for computers in an average year.[3] Beginning in 1983, the Air Force plans to spend more than $647 million just to replace its base-level computers, not to mention its already enormous investment in embedded computers within new weapon systems.[4] Computer use has been propagated not by osmosis but by mission requirements.

Every major Air Force weapon system and virtually all management processes use compu-

ters as either the controlling or integrating function of a given system. The Air Force, indeed, is systems oriented, and computers are essential elements of most Air Force systems, from the Strategic Air Command to the Military Personnel Center.

Although improvements are necessary in many current Air Force computer systems to enhance their effectiveness, it is a truism that the Air Force could not accomplish its mission without the aid of computers. A major challenge, however, is the problem of making computers more effective tools for today's leaders.

Effective and Ineffective Computer Systems

Many of literally thousands of computers in the Air Force are less than fully effective in satisfying requirements for information and process control. Based on 14 years in the Air Force computer systems career field, I believe that approximately half of all computer hardware and software acquisitions or development efforts fail to satisfy their original objectives or requirements. This failure, in turn, implies that at least half of the requirements of Air Force leaders for information and process control are not satisfied. The General Accounting Office (GAO) understood the magnitude of this problem when it recently reported that only 2 percent of the software developed under all government contracts could be used as delivered without changes.[5] And these changes increase the cost of the system and delay the satisfaction of requirements for information or control.

A classic and, perhaps, the worst example of an ineffective Air Force computer system was the Advanced Logistics System (ALS) attempted by Air Force Logistics Command (AFLC) during the late 1960s and early 1970s. Some observers professed that the proverbial Captain Murphy worked on this system prior to writing his infamous "laws." The basic concept of the system was to provide on-line status and control of all AFLC logistic resources and activities.

The poor performance ratio of computer systems can be attributed to a number of problems:

- Poor requirements definition prior to computer system development or acquisition;
- Untrained or inexperienced system users or developers;
- Overselling of technological capabilities by the computer development staff;
- Overexpectation of computer capabilities by the user community;
- Attempts to automate an unproven or undocumented manual process;
- Inaccurate input data;
- Poor project management;
- Automation of a process for the sake of automation rather than satisfaction of stated user requirements;
- Penchant for state-of-the-art equipment when older proven technology would do the job;
- Lengthy computer acquisition schedule and needless bureaucracy;
- Change in technical state of the art;
- Inadequate documentation after system development;
- Personnel turnover; and
- Overreaction or total reliance on computer-generated performance parameters by system users.

Obviously, both users and computer support staffs can be equally blamed for ineffective computer systems.

ALS development exemplified almost all of the mentioned pitfalls, and many of them occurred simultaneously. The system was conceptualized to revolve around huge on-line data bases located at major logistics centers and AFLC Headquarters. The concept was basically sound, but the development effort was beset with problems from the beginning.

The definition of ALS information requirements was not completed prior to the hardware acquisition phase; consequently, the hardware and software acquired did not match the information and control requirements of AFLC leaders. Functional users were encouraged to "blue-sky" their information requirements, and they expressed very high expectations for useful data. The Advanced Logistics System was promul-

gated on the basis of saving 3600 manpower spaces. The software development staff was told to develop programs for a computer "X" and to refine the software after the hardware had been selected. Thus, the entire effort to develop an on-line data base was attempted on unproven software. An obvious conclusion from the multitude of developmental problems and the knockout punch for this beleaguered heavyweight was the lack of strong project management. After more than five years of AFLC development and an expenditure of almost $1 billion, Congress canceled the ALS effort in 1975. This massive failure did much to tighten congressional controls of all computer-related activities in the Air Force and greatly undermined Air Force confidence in developing large, complex computer systems.[6]

Another major DOD effort to develop a computer system has experienced severe problems and very close scrutiny and high visibility. The Department of Defense Worldwide Military Command and Control System (WWMCCS) has been under development for more than five years, and the Air Force is an active participant. To date, hardware and software expenditures have exceeded $1 billion. The objective of this command and control system is to provide information to commanders and the national command authorities (NCA) in time of crisis. A GAO report of June 1980 stated:

> After almost 30 years of using computers to support the command and control environment, the Department of Defense still has not clearly defined the functional informational requirements of the military commanders who must use and rely on WWMCCS ADP capabilities for their operational needs. Instead, the Department prefers to allow the WWMCCS ADP program to continue to "evolve." It seems apparent to GAO that it is time to stop "evolving" and to begin designing a system that, when placed into operation, will provide needed support capabilities to military commanders, particularly during a time of crisis.[7]

Although the Department of Defense refuted the GAO comments and continued to develop the Worldwide Military Command and Control

System, the criticisms are valid examples of typical difficulties facing many large-scale computer systems.

While the Air Force has experienced difficulty with "those damned computers," the problems cited are not unique to the computer systems developed by the military and the government. Private industry also suffers from most of the same pitfalls in varying degrees.[8] Nonetheless, commercial businesses have at least two distinct advantages in developing computer systems; the opportunity to acquire a new hardware and software in rather short periods and relative freedom to hire, fire, or promote personnel. In the federal government, acquisition of a computer system and or termination of an incompetent employee can take years.

Another potential problem with computer systems concerns management information systems and their impact on an organization. Henry Lucas claims that organizational behavior is a primary factor in the failure of management information systems to perform effectively.[9] Typical organizational problems stem from relations between users of management information and developmental staffs, lack of cooperation and acceptance by users, ambivalence to change, and potential redistribution of power within work units.

For example, organizational behavior contributes to a number of problems in the area of word processing. I witnessed the implementation of word processing systems in four different Air Force units with problems stemming from organizational behavior. Two of these organizations totally rejected the concept, and the others overcame initial problems of implementation and then enthusiastically accepted it. Major organizational problems included loss of personal secretaries working for branch and division chiefs, changes in required job skills for typists, and designation of clerical supervisors within administrative work units. People who had been personal secretaries now became mere computer operators in typing pools. The success or failure of word processing depended

directly on the persuasiveness of organizational leaders and the training of administrative personnel and users. Leaders made their systems work when they recognized and understood the efficiencies and dollar savings possible from word processing regardless of the inherent organizational resistance to change.

Despite numerous instances in which "those damned computers" are less than fully effective, many Air Force computer systems prevail. Computer systems are effective if they help provide information needed by users to make correct decisions or to control resources. But computers should not be allowed to make decisions without sufficient checkpoints; they should provide information for leaders to use in their decision-making processes.

Kit Grindley and John Humble cite four fundamental indicators of effective computer systems: improved performance of repetitive tasks, increased volume of repetitive tasks, release of humans for discretionary tasks, and improved control methods.[10] A good example of an effective computerized control system involving Air Force staffs was the aborted lift-off of the NASA space shuttle in November 1981. The countdown for launch was halted when one of the five on-board computers indicated a pressure build-up in a power cell. NASA officials researched the problem and discovered that the computer had correctly identified a dangerous pressure buildup in an auxiliary power unit that controlled the hydraulic system. They later acknowledged that the shuttle could have experienced difficulty during its return to earth if they had not heeded the computer's warning. But the computer system was effective in identifying a potential problem, and NASA leaders made a correct decision based on that information. "Those damned computers" possibly saved at least two lives, billions of dollars, and the credibility of the space shuttle program.[11]

Another very successful computerized effort, the Joint Uniform Military Pay System (JUMPS), is one of the most effective management information systems in the Air Force. In producing more than 1.5 million pay checks per year, JUMPS is so accurate and reliable that most Air Force members cannot cite a single instance when the JUMPS computer system was responsible for an error in their pay. As a rule, human error or delays caused by the bureaucratic process are responsible. Even accounting and finance officers (noncomputer people) admit that the payroll system used prior to JUMPS was marginal at best. JUMPS personifies improved performance of repetitive tasks by effective use of computer technology.[12]

Compatible Air Force Leaders and Computers

James MacGregor Burns speaks of executive leadership in these terms:

> Classical thinking about executive decision-making has viewed the process as an essentially orderly and rational one. A problem is defined and isolated; information is gathered; alternatives are set forth; an end is established; means are created to achieve that end; a choice is made.[13]

Modern computers literally provide reams of information and process control for Air Force leaders. Admittedly, much of that voluminous data is not meaningful information and should be discarded, but meaningless output data are not entirely the fault of computers. Since computers are programmed by humans, effective leaders can exercise direct influence on the people responsible for controlling them, and they can influence the type of information generated or the processes controlled by computers.

Steven Alter suggests that the ultimate success or failure of a computer system is "the extent to which managers can use the system to increase their effectiveness within their organizations."[14] Computer systems are successful only if they provide information that helps a leader direct or control his organization, weapon system, functional process, etc. Effective leaders will not tolerate inefficient computer systems, but they cannot improve the systems without considerable and conscious effort.

All leaders should closely examine the computer systems used in their organizations and determine whether the systems satisfy their requirements for information and control. When the systems fail to support organizational requirements, they should consult with functional users and computer staffs and seek solutions. If the systems continue to waste resources, they should either be repaired or turned off. Admittedly, the process of changing current or acquiring new computer systems is very time-consuming. But "those damned computers" will run rampant and continue to waste time and resources if leaders fail to take the initiative and demand changes.

On the other hand, leaders should exercise caution in their efforts to change standard management information systems used by the Air Force. These systems have been developed over a number of years. Many of them also have data elements or structured information based on regulations or law, and statutory requirements may prevent changes.

A key ingredient and major contributor for an organizational leader in exploiting computers is his computer support staff. Two basic understandings between a leader and his computer systems support staff are essential. First, a leader must be certain that his computer staff understands that it is first and foremost a *support staff* and not an independent development activity. Computer systems are not self-serving, and they should not be self-perpetuating or egocentric. A second critical understanding is that the computer support team is *part of the overall team* and that teamwork is paramount to the organization's mission. The computer support staff should not feel isolated from mission areas but part of a synergistic effort. A leader should recognize his computer support staff's positive and negative contributions to the mission and act accordingly. A staff can work wonders when members feel that they are part of the team and are recognized for their expertise and value. A motivated computer staff can wade rapidly through the bureaucratic process of acquiring a

new computer or fixing a software bug. But, in many organizations, computer staffs are treated as second-class citizens and usually respond as they are treated. The treatment is justified in some instances, and, in others, negative attitudes toward the staffs are the result of "those damned computers."

An effective leader should make the best possible use of the tools provided by computer systems to gather and analyze information. As available dollars and manpower shrink, computer power can help to reduce the gap between limited resources and mission accomplishment. I believe that the U.S. Air Force's growing pains with computer systems are similar to the U.S. Army's problem in recognizing the value of the airplane more than 50 years ago. Today's leaders must learn to appreciate and exploit modern technological advances. With the assistance of their support staffs, they should refine their baseline computer systems and use them as building blocks for enhanced capabilities.

The refinement process should begin with a conscious appraisal of the what, when, where, why, and how of computer use throughout the entire Air Force. To ensure objectivity, a disinterested third party or a contractor should make the assessment and brief the Air Staff and all major commands on the results. These actions would mark the beginning of an Air Force-wide program to make computers more effective. Major aspects of the program would be identification of effective and ineffective computer systems, necessary actions to enhance current effective systems, redirection or cancellation of ineffective systems, and identification of functional areas or processes that offer potential "high payback" for the use of computers.

Another much-needed initiative is to focus attention on information as a major resource and manage it as carefully as we manage logistics, personnel, dollars, etc. Computer and communication systems are technical solutions to information requirements and should be viewed as subsystems in a total information systems approach. The recent Air Staff initiative to form

an Assistant Chief of Staff (ACS) for information systems is a positive first step in developing an information resource management approach. However, promulgation of this concept throughout the Air Force is a major undertaking that will involve fundamental changes in the way the Air Force manages its computers and communications.

A STUDY by the Rand Corporation in 1976 summarized the importance of computers to the Air Force as follows:

> Computer technology has become central to the Air Force's ability to perform its role and mission. Computer hardware failures and inadequate software can mean that an aircraft cannot fly or cannot carry out its design missions, that command and control systems cannot communicate with each other, or that important management information is not received in a timely or accurate manner.[15]

Since that study was completed, computer use in the Air Force has continued to grow at an exponential rate. Whether "those damned computers" run the Air Force or whether they are used effectively to satisfy mission requirements depends heavily on teamwork among computer users, support staffs, and strong leadership.

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Notes

1. Donald H. Sanders and Stanley J. Birkin, *Computers and Management in a Changing Society* (New York: McGraw-Hill, 1980), pp. 1-137.

2. Air Force Manual 1-1, *United States Air Force Basic Doctrine*, 14 February 1979, United States Air Force, p. 2-24.

3. Robert V. Head, "The Complex Nature of Federal Data Processing," *Government Executive*, March 1981, pp. 30-31.

4. "We Have Play-offs, Runoffs, Bake-offs; Now a Compute-off," *Wall Street Journal*, September 21, 1981, p. 1.

5. Robert V. Head, "Federal ADP Systems: Atrophy in the Sinews of Government," *Government Executive*, February 1981, pp. 36-41.

6. Air Force Logistics Command, *Advanced Logistics System Assessment, Executive Summary* (Wright-Patterson AFB, Ohio, 1975), pp. 1-53.

7. General Accounting Office, *The Worldwide Military Command and Control System—Evaluation of Vendor and Department of Defense Comments* (Washington: Government Printing Office, 30 June 1980), pp. 2-3.

8. Kit Grindley and John Humble, *The Effective Computer* (New York: McGraw-Hill, 1973), pp. 1-18.

9. Henry C. Lucas, *Why Information Systems Fail* (New York: Columbia University Press, 1975), pp. 1-30.

10. Grindley and Humble, pp. 21-60.

11. "Shuttle Launch Delay Attributed to Oil, Software Problems," *Aviation Week & Space Technology*, November 9, 1981, pp. 20-21.

12. Barbara Englert, "Air Force Pay Service—The Best from the West," *Air Force Comptroller*, July 1981, pp. 8-9.

13. James MacGregor Burns, *Leadership* (New York: Harper and Row, 1978), pp. 369-97.

14. Steven L. Alter, "How Effective Managers Use Information Systems," *Harvard Business Review*, November-December 1976, pp. 97-104.

15. Stephen M. Drezner, Hyman Shulman, et al., *The Computer Resources Management Study* (Santa Monica: Rand Corporation, 1976), pp. 1-29.

Time has decided that 1982 is the year of the computer. It would have been possible to single out as Man of the Year one of the engineers or entrepreneurs who masterminded this technological revolution, but no one person has clearly dominated those turbulent events. More important, such a selection would obscure the main point. *Time*'s Man of the Year for 1982, the greatest influence for good or evil, is not a man at all. It is a machine: the computer.

"Machine of the Year: The Computer Moves In,"
*Time*, January 3, 1983, p. 16

MILITARY IMPLICATIONS OF INDIA'S SPACE PROGRAM

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IN A COUNTRY where the bullock cart still constitutes a principal mode of transportation, India's space program stands out as a dramatic achievement. Although New Delhi has consistently maintained that the space program bears no relation to defense requirements, India could produce an intermediate-range ballistic missile (IRBM) by the end of the decade assuming requisite political determinations are made. This article identifies the present accomplishments of India's space effort and discusses near- and mid-term program objectives. Further, it
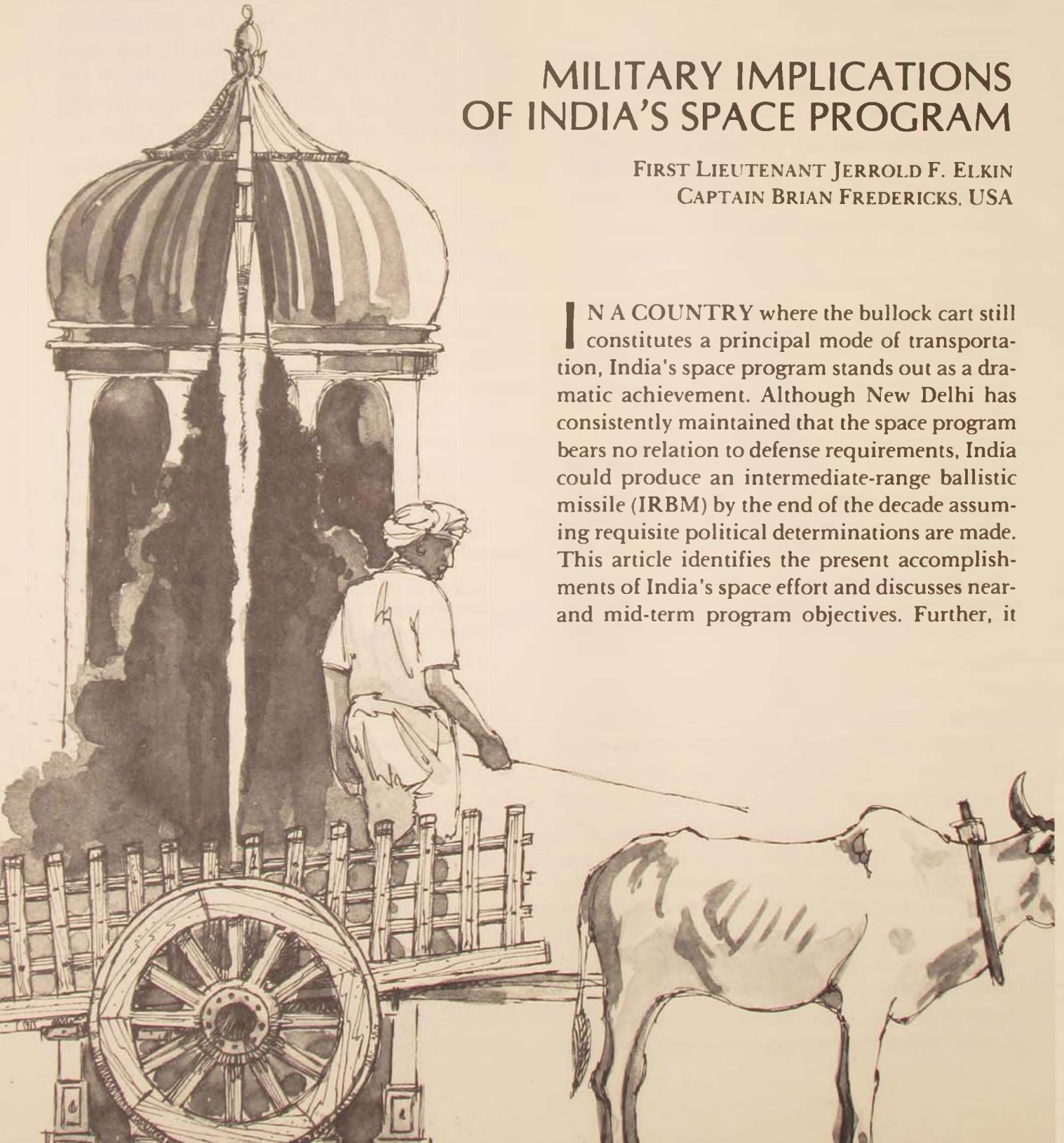
examines potential military application of Indian space technology and analyzes those factors most likely to enter New Delhi's decision calculus respecting development of a nuclear weapon carrier missile system.

India's Space Achievements

On 18 July 1980, India successfully launched the Rohini I satellite and thereby became the sixth nation—after the Soviet Union, the United States, France, Japan, and China—to orbit a satellite with an indigenously produced launch vehicle. This event demonstrated that, in the eighteenth year of its existence, India's space program had become a truly sophisticated enterprise. In an organizational sense, the program began in 1962 with the creation of the Indian National Committee for Space Research under the Department of Atomic Energy. The formation of the Indian Space Research Organization (ISRO) in 1969 highlighted the transition of the space effort from a scientific undertaking of limited magnitude to a coordinated program with specific goals and time-bound projects in space applications and technology. The program's organizational structure was further augmented in 1972 with the establishment of a Space Commission and a Department of Space. The Space Commission is responsible for general policy formulation and approval of the budget of the Department of Space. The Department of Space is tasked with planning, programming, and resource allocation. The ISRO is a constituent element of the Department of Space.[1]

Professor Satish Dhawan, Chairman of the Space Commission and ISRO and Secretary to the Government in the Department of Space, has been the driving force behind India's space undertakings. Under Dhawan, India has made material progress in the areas of satellite and launcher development and ground support infrastructure expansion. While Dhawan has emphasized the need to enhance indigenous capability in all aspects of space technology, he has recog-

nized that, as an interim step, acceptance of foreign assistance is imperative. Such assistance, in the form of satellite design support and actual launching of Indian satellites, has come from the United States, the U.S.S.R., and France.

On 19 April 1975, India's first satellite, the 35 kg Aryabhata, was placed in a 600 km circular orbit by a Soviet rocket. The launching of Aryabhata demonstrated the ability of Indian scientists to design and fabricate orbital satellites. With the exception of the solar panels and batteries, all of Aryabhata's systems were manufactured in India. Beyond this, the Indians evidenced an ability to employ receiving, transmitting, and tracking facilities for the purpose of satellite monitoring.

India's second experimental satellite, the 444 kg Bhaskara, was launched in June 1979 from the U.S.S.R. on a Soviet rocket. The Bhaskara carried two remote-sensing payloads: a television camera and microwave imaging system. However, the TV camera failed to operate for nearly a year. After an extensive simulation exercise, Indian scientists were able to remedy the problem, and in May 1980 the satellite began transmitting as many as ten pictures a day. The quality of the nearly 1000 pictures sent back by Bhaskara's TV camera compared favorably with similar pictures taken by other meteorological satellites.[2]

While the Aryabhata and Bhaskara were placed in orbit by Soviet boosters, Indian efforts to design and fabricate a satellite launch vehicle continued apace. An indigenously produced four-stage, solid fuel rocket, designated the SLV-3, made its maiden flight on 10 August 1979. A malfunction in the second stage caused a flight termination after only 317 seconds. However, in July 1980, the SLV-3 successfully injected the 35 kg Rohini I satellite into near-earth orbit. The primary objectives of the Rohini I were performance evaluation of the SLV-3 and determination of the satellite's orbital characteristics.[3] The magnitude of this achievement becomes apparent when one considers that Japan, a technologically advanced nation, was

unable to put a satellite into space until its fifth attempt.

The year 1981 witnessed an acceleration of India's space activity. In May, the second Rohini satellite, with an expected mission duration of 300 days, was placed into an elliptical orbit. The Rohini carried a landmark sensor of Indian manufacture capable of photographing areas 250 by 80 km with a resolution of 1 km. However, a problem in the fourth stage resulted in a failure to achieve required orbital altitude; in consequence, Rohini II reentered the earth's atmosphere after only nine days in space. In June, India's first geostationary satellite was launched by the European Space Agency from French Guiana. This satellite, known as APPLE (Ariane Passenger Payload Experiment), was meant to serve as a test bed for India's communication satellite program. The most critical phase of the APPLE mission profile involved employment of an apogee boost motor to shift the spacecraft from a transfer to a drift orbit, from which the satellite was maneuvered to its permanent station.[4] The success of Indian scientists in correctly positioning APPLE was trumpeted by the Indian press, which emphasized that this capability had been previously demonstrated only by the United States, the U.S.S.R., France, and Canada. In November 1981, Bhaskara II, India's second earth observation satellite, was launched from a Soviet cosmodrome. Unlike its predecessor, the Bhaskara II experienced no problems with its cameras. This satellite provided information, inter alia, on cloud formation and atmospheric moisture content.

India's communication capability will be further enhanced with the initiation of Indian National Satellite (INSAT) operations. In addition to telecommunications and direct TV broadcasting, the INSAT system will have a meteorological earth observation and data relay mission. Two INSAT spacecraft have been fabricated by a U.S. firm according to Indian specifications. INSAT's ground support equipment will include thirty-five tracking stations, six of these being mobile facilities.

INSAT-1A was launched from the Kennedy Space Center on 10 April 1982 and inserted into a geosynchronous orbit on the thirteenth. However, a premature exhaustion of thruster propellant resulted in a cessation of operations only 150 days after launch. Nevertheless, New Delhi remains satisfied with the basic design, and a 1983 launching of INSAT-1B is anticipated.

Projected Space Development Programs

The Indians have embarked on a number of satellite development projects to be completed by the end of the decade. Among these is proto-INSAT, which will be used in establishing design parameters for indigenously built INSAT replacement satellites. However, it is in the area of booster technology that impressive advances can be anticipated in the near term. During the 1980s, India intends to produce an augmented satellite launch vehicle (ASLV) and a polar satellite launch vehicle (PSLV). The ASLV will consist of an SLV-3 with two first-stage SLV-3 rockets as strap-on boosters. The ASLV will be able to inject a 150 kg payload into low-earth orbit, as compared with the 35-50 kg lift capacity of the SLV-3. As presently configured, the PSLV will consist of a solid fuel booster with six strap-on motors derived from the SLV-3 first stage, a liquid fuel second stage, and two solid fuel upper stages. This launch vehicle, designed to place a 1000 kg payload into a 900 km polar sunsynchronous orbit, is expected to be operational by 1987.

Dr. Abdul Kalam, head of launch vehicle development in the ISRO, has declared that by 1990 India will be able to position a 2500 kg communication satellite into geosynchronous orbit at 36,000 km. He has further asserted that the ISRO can produce a cryogenic rocket engine (using liquid oxygen and liquid hydrogen) during the 1980s. The Indians consider cryogenic engines more cost effective than rockets employing solid or storable liquid fuel because of greater thrust generation and the possibility of reduced vehicle size.[5]

Military Implications of Space Research

The Indian leadership has emphasized that advances in rocket and satellite technology will not be translated into an enhanced military capability. Thus, for example, the Minister of State in the Ministry of Defense apprised Parliament after the launching of Rohini I that no plans existed for the manufacture of IRBMs.[6] Despite such pronouncements, potential military applications of Indian space technology are manifold, to include development of reconnaissance satellites, improvements in command and control, greater precision in operational planning based on satellite-derived meteorological data, and IRBM production.

reconnaissance satellites

India has already designed a satellite camera system and placed it into orbit. While the resolution of the Rohini II landmark sensor was inadequate for detailed surveillance activity, it would have allowed New Delhi to locate road and rail nets in neighboring countries. The 1981 acquisition of advanced MiG-25 Foxbat reconnaissance aircraft from the Soviet Union evidences India's interest in improving its ability to monitor military installations and troop movements in Pakistan and China. The production of satellites (employing sophisticated optics either indigenously fabricated or acquired from third countries) would appreciably augment India's existing photographic intelligence resources.

command and control

A substantial upgrading of India's domestic communication infrastructure constitutes a fundamental objective of the INSAT program. The INSAT-1B platform will have twelve communication channels, each able to handle 2000 telephone conversations, plus two direct broadcast television channels. The applicability of such an information transmission system to defense requirements is patent. Thus, for exam-

ple, the six mobile down links associated with INSAT may well prove forerunners of systems integrated into army units that will enable these units to deploy from peacetime cantonments with little or no communication disruption. Similarly, satellites could increase the effectiveness of the Indian Navy both by ensuring continuous communication with all naval vessels and improving the accuracy of maritime navigation. In this context, it must be appreciated that India's armed forces comprise the world's fourth largest army, the fifth largest air force, and a navy transitioning from a coastal defense force to a blue-water fleet. A military organization of this magnitude, with installations distributed throughout India and numerous warships at sea, would derive particular benefit from a satellite-enhanced C^3 network.

weather forecasting

Weather conditions form a critical variable in military planning. The greater precision in weather forecasting afforded by Indian meteorological satellites will, in consequence, materially assist planners in structuring military exercises or actual combat operations.

intermediate-range ballistic missiles

The Indian political leadership has consistently asserted that the activities of the Department of Space are nonmilitary in nature. However, Satish Dhawan declared in 1979 that the SLV-3 could be converted into an IRBM with a range of approximately 1500 km.[7] Adoption of such a course of action would appear to have the support of India's armed forces. An editorial in the November 1981 edition of *Vikrant*, a semiofficial Indian military publication, states that India ". . . must possess adequate capability for strategic long-range strike in the form of MRBM IRBMs equipped with nuclear warheads, a strategic air strike and interdictor force and adequate air defence, all equally complementary and coordinated."[8]

Modification of the SLV-3 into a nuclear-

weapon-carrier missile involves more than mere payload substitution; rather, a number of significant technological difficulties must be surmounted. First, a reentry heat shield capable of withstanding temperatures of several thousand degrees centigrade must be developed. It has been reported that Indian scientists are presently endeavoring to perfect an ablative heat shield system that would satisfy this requirement.[9] Second, sophisticated guidance systems are needed to ensure that warheads arrive at their targets. India's demonstrated capability to maneuver a satellite into geosynchronous orbit evidences possession of sensitive position-correcting instruments. A senior Indian scientist has asserted that such guidance systems could be applied to defense purposes after modest refinement.[10]

Indian military affairs analyst R. R. Subramanian notes that the SLV-3, a four-stage launcher using solid propellant motors, is far from an ideal weapon delivery vehicle. The disadvantages of a four-stage rocket are said to include the need to integrate control and guidance equipment with each of the stages and the increased likelihood of engine malfunction. Further, the solid propellant rockets of the SLV-3 cannot generate as much thrust as liquid-fuel engines (and thus have a lesser payload-lift capability[11] In this regard, it should be appreciated that India is currently designing a liquid-fuel rocket which, in combination with solid fuel rockets, will form the PSLV power plant.

In sum, it is probable that, given a political decision to manufacture nuclear bombs and a missile delivery system for such weaponry, India could have an operational IRBM force by the end of the decade. Indeed, a senior ISRO official has observed that India could develop an IRBM prototype within two years.[12]

The SLV-3 was designed and developed to put the 88-pound Rohini satellite into near-earth orbit. Its second flight on 18 July 1980 was successful, making India the sixth nation to orbit a satellite of its own creation.
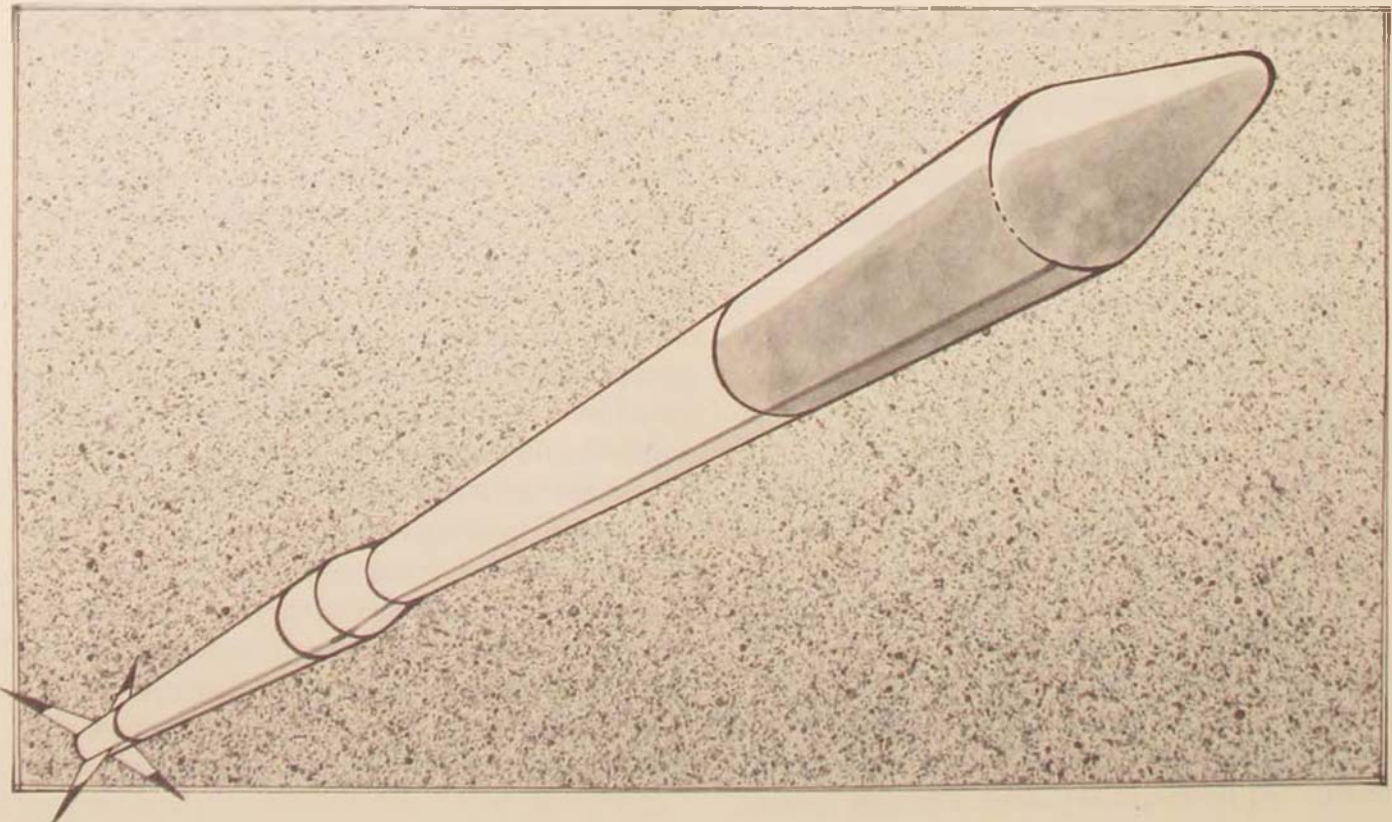
Factors Influencing India's Decision to Develop IRBMs

Prime Minister Indira Gandhi has repeatedly maintained that India's nuclear program is dedicated to peaceful and constructive purposes. However, many influential figures have articulated the view that development of nuclear weaponry is imperative. The late Air Chief Marshal P. C. Lal, former head of the Indian Air Force, asserted that "India has the capability to make the atom bomb at short notice and should integrate it in its military arsenal and build up its defence strategy and tactics around it." He further advocated the establishment of training programs to familiarize Indian armed forces with nuclear warfare.[13] K. Subrahmanyam, director of the Institute for Defence Studies and Analysis (an autonomous but government-funded body that serves as a principal actor in the formulation of defense policy), observed that "India has to keep a few steps ahead of Pakistan in nuclear weapon technology and develop the infrastructure to be in a position to deter Pakistan when it reaches nuclear capability."[14] If Pakistan does in fact explode a nuclear device, pressure applied by India's "nuclear bomb lobby" may prove irresistible. If the decision to develop nuclear weaponry is made, the question of an appropriate delivery vehicle must be addressed.

Pakistan

There is no need to employ ballistic missile assets against Pakistan. Strike aircraft presently maintained by India (namely, the Canberra medium bomber, the Anglo-French Jaguar, and the Soviet MiG-23 Flogger, along with the French Mirage 2000 to be acquired during 1984-85) can hit targets throughout Pakistan with nuclear bombs.

It should be noted parenthetically that there is no uniformity of opinion within India regarding the indispensability of countering Pakistani nuclear weaponry with equivalent Indian weaponry. Rather, some analysts believe that a Pakistan armed with several crude nuclear bombs could be readily defeated by India's overwhelming conventional strength.[15]

China

India considers China to be its chief strategic threat. This perception results in part from the severe defeat suffered by New Delhi in the 1962 Sino-Indian War. India reacted to this defeat by substantially augmenting military force levels along its northern and northeastern borders. Today, an appreciable percentage of India's ground and air strength is oriented toward China. However, India's conventional arms cannot offset the threat presented by China's medium- and long-range ballistic missile inventory.

India is endeavoring to meet the Chinese threat by diplomatic as well as military means. In December 1981, efforts to resolve Sino-Indian differences regarding demarcation of their common border were reinstituted after twenty-one years; subsequent rounds of talks occurred in May 1982 and January 1983. It is far from certain, however, that these border negotiations will be satisfactorily concluded. Thus, for example, an exacerbation of tensions between India and Pakistan, a principal Chinese ally, could lead to a termination of discussions. The talks could also collapse if India and China are unable to overcome decades of ill-feeling and mutual suspicion. In such circumstances, India's possession of an IRBM force would prove of marked utility, serving to inhibit active Chinese intervention in any future Indo-Pakistani conflict and deter a Chinese attack against India.

Indian Ocean

India appreciates that its regional maritime interests can be secured only through an increased power presence. This in large measure accounts for the emphasis being given to the development of a blue-water navy. The addition

of ballistic missiles to New Delhi's weapon inventory would materially enhance its ability to project military force throughout the Indian Ocean. Increased attention paid to Indian security concerns by outside powers operating in the region (for example, the United States, with its Diego Garcia base) would prove an attendant benefit.

psychological and prestige factors

India wishes to be recognized as a technologically advanced state. The desire to instill this perception was, in addition to military and scientific considerations, a driving force behind the 1974 explosion of a nuclear device. Similar motivations have impelled the establishment of the space program and, to a great degree, stimulate interest in the development of IRBMs.

The political significance of an IRBM force is also not lost on the Indian leadership. Only a few major powers have a ballistic missile production capability. Should India join this group, it would doubtless facilitate efforts at realizing an international security role commensurate with its size and potential. Furthermore, New Delhi would be able to resist the strategic demands of great powers that might otherwise have to be accommodated.[16]

nonaligned movement

Maintenance of India's status as a leader of the nonaligned movement is one of Mrs. Gandhi's central concerns. The manner in which procurement of nuclear weapons and carrier missiles would impact on this policy objective is therefore an issue of considerable moment. In consequence, the Indian government must weigh the likelihood of ballistic missile production raising India's stature in the Third World or, in the alternative, isolating New Delhi within the nonaligned movement by generating apprehension regarding Indian intentions.

economic factors

India's space program expenditures totaled $330 million during the period 1962-80. The relative frugality of this enterprise resulted in part from the willingness of the Soviet Union and the European Space Agency to launch Indian satellites at little or no cost. The dramatic growth of space activity in the 1980s will necessitate a financial outlay of approximately $1.1 billion, a figure that will increase appreciably if space technology is applied to defense requirements. However, such amounts are far less than the costs associated with India's present force modernization effort. In 1979, India signed a $1.7 billion contract with the United Kingdom for Jaguar strike aircraft; in 1980, weapon procurement agreements totaling more than $2 billion were concluded with the Soviet Union and West Germany; and in 1982, India purchased Mirage 2000 multimission aircraft from France at a cost of nearly $1 billion. Therefore, it would appear that, if deemed militarily imperative, economic factors will not dissuade the Indian government from developing a ballistic missile force.

THERE IS NO EVIDENCE to suggest that New Delhi is currently employing space program assets to satisfy defense requirements. It must be recognized, however, that many of the accomplishments of India's space scientists have direct military applicability. Further, the lead time needed to convert satellites and launchers from civilian/scientific to military end use will diminish as India's space effort becomes more sophisticated. Undoubtedly, India's leadership would authorize such a program reorientation should this course of action be deemed advantageous.

Defense Intelligence Agency
and
*George Washington University*

Notes

1. P. Nandakumar, "Space Research in India," *Indian and Foreign Review*, November 6, 1977, p. 15.

2. S. P. Baranwal, editor, *Military Year Book 1980-1981* (New Delhi, India: Guide Publications, 1980), p. 19.

3. "Space Research in India," *India News*, October 26, 1981, p. 5.

4. European Space Agency, *APPLE: India's Experimental Communication Satellite*, 1981, p. 4.

5. "Reusable Boosters for Indian Rockets by 1986," *The Hindu* (Madras), September 1, 1981, p. 1.

6. India, Parliament, *Parliamentary Debates* (Rajya Sabha), vol. 115, no. 16 (August 1980), col. 158.

7. R. R. Subramanian, "SLV-3 a Giant Step into the Missile Age," *The Hindu* (Madras), August 15, 1980, p. 18.

8. "Zero Option for India," *Vikrant*, November 1981, p. 2.

9. "India Reported to Develop Missile Capacity," *Patriot* (New Delhi), December 13, 1980, p. 1.

10. Ibid.

11. Subramanian, p. 18.

12. S. K. Ghosh, "India's Space Programme and Its Military Implications," *Asian Defense Journal*, September 1981, p. 36.

13. "P. C. Lal for India Making A-Bomb," *Times of India* (Bombay), July 19, 1981, p. 5.

14. Ibid.

15. "Nuclear Weapons: To Blast or Not to Blast," *India Today*, September 15, 1981, p. 95.

16. Onkar Marwah, "India's Nuclear and Space Programs: Intent and Policy," *International Security*, vol. II, no. 2, 1977.

Aims of Education

The right kind of education is the awakening of intelligence and the fostering of an integrated view of life. So, the truly educated man, who cannot be selfish and narrow-minded, is freed from the chains of degrading reality and develops a human outlook. He approaches life with intelligence and sympathetic understanding. He tackles controversial issues with the temper of a judge rather than that of the advocate or the notorious expert witness. He resists the trivializing influences of society and the effects of a nervous and mindless culture which craves for sensory satisfaction. He judges things by standards which reject what is false and second-rate in life and weighs all evidence in the scales of a balance which are not tricked, biased or tilted to one side. In short he is a successful and a socially well adjusted citizen with character, personal rectitude, creative thinking and capacity for cooperation.

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air
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review
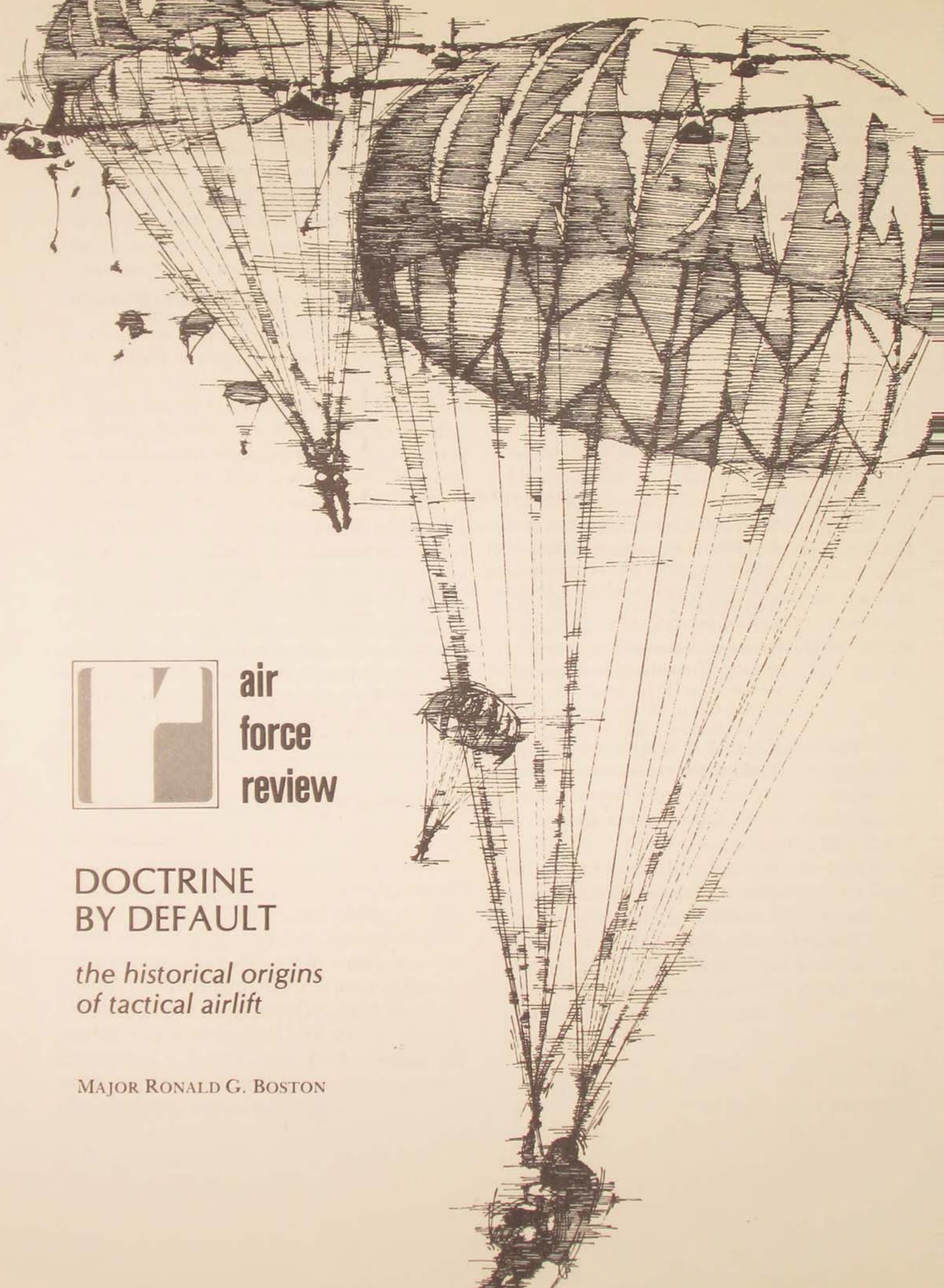
DOCTRINE
BY DEFAULT

*the historical origins
of tactical airlift*

Major Ronald G. Boston

MODERN tactical airlift traces its origins to troop carrier units organized by the Army Air Forces (USAAF) during World War II. These units were created to carry airborne forces into combat, but they soon became a versatile theater airlift force to meet the U.S. Army's growing demands for rapid logistics support. Today, this airlift force is a joint service resource that conducts airborne operations, aerial resupply, logistics transports, aeromedical evacuation, and numerous other tasks assigned by the theater commander. Its doctrine applies the principles of flexibility and responsiveness inherent in all forms of air power to meet airlift needs within a theater of operations.

The driving force behind tactical airlift has always been the Army's need for battlefield mobility, and the lessons of combat provided the basis for tactics and doctrine that emerged with the growth of airlift forces. At the start of World War II, doctrine comparable to the well-developed theories for bombardment aviation was simply nonexistent. Air Corps preoccupation with strategic air power left tactical airlift to its own devices and to the demands of Army ground commanders. As a result, doctrine for tactical airlift developed more by default than by the efforts of foresighted airmen.

Doctrine developed as experience revealed the capabilities and limitations of tactical airlift forces. Lieutenant General James Gavin, former commander of the 82d Airborne Division, notes that in 1941 considerable debate focused on whether three aircraft could drop paratroops in close formation.[1] Yet his division was part of the 17,000 troops and equipment deposited on the east bank of the Rhine River in March 1945 as the Allies opened their final assault on the heart of Germany. For 2 hours and 37 minutes, a train of troop carriers 240 miles long—1595 aircraft and 1347 towed gliders—filled the sky over the gently rolling terrain north of the German town of Wesel.

During those war years, troop carrier leaders wrestled with and perfected the techniques of mass airborne operations, though not without disastrous failures along the way. By the end of the war, the highly accurate, mass daylight delivery of airborne forces was firmly established as doctrine. At the same time and to the dismay of troop carrier leaders, the requirement for logistics transport increasingly diverted troop carrier resources from their primary task of planning and conducting airborne operations. Control of tactical airlift had passed from airmen to theater commanders. The conflicts in Korea and Vietnam led to further refinements in doctrine as once-secondary airlift support roles rose to a level approaching airborne operations, and centralized theater control became the key to flexibility and responsiveness. Thus, our current doctrine is the product of four decades of experience in organizing and employing tactical airlift forces.

Early Troop Carrier Organization

The concept of parachuting troops into combat dates back to World War I. General Billy Mitchell had prepared to drop elements of the American 1st Division behind German lines to seize the town of Metz, but the armistice stopped him from testing his idea. He later demonstrated the concept by dropping a group of fully armed troops at Kelly Field, Texas. But more dramatic uses for military aviation in strategic bombardment eclipsed interest in air transport during the years prior to World War II. The few transport aircraft purchased by the Air Corps were intended for logistical support of air combat units.

The invasions of Holland and Crete by German airborne forces in 1940 sparked renewed American interest in the use of paratroops. Adhering closely to the doctrine of the Air Corps Tactical School for employing all air power, General Henry "Hap" Arnold and other air power enthusiasts began advocating deep penetrations by airborne forces to strike the enemy's strategic nerve centers. Although the Army Air Forces never possessed the resources for such an operation, Arnold pushed throughout the war for a deep strategic insertion of airborne forces. The absence of doctrine for tactical airlift was

evident in 1941, when he cautioned against too close an association with the Army: "Aviation will be frittered away on trivial assignments in the transport of foot troops when it should be engaged on other and more important missions."[2]

The Army responded to the German example with the creation of a parachute training school at Fort Benning, Georgia, in 1940. USAAF transport resources of slightly more than 100 aircraft were strained to support Army training requirements. In the absence of any development on a military transport, the Army was fortunate in that the civilian DC-3 airliner could be readily adapted for both logistics and troop carrier roles. Deliveries of new transports were slow, however, since the production of combat aircraft took priority. The USAAF received the first DC-3 (designated the C-47) in September 1941 and owned 500 of these aircraft by the following summer; production reached 100 per month by mid-1943. With a top speed of 150 miles per hour and a payload of 3 tons or 18 paratroopers, it had limited capabilities, but with sufficient numbers and organization, it met many unforeseen demands for troop carriers during the years ahead.

In March 1942, the Army consolidated its paratroop units into an airborne command, and in response to demands for better airlift support, General Arnold established the Air Transport Command the following month "to organize and train Air Transport units for all forms of Air Transport with special emphasis on the conduct of operations involving the air movement of airborne troops, glider infantry and parachute troops."[3] In June 1942, the command was redesignated the Troop Carrier Command in what was a landmark in airlift doctrine: troop carrier forces were dedicated as theater resources responsible primarily for airborne operations, but they were also tasked with logistics support within a theater of operations. The same order transformed the old Air Ferrying Command into a new Air Transport Command responsible for air logistics between theaters—the predecessor

of the Military Air Transport Service and, later, the Military Airlift Command.[4] This division of airlift continued for three decades and gave tactical airlift the freedom necessary to develop its doctrine as a distinct arm of air power.

The creation of an airlift command charged with conducting airborne operations provided a focus for joint planning. Troop carrier and Army representatives formed the Airborne Operations Board to develop standard altitudes, airspeeds, and in-flight procedures for troop drops, but it gave little thought to planning or executing large airborne operations. Field Manual (FM) 31-30, *Tactics and Techniques for Airborne Troops*, published in May 1942, envisioned only small-scale operations to neutralize key objectives or to capture airstrips for landing reinforcements.[5]

When troop carriers went into combat in North Africa in November 1942, operations generally followed FM 31-30 as loosely assembled groups of 20 to 40 aircraft deployed paratroop units to seize airfields in the path of Allied ground forces. These operations met little or no resistance until the final troop drop of the North African campaign. In that operation, 530 paratroops readily seized two lightly defended airfields behind German lines near Tunis, but shortly thereafter, German fighter aircraft and tanks decimated the small, lightly armed force. Future operations would stress the need for greater concentrations of troops and more firepower.[6]

The Invasion of Sicily

Troop carrier units received their first test under fire in operations over Sicily in July 1943. Allied plans called for a predawn drop of British and American airborne units to block access routes to beaches lest German reserves interfere with amphibious landings on the southeastern coast of the island. Although darkness would handicap the units in their efforts to assemble on the ground, it was deemed necessary to preclude interception by enemy aircraft. Newly arrived American Waco gliders would fly in the heavy

equipment and artillery needed to survive until ground forces could move up from the beaches.

With neither prior experience nor a joint command or planning organization to guide this first large-scale assault, representatives of the troop carrier units and the 82d Airborne Division met to devise tactics most likely to concentrate the troops on the ground in platoon and company order. They agreed on tight V-shaped formations of 9 or 12 aircraft spaced one and one-half minutes apart to cross over the drop zone in the shortest possible time. Gliders would be towed two abreast in columns to their release points. Heavy demands for air logistic support prior to the invasion allowed the aircrews little time to practice these new tactics but troop carrier leaders were optimistic about performing what they considered simple noncombat maneuvers.[7]

Their optimism was ill-founded. Early on 10 July, the first mission of 226 C-47s carrying the 82d Airborne Division departed on a complicated low-level route to avoid overflying Allied convoys. All lights on the aircraft were extinguished with the exception of tiny position lights visible only within the formation; a quarter moon offered little light, and salt spray on the windscreens further reduced visibility. As a result, stragglers fell hopelessly behind since they could not see the dim formation lights to regain their proper positions. An unexpected 35-mile-per-hour crosswind caused inexperienced crews to make landfall far off course. Dust and smoke from the preinvasion bombardment obscured the landmarks and drop zones and added to the confusion that left paratroopers scattered for 50 miles along the coast. A British glider infantry force towed by American troop carriers fared no better. Many of the British pilots, who had received an average of only four and one-half hours of training in the American Wacos released too soon because of darkness and unexpectedly strong headwinds. Only 12 of 137 gliders reached their landing zones, and 65 plunged into the sea with heavy loss of lives.

Two nights later, disaster befell troop carriers

attempting a seemingly routine drop of reinforcements in friendly territory along the coast. As they approached the drop area, trigger-happy gunners, who had been under air attack all day, suddenly began firing from the shore and from ships at anchor and immediately shot down six fully loaded C-47s. Pilots broke formation, dumped their troops along the beach, and fled the scene. Of 237 aircraft, 23 were lost and 37 were heavily damaged. One wounded crewman noted wryly that he was "pleased our troops could shoot so well."[8] On 14 July, Allied ships again fired on troop carriers transporting British paratroopers for an assault on the east coast near Syracuse; the formations scattered after several aircraft were destroyed and others were damaged.

The troop carrier operation at Sicily was a failure since scattered troops were unable to accomplish their assignments. Although General Omar N. Bradley noted that the operation reaped a secondary benefit in causing the enemy to overestimate Allied strength and panic,[9] Army leaders in Washington were ready to scrap the idea of mass airborne assaults. Only the concerted efforts of General Matthew B. Ridgway of the 82d Airborne Division and other senior officers prevented resumption of small-scale employments described in FM 31-30. General Dwight D. Eisenhower, the Supreme Allied Commander in Europe, ordered a full investigation that pinpointed the need for improved troop carrier proficiency, more effective air-ground coordination, and better methods of identifying drop zones.[10] The problem had been one of delivery rather than the concept of mass employment of airborne forces; the result was further training for troop carrier units.

Two months later, Troop Carrier Command gave a better performance in minor operations supporting the invasion of Italy. Although logistics flying again competed with training, troop carrier and airborne units received a week of joint training in North Africa. A major innovation was the development of small pathfinder teams equipped with marker panels, lights, and

a new radar beacon known as Eureka to precede the main formation and mark the drop zones. The lead aircraft in the formations carried interrogator sets called Rebecca to receive signals from Eureka. The successful drops in Italy helped restore the Army's confidence in troop carrier units and the airborne concept.

In the absence of well-developed doctrine for airborne warfare, troop carrier operations in the Mediterranean had been experiments in methods of delivering the Army's airborne forces. The operation over Sicily had been planned by staff officers with no troop carrier or airborne experience, and troop carrier leaders quietly acquiesced because they either had no better proposal or misunderstood the difficulties involved. Experiences in Sicily emphasized the need for a joint airborne planning headquarters subordinate to an Air Force commander and responsible for the entire operation until the troops reached the ground. Obviously, the key to airborne warfare lay in concentrating troops and firepower on the ground, a function of thorough planning and proficient troop carriers. These lessons became the doctrinal basis for airborne operations in the invasion of Europe.[11]

The Normandy Invasion

Army and USAAF leaders differed on the best use of airborne forces in the invasion of France. Training Circular No. 113 published by the Army in October 1943 stressed tactical use of airborne and troop carrier units in conjunction with ground forces. General Arnold, on the other hand, convinced Army Chief of Staff George C. Marshall to recommend a strategic airborne thrust deep into France to sever vital transportation links near Paris. General Eisenhower dismissed this suggestion, however, because he knew full well that he could not spare such a force and that it could not withstand heavy German firepower.[12]

Eisenhower's staff prepared plans for three airborne divisions to secure bridges and road junctions against German reserves that might oppose amphibious landings on the Normandy coast. Fear of enemy interceptors and ground fire again dictated a night drop followed by glider landings of troops, artillery, and supplies. Additional glider missions would arrive later on D-day and the day following. So critical was the airborne task of isolating the beachhead that Allied leaders were willing to accept 50 percent casualties during the airborne assault.[13]

American troop carrier units in England were organized as the Ninth Troop Carrier Command under the Ninth Air Force, which had been designated the tactical theater air force. British and American theater forces were joined in the Allied Expeditionary Air Force commanded by British Air Marshal Trafford Leigh-Mallory. Coordination between troop carrier and airborne staffs focused in a joint planning committee also supervised by Leigh-Mallory. Joint practice began in March 1944, and pathfinder aircrews and ground teams received intensive training in navigating and establishing drop zones. In May, a dress rehearsal for 850 aircraft, 110 gliders, and 8400 troops led jubilant commanders to anticipate a 90 percent reliability for the airdrop and glider landings.[14]
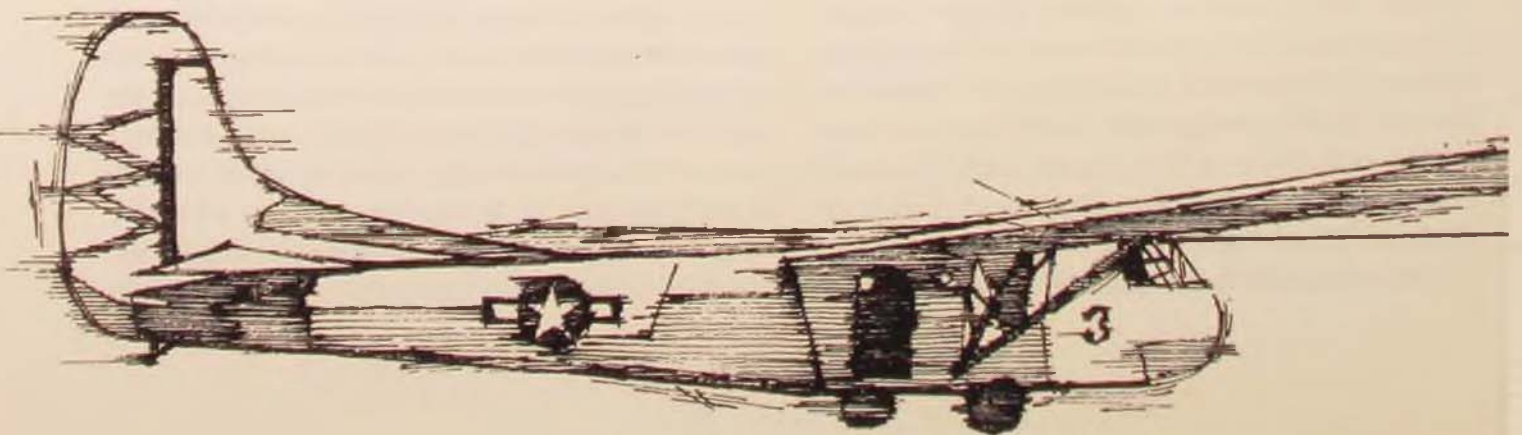
The months of planning and training culminated on 6 June as 821 C-47s carrying the 82d and 101st Airborne divisions assembled in formations over their English bases and departed for France. Aircraft and gliders marked with black-and-white stripes on the fuselage and wings for identification by friendly surface forces flew in absolute radio silence. Pathfinders preceded the main force by 30 minutes to mark six drop zones around the town of Ste. Mère-Eglise. All went well until the force arrived over the French coast and the lead section plunged into an unexpected cloud bank. Unwilling to break radio silence and warn subsequent groups, the formation began to break apart as section after section disappeared into the clouds. Three out of five crews had no navigator, and many stragglers could not find the drop zones through the patchy clouds. Although the Rebecca receiver had become standard equipment on all aircraft, it was inaccurate when it came near the ground transmitter, and enemy activity prevented several pathfinder teams from setting up lights and beacons on the drop zone. Of the 13,000 American troops dropped, less than 10 percent landed in their drop zones, but 60 percent landed within two miles of their zones. Despite great difficulties in assembling among numerous hedgerows in the dark, the troops suffered far fewer casualties than had been expected and were generally successful in seizing their objectives.[15]

The glider formations experienced similar difficulties. The two groups scheduled to arrive before dawn encountered the same weather, and clouds, darkness, and numerous landing accidents rendered the initial glider force only 50 percent effective in delivering its loads. Subsequent waves arrived during daylight on 6 and 7 June and achieved 90 percent effectiveness in reaching their assigned landing zones. Despite extensive damage to the gliders on landing, their cargo of jeeps, antitank guns, and ammunition arrived in serviceable condition. Thereafter, all troop drops and glider operations were scheduled for daylight hours because increased accuracy greatly offset the hazards of enemy aircraft and ground fire.[16]

Demands for airlift mushroomed after D-day. On 7 June, troop carriers began large-scale, preplanned resupply drops to the airborne forces in contact with the enemy. But each C-47 was capable of airdropping only one ton of cargo in small bundles pushed out the troop door or released from shackles under the fuselage, and poor aircrew techniques further limited recovery of supplies. Additional drops of supplies were made as necessary during the next six days. After the Allies broke out of the Normandy area, troop carriers were tasked to fly supplies, especially gasoline, into captured airfields and sod or dirt airstrips in the wake of advancing armies. Casualties were often evacuated on return flights as this effort swelled to 600 aircraft per day. Army commanders screamed for a greater airlift effort, while troop carrier leaders complained that they were distracted from their primary mission of maintaining readiness for an airborne operation.[17] General Eisenhower set priorities in favor of supply, and, as a result, only a few troop carriers were released for training.

Thus, a doctrine for total theater airlift emerged with the Normandy invasion. Troop carrier resources were engaged in every conceivable airlift task—airdrop, resupply, logistics transport, and aeromedical evacuation—dictated by needs within the theater. And despite some errors and shortcomings, the operation firmly established the methodology for more ambitious airborne assaults.[18]

The Air Invasion of Holland

Field Marshal Bernard Montgomery's plan to outflank German resistance by leaping the Rhine River in eastern Holland gave Air Force leaders an opportunity to demonstrate a more independent role for air power. The plan called for heavy Allied air attacks on enemy defenses followed by airborne assaults to capture key river bridges. The British 1st Airborne Division was assigned the primary objective of capturing the bridge over the Rhine at Arnhem, and the American 101st and 82d divisions were tasked with seizing bridges at Nijmegen and Eindhoven along the route leading to Arnhem 60 miles into enemy territory. Troop carriers would supply and reinforce the three airborne divisions until Montgomery's 2nd Army could push through to relieve them. Army Air Force leaders eagerly welcomed this opportunity to use airborne forces in a decisive role.[19]

To streamline the planning and execution of airborne operations, British and American airborne and troop carrier units were consolidated in August into the 1st Allied Airborne Army commanded by USAAF Lieutenant General Lewis H. Brereton, but the limiting factor in Holland was the availability of troop carrier airlift. Three consecutive days of troop drops and glider missions were needed to deliver the entire airborne force. Their plan made no allowances for weather or other delays that might leave understrength units dangerously exposed on the ground.

The performance of the troop carriers was a model of perfection. Allied bombers had attacked enemy antiaircraft defenses for several days, and 1544 transports and 491 gliders met little opposition as they delivered the first contingent on 17 September. The pathfinders' work had been precise, and troops and gliders landed with almost perfect accuracy: they lost only 35 aircraft and 13 gliders to enemy flak. Although fog and rain delayed takeoffs until noon the next day, a force of similar size repeated the successes of the first day. But the element of surprise was lost, and the enemy began to concentrate his defenses.

Understrength airborne forces on the ground came under increasingly heavy attack, and the operation fell even farther behind schedule on the third day, when troop carriers failed to reach their objective because of bad weather. Gliders proved especially unmanageable in turbulent, instrument-flight conditions, and many broke loose from their tow planes. Poor weather brought operations to a standstill on days four through six, and sporadic attempts to drop supplies resulted in heavy losses with little success. And Montgomery's 2nd Army had been unable to reach Arnhem to relieve the British airborne division. The weather finally lifted on the seventh day, but further efforts at reinforcement were to no avail. Remnants of that decimated unit withdrew the next day.

Despite the successes of the 82d and 101st divisions in securing their bridgeheads, the overall operation ended in failure. Although troop carrier crews performed admirably, air power could not sustain the airborne force. In failing to allow for bad weather, the decision to spread the operation over three days unwittingly exceeded the capabilities of the troop carriers and forfeited the element of surprise before ground forces were prepared to withstand enemy counteractions. General Brereton wrote to Arnold that the error stemmed from dependence on the linkup with the 2nd Army and even suggested that an independent airlift operation into captured airheads would have been more successful.[20] But the need to defend fixed airheads would only have complicated a deteriorating situation on the ground. Further airborne operations would be less bold.

Final Battles of World War II

As Allied armies advanced in Europe, their logistic needs forced troop carriers more and more into the role of theater airlift and steadily eroded General Brereton's concept of the 1st Allied Airborne Army as a "strategic reserve

force" to be employed only by the Allied High Command.[21] The versatility of airlift was too great for it to sit idle between airborne operations. Christmas of 1944 found an American army surrounded in the Belgian town of Bastogne during the Battle of the Bulge. Inclement weather precluded close air support of the beleaguered force, but C-47s made 1000 airdrops of food and ammunition. And troop carrier pilots successfully landed 48 of 61 gliders attempting to deliver medical supplies and reinforcements. This mission was a precursor of far more sophisticated resupply operations in Korea and Vietnam.

Following the Battle of the Bulge, the Allied High Command released much of the airlift force for joint training in preparation for the final push into Germany. Less experienced units and units equipped with the new C-46 transport received the bulk of the training that preceded the airborne assault across the Rhine near Wesel in March 1945. In this final and most complex operation undertaken in a single day, aircrews of the 1st Allied Airborne Army demonstrated the great strides that had been made in troop carrier tactics over the course of the war.

The elements of successful airborne warfare were proven concepts: surprise, air superiority, and, failing all else, rapid delivery of the force in tight concentration at any cost. One-third of the transports and more than half of the gliders over Wesel were damaged by intense antiaircraft fire. General Gavin underscored a disquieting tendency of the new C-46 to burst into flames when he recalled a sky full of burning troop carriers,[22] but less than 5 percent of the force was destroyed. The formations maintained their ranks, made highly accurate deliveries, and achieved overwhelming success in the operation. The ragged little formations over North Africa and utter confusion in Sicily had become things of the past.

The lessons of combat in every theater of the war underscored the role of troop carriers as a versatile airlift force. American Air Commandos in Burma made successful glider assaults into jungle clearings, airdropped supplies to British army units, and operated from hastily prepared airstrips deep in Japanese territory. Small-scale paratroop operations against lightly contested objectives in the Southwest Pacific demonstrated the capability of airborne forces to take objectives inaccessible to ground troops. The unorthodox paratroop assault on tiny Corregidor Island in February 1945 demonstrated the flexibility of properly employed airborne forces. Although General Brereton and other leaders of the troop carrier force continued to advocate huge fleets of transports dedicated to strategic airborne divisions,[23] the war had led to the broader concept of versatile, responsive theater airlift. True to General Arnold's fears in 1941, the Army had come to expect and demand air transport to enhance its tactical mobility, and, by 1945, "troop carrrier" had already become a misnomer.

The Postwar Era

Close identification of the troop carriers with conventional ground forces almost led to their demise in the postwar era of hard budget cuts and nuclear strategy. The Army advocated larger and more sophisticated aircraft to support the decisive (strategic) airborne role proposed by Generals Arnold and Brereton throughout the war. General Gavin, the most prolific postwar spokesman for airborne warfare, wrote that flexible airborne armies could avoid the risks of nuclear attack on the battlefield by quickly converging on objectives, neutralizing them, and dispersing.[24] The Army pushed for a joint airborne forces command organized along the lines of the 1st Allied Airborne Army, but the USAAF was more interested in gaining its independence from the Army.

In its bid for autonomy, the Air Force was quick to eschew any ties that conflicted with the independent and decisive role of strategic air power. Lieutenant General Lauris Norstad, Chief of Air Staff planning for postwar reorganization, remarked in 1945: "Although the con-

ception of a tactical air force was one of the greatest developments of this war, it is now as old-fashioned as the Maginot line."[25] Army and naval forces and their supporting aviation had suddenly become obsolete. No troop carrier organization higher than a group existed after 1946, and existing airlift forces were viewed as necessary only to support deployments of strategic air units. Few wartime troop carrier leaders remained in service to advocate their mission, and the Air Transport Command almost won a bid to incorporate the remaining troop carrier units into a single transport organization. In a surprising decision for the times, General Arnold opted to retain the troop carriers as part of a small tactical air command.[26]

Ardent Army support of the airborne concept and the appearance of modern troop carrier aircraft kept troop carrier units alive. The shortcomings of the C-47 prompted work in 1942 on an aircraft specifically designed for airdrop, and, in 1945, the first C-82 Packet—forerunner of the C-119 Flying Boxcar—entered the airlift force. It revolutionized troop carrier airlift with its capability of airdropping large pieces of equipment and supplies formerly limited to glider operations. The Air Force reluctantly continued development of military cargo gliders only at Army insistence.[27]

The creation of an independent Air Force in 1947 permanently severed any organic ties between the troop carriers and airborne units. The role of troop carrier units in theater airlift and the distinction between theater and strategic airlift became blurred, and the overlapping capabilities of the two branches of airlift added to the confusion. During the Berlin Airlift of 1948-49, troop carrier units augmented the newly formed Military Air Transport Service in a classic example of a round-the-clock strategic flow of supplies. Interest in troop carrier activities waned as airlift came to be seen in terms of ton-miles hauled and firm scheduling—"the doctrinal legacy of the Berlin Airlift."[28] The next conflict, however, rekindled interest in responsive theater airlift.

the Korean War

The outbreak of hostilities in Korea compelled the Air Force to respond to the unpredictable and diverse airlift needs of the entire theater, including the needs of its own deployed tactical air units. Army leaders sought a joint troop carrier-airborne organization similar to the wartime organization in Europe to support their needs. But the Air Force had too few transports to dedicate any to a single user. Instead, it created a single airlift force, the Far East Air Force Combat Cargo Command (later, the 315th Air Division) headed by Major General William H. Tunner, who had directed the Berlin Airlift and World War II operations over the "Hump" into China. General Tunner assembled the troop carrier units of the Far East Air Force as a "composite all-purpose fleet and let the tactical situation dictate the employment of the aircraft for a particular period."[29] He relied on techniques adopted from the Berlin Airlift for aerial port operations, scheduled maintenance, and command and control of a fleet that averaged only 210 aircraft.

Cargo Command allocated airlift based on priorities set by the joint theater command in an operation that became known as "Flexible Air Transport" designed to provide airlift for all users. General Tunner maintained a contingency plan for conducting airborne operations on 72 hours' notice, but only two troop drops were made in Korea.[30] Both drops were essentially reenactments of World War II operations designed to cut off retreating Communist forces in contact with United Nations ground forces. Ideal conditions and total lack of opposition offset any shortcomings in aircrew proficiency. Flexible air transport proved far more significant in resupplying troops along the ever-fluid front. When Chinese "volunteers" pushed United Nations troops out of North Korea in 1950, retreating elements of the 1st Marine Division and 7th Infantry were totally dependent on airlift. C-46s and C-119s airdropped supplies to isolated units, and C-47s operated into dirt- and snow-covered airstrips to move up reinforce-

ments and evacuate the wounded. For their efforts, troop carriers received the first distinguished unit citations awarded to any Air Force units in Korea.

The Korean experience led to a refinement of theater airlift doctrine in the sense that it equated logistics resupply and aeromedical evacuation with airborne operations. The concept of theater control was further enhanced by assigning all airlift to a central agent responsible to the theater commander. No longer could the Air Force afford the luxury of airlift organically assigned to airborne units and not used to maximum advantage. As part of its first effort to write doctrine since gaining independence, the Air Force incorporated its Korean airlift experiences in Air Force Manual (AFM)1-9, *Theater Airlift Doctrine*, published on 1 July 1954.

Korea also demonstrated the need for more efficient aircraft to operate into forward airstrips and even unprepared terrain near front-line troops. The Army began experimenting with helicopters to provide its own organic battlefield mobility, and this challenge to the Air Force's central role in air power prompted it to maintain an active, albeit small, interest in theater airlift after the war. Success with a powered version of the rugged, all-metal CG-20 assault glider in the late 1940s offered the Air Force a practical way to compete. This hybrid became the C-123 Provider, an assault transport capable of delivering troops and cargo to short makeshift runways in a combat zone.[31] Theater airlift thus became better able to fulfill its doctrinal commitments for logistics resupply to the battlefield and moved into the hotly contested role of shuttling troops between points within a battlefield. Entry of the four-engine C-130 Hercules into the airlift fleet in 1956 gave theater airlift true versatility with greater speed, larger payloads, and intertheater range.

The Air Force returned full scale to the concept of theater airlift under the doctrine of "flexible response" in the 1960s. The Army had a force of 5500 aircraft of various types by 1960 and seriously challenged the Air Force for the air role

over the battlefield. In 1962, the Army won approval to develop its "airmobile" concept for an entire division deployed and supported in battle by organic Army aviation. The Air Force responded by improving the capability of the C-130 for shortfield landings and pinpoint aerial delivery of cargo with low-level methods of extraction. The Air Force rewrote its basic doctrine in 1964 and, for the first time, specifically differentiated between strategic and tactical airlift and emphasized the theater role of tactical airlift.[32] In a series of joint exercises, each service tried to demonstrate primacy in the role of battlefield mobility. Compatibility between centrally controlled theater airlift and the Army's organic airlift resources waited in time-honored fashion for the demands of combat.[33]

the Vietnam conflict

The conflict in Vietnam led to further refinements in the concept of centrally managed theater airlift and resolved the Army-Air Force controversy over the division of labor in battlefield mobility. Some of the first American units deployed to Vietnam were U.S. Air Force transports, which comprised the Southeast Asia Airlift System under the United States Military Assistance Command, Vietnam. In 1965, the newly arrived 1st Cavalry Division (Airmobile) rapidly exceeded its organic resupply capability during large-scale operations in the Central Highlands. The Army became dependent on the C-123s and C-130s for a steady stream of fuel and supplies to the division's base camps located adjacent to small, typically unsurfaced airstrips. From these bases, Army helicopters lifted the supplies to troops in contact with hostile forces. This pattern of "wholesale" distribution allowed both services to optimize their resources, and the Air Force transports performed numerous other duties when they were not supporting Army tactical operations. In addition to logistical resupply, the Army came to rely on theater airlift to move entire units between forward

bases more than 50 miles distant and in other situations dictated by lack of surface transport or security.[34]

The two services cemented this new relationship in 1967 with publication of AFM 2-50/FM 100-27, *US Army/US Air Force Doctrine for Tactical Airlift Operations*. The Army recognized the Air Force's preeminence in fixed-wing transport and relinquished its C-7 Caribou aircraft, and the Air Force withdrew from the helicopter airlift role in favor of the Army.[35] In the same year, the Air Force redesignated its troop carrier squadrons and wings as "tactical airlift" units to reflect the broader airlift role that had evolved since 1942, when troop carrier units were created to transport paratroops.

Airborne operations were only a small part of the tactical airlift mission in Vietnam. The single paratroop drop of the war occurred in 1967 to augment an Army helicopter (airmobile) assault along the Cambodian border. A much larger airdrop task in Vietnam was the aerial resupply of isolated outposts, such as Khe Sanh in 1968 and An Loc in 1972. All modes of delivery aimed at providing tactical mobility within the theater. In the insurgent-plagued environment of Vietnam, the lack of secure rear areas and surface transportation made tactical airlift a critical element of American ability to operate outside the major cities and inland from coastal ports.[36]

The Vietnam experience led to a formalized, efficient working relationship between tactical airlift and organic Army air transportation. AFM 2-50/FM 100-27 placed tactical airlift into the Tactical Air Control System to which the Army forwards all its requests for air support. Under this system, the Airlift Control Center—known as "Hilda" during the Vietnam years—directs airlift operations for the entire theater. This arrangement for responsive, centrally controlled theater airlift to the very edge of the battlefield is current Air Force doctrine.

Modern Theater Airlift

The consolidation of all airlift resources under the Military Airlift Command (MAC) in 1974 represents the final step in the evolution of tactical airlift, and, as such, it ends the airlift dichotomy created in 1942. The cry for greater efficiency and economy in the post-Vietnam era propelled tactical airlift further in the direction of centralized control. But tactical airlift did not become smothered in a global logistics system, for, at no other time in its history, has tactical (theater) airlift been so firmly established with an accepted doctrine. Although the Military Airlift Command became a specified command in 1977, tactical airlift remains a theater resource responsible directly to the joint commander. Control is exercised through a commander of airlift forces who directs all MAC forces committed to a theater.[37] The issue of overlapping capabilities and equipment once blurred the distinction between tactical and strategic airlift forces, but, today, it is a benefit in the sense that each force can augment the other without redundancy in effort or command structures. Once tactical airlift had achieved compatibility with the Army on the battlefield, the final act of consolidation was a simple streamlining of the Air Force logistics network. In the course of three wars, tactical airlift has emerged as the vital link between the strategic flow of supplies and the user in combat. No other form of airlift has experience in this role.

Tactical airlift began with the creation of troop carrier forces to deliver the Army's airborne units, but it quickly assumed a variety of transport roles commensurate with its versatility in meeting the Army's needs for battlefield mobility. The doctrine for this theater airlift came after the fact on the basis of lessons learned in combat. Its essentials have always been flexibility and responsiveness to the needs of theater commanders. Better equipment and tactics have

greatly enhanced the capabilities of tactical airlift since the era of the C-47, but the prerequisites for its successful employment are the same.

EXAMINATION of the historical role of tactical airlift reveals constraints and limitations that very much affect future operations. The air superiority so vital to Allied troop carrier formations in Europe and the Southwest Pacific was equally vital to every airlift operation in Korea and Vietnam. The same is true of the need for surprise and close air support to neutralize enemy ground defenses and allow slow, unarmed transports to reach their objectives. Sophisticated enemy air and ground defenses may very well preclude future large airborne operations, even though conditions may favor small-scale troop insertions and resupply operations that make enemy detection and interception more difficult. However, an airborne assault against an unsophisticated enemy in a limited war scenario remains a powerful weapon. To this end, the Army retains one airborne division, and MAC units maintain proficiency in methods to airdrop brigade-size forces. The tactics have changed since World War II to match changes on the battlefield, but the doctrine that evolved remains intact.

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Notes

1. James M. Gavin, *Airborne Warfare* (Washington, 1947), p. 84.
2. H. H. Arnold and Ira C. Eaker, *Winged Warfare* (New York, 1941), pp. 120-23; H. H. Arnold, *Global Mission* (New York, 1949), p. 521.
3. Cited in USAF Historical Studies: No. 74, *Airborne Missions in the Mediterranean, 1942-1945* (Washington: USAF Historical Division, September 1955), p. 3.
4. Arnold, *Global Mission*, p. 294.
5. Ernest F. Fisher, "Evolution of U.S. Airborne Doctrine," *Military Review*, May 1966, p. 71.
6. *Airborne Missions in the Mediterranean, 1942-1945*, pp. 18-19.
7. Ibid., p. 28.
8. Maxwell D. Taylor, *Swords and Plowshares* (New York, 1972), p. 50.
9. Omar N. Bradley, *A Soldier's Story* (New York, 1951), p. 127.
10. *Airborne Missions in the Mediterranean, 1942-1945*, p. 54; Taylor, p. 52; Wesley F. Craven and James L. Cate, editors, *The Army Air Forces in World War II*, Vol. II (Chicago, 1951), p. 456.
11. *Airborne Missions in the Mediterranean, 1942-1945*, pp. 111-12; Craven and Cate, p. 456.
12. Fisher, p. 72.
13. Samuel T. Moore, "Tactical Employment in the U.S. Army of Transport Aircraft and Gliders in World War II" (Typewritten, Albert F. Simpson Historical Research Center, File No. 546.04, 1941-1945, Maxwell AFB, Alabama, n.d.), Chapter 4, p. 8.
14. USAF Historical Studies: No. 97, *Airborne Operations in World War II, European Theater* (Washington: USAF Historical Division, September 1956), p. 22.
15. Ibid., p. 59.
16. "A Review of Airborne Operations," prepared by the Evaluation Staff of the Air War College (Mimeographed, Air University, Maxwell AFB, Alabama, 1954), pp. 45, 50.
17. Lewis H. Brereton, *The Brereton Diaries: The War in the Air in the Pacific, Middle East and Europe, 3 October 1941—8 May 1945* (New York, 1946), p. 339; *Airborne Operations in World War II, European Theater*, p. 86.
18. The methodology was validated in a daylight airborne assault during the Allied invasion of southern France in August 1944. See "A Review of Airborne Operations," pp. 51-56.
19. *Airborne Assault on Holland, An Interim Report*, Wings at War Series, No. 4 (Washington: Hq Army Air Forces, n.d.), pp. 1-2.
20. Brereton, p. 365.
21. Ibid., p. 339.
22. Gavin, p. 135.
23. See John C. Warren, "Troop Carrier Aviation in the USAF, 1945-1955" (Typewritten draft, Albert F. Simpson Historical Research Center, File No. 106-134, 1945-1955, Maxwell AFB, Alabama, n.d.), pp. 8-10.
24. Gavin, p. 140.
25. Quoted in Perry M. Smith, *The Air Force Plans for Peace, 1943-1945* (Baltimore and London: Johns Hopkins Press, 1970), p. 100.
26. Ibid., p. 99; Jimmie L. Jay, "Evolution of Airlift Doctrine" (Unpublished Air War College thesis, Air University, March 1977), pp. 12-13; Warren, p. 35; Robert F. Futrell, *Ideas, Concepts, Doctrine: A History of Basic Thinking in the United States Air Force, 1907-1964* (Maxwell AFB, Alabama: Air University, 1974), pp. 93-94.
27. Warren, p. 31.
28. Jay, p. 19.
29. *Flexible Air Transport*, Headquarters 315th Air Division (Combat Cargo), 15 November 1951, p. 1.
30. Robert F. Futrell, *The United States Air Force in Korea, 1950-1953* (New York: Duell, Sloan, Pearce, 1961), p. 524.
31. Colonel Ray L. Bowers, "USAF Airlift and the Airmobility Idea in Vietnam," *Air University Review*, November-December 1974, p. 3.
32. See AFM 1-1, *Aerospace Doctrine—United States Air Force Basic Doctrine*, 14 August 1964, pp. 4-3, 5-2.
33. Bowers, p. 8.
34. Ibid., p. 13.
35. AFM 2-50/FM 100-27, *US Army/US Air Force Doctrine for Tactical Airlift Operations*, 1 January 1967, p. 2-2.
36. Lieutenant Colonel Horace E. Wood, Jr., "Airlift—A Balanced View," *Air University Review*, May-June 1972, p. 64.
37. See MACR 55-130, *Operations—C-130 Tactical Airlift Operations*, 10 October 1979, p. 2-1.
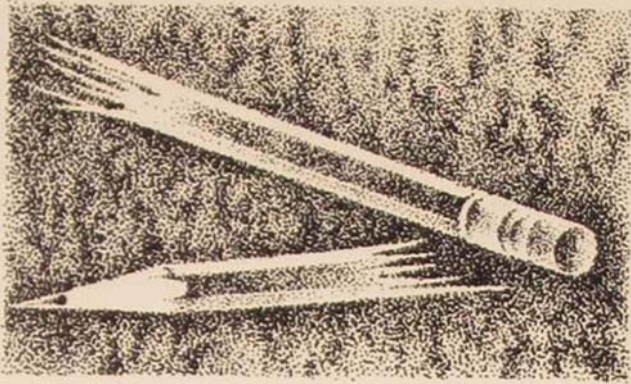
MANAGING STRESS IN THE AIR FORCE: AN OUNCE OF PREVENTION

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THE TYPICAL Air Force officer is effective at managing the various stresses he encounters in Air Force life or he would not be there. This does not mean that it is impossible to improve both health and performance by refining and improving stress management capabilities. In fact, we are continuing to learn new things as well as refining established practices and procedures in an effort to improve the ways in which individuals manage their stress to achieve high levels of performance and health. The purpose of this article is, first, to discuss what causes stress with particular attention given to unique sources of stress for Air Force personnel; second, we want to reinforce some of the healthful things you are already doing to cope with stress as well as suggest some supplemental and complementary activities that will add to your current capabilities.

What Is Stress?

Stress is the naturally occurring patterned experience that we all have in response to any demand placed on us. (See Figure 1.)[1] The stress response begins with the release of catecholamines (primarily adrenaline and noradrenaline) into the blood. These messengers stimulate the sympathetic nervous system and the endocrine system, resulting in the elevated physiological indicators shown in Figure 1. The extent to which these indicators rise depends on the number and level of demands that we are subject to as well as the variety of resources at our disposal to manage these demands.

As indicated in the figure, these demands come from a variety of duty and nonduty-related sources. Our resources for managing the demands are found both within ourselves and in our social support system. For example, the young lieutenant who must brief the base commander on the unit's operational readiness has the abilities, energy, and skills to meet this demand. He may need to get certain information from divisions, branches, or combat support groups to prepare his briefing. In doing so, he is drawing on his social support system, which is an important resource for him in meeting this briefing requirement.[2]

The responses to the demands we face include various behavioral, psychological, and physiological responses as well as the stress response. As Hans Selye points out, when we do not manage this experience well, we encounter distress, which has undesirable consequences such as depression (psychological), accident proneness (behavioral), and cardiovascular disease (physiological).[3] All stress does not necessarily become distress. The alternative to distress, which occurs when we manage stress in a healthy way, is called *eustress*. The desirable consequences of eustress include exhilaration (psychological), high performance levels (behavioral), and freedom from disease (physiological).

Unique Air Force Demands

Any occupation or career pattern will make demands that create stress for the individuals involved in them. The nature and source of these demands vary substantially by occupation and organization. The U.S. Navy has conducted some interesting research that identifies the sources of stress for shipboard personnel.[4] The demands of Air Force life are in many ways different from life in the other services, although there are some similarities. There are four sources of stress that we will focus on here: frequent transfers that Air Force personnel undergo, remote tours of duty, the up-or-out promotion system, and the supervisor and his work environment.

frequent transfers

According to the Military Personnel Center (MPC), an Air Force officer may expect a change of assignment on the average every three years. This frequency in change of assignment creates a double set of demands for the officer. On the one hand he must adjust to the change of duty assignment and reporting official while at the same time easing the adjustment for his wife and children. The transition may be especially demanding where family members must be uprooted from well-established work or school relationships.

If the timing and location of the transfer can be anticipated, then this will reduce the uncertainty for the officer and his family as well as the associated stress. It is often the experience of uncertainty and the unexpected which causes individuals high levels of stress. This stress is reduced when the individual can anticipate possible major life changes, such as a transfer.
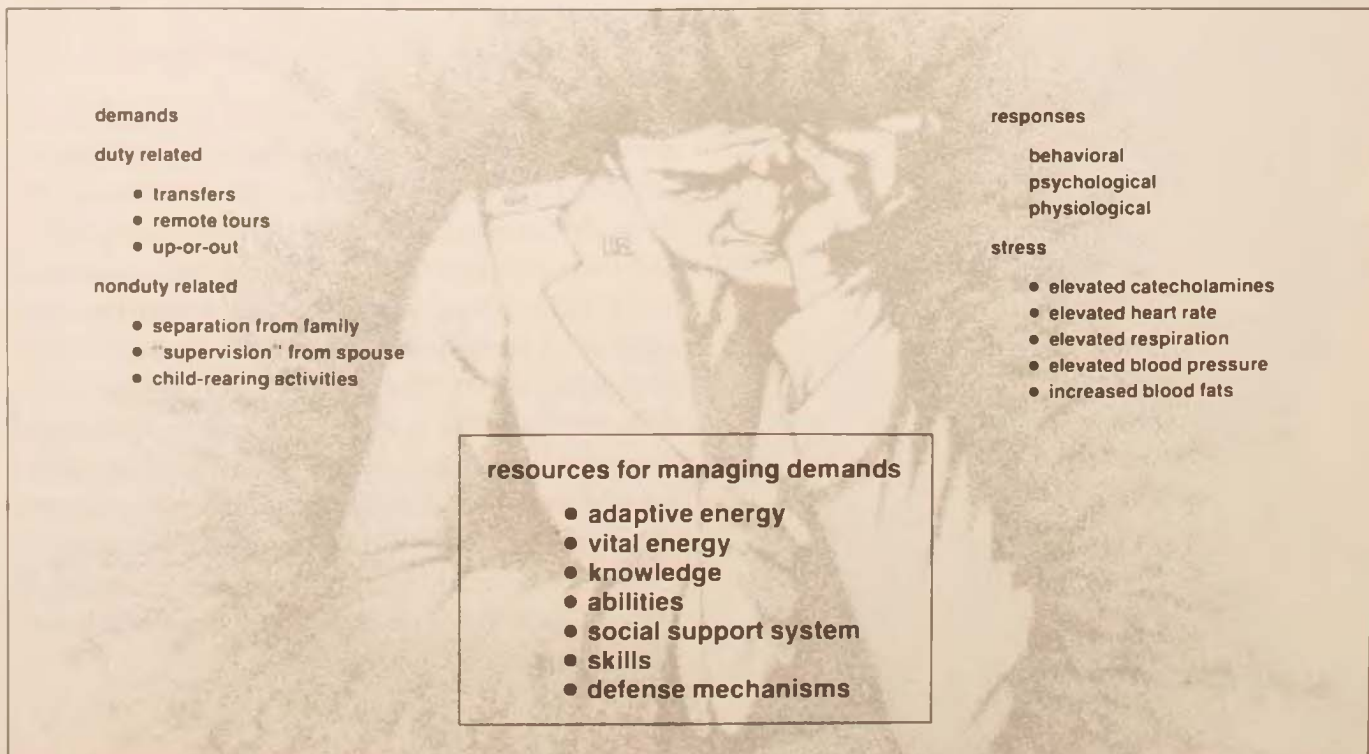
Another difficulty associated with a transfer is the disruption of the individual's social support system. Our social supports are one key resource for managing stress-related demands in life.[5] When our support systems are disrupted or reduced, this reduces the extent to which we may be buffered from the stress-related demands of life. Partly for this reason, Air Force personnel have generally evolved rather good mechanisms for providing social supports for transferred officers. Officers' clubs, officers' wives' clubs, base housing arrangements, and related support mechanisms begin replenishing lost social support from previous assignments. Although these mechanisms may be available and useful, each officer and his family must still deal with the stresses associated with the change.

the remote tours of duty

While the normal, accompanied changes of assignment may be stressful enough, the remote tours of duty provide several different demands that the officer and his family must deal with.

Figure 1. The natural experience of stress

demands

duty related

- transfers
- remote tours
- up-or-out

nonduty related

- separation from family
- "supervision" from spouse
- child-rearing activities

responses

behavioral
psychological
physiological

stress

- elevated catecholamines
- elevated heart rate
- elevated respiration
- elevated blood pressure
- increased blood fats

resources for managing demands

- **adaptive energy**
- **vital energy**
- **knowledge**
- **abilities**
- **social support system**
- **skills**
- **defense mechanisms**

The Military Personnel Center indicates that an officer may expect three of these 12-to-18-month tours in a twenty-year career. There are two aspects of these tours that make them stressful.

First, the officer is separated from his family. The family is one key source of social support for an individual, and its temporary loss leaves a gap in the individual's resource and defense base. Therefore, he is cast into the position of drawing more heavily on work-related support systems and developing nonwork-support based in the remote location. The associated stressor is the family's loss of his social support. They too must adjust to his loss and supplement their social supports during his period of absence.

One combat pilot's wife whom we know simply took herself and their two daughters and son back to her parents' home in Kansas while her husband was in the Far East on a remote tour. This manner of managing the stress of the separation was a healthy way of drawing on the social support available in the extended family. A related way of achieving this same objective would be to settle in an established area where the family could draw strength from other Air Force families.

The second stressful dimension of remote tours of duty is in dealing with the diversity, newness, and strangeness of a different culture. Each culture evolves its own unique patterns of behavior, customs, language, and ways of relating. It is very demanding to learn new ways and new modes of behavior in a new land. This may be either eustressful or distressful, in part depending on the officer's unique interests and characteristics. Some individuals find this adjustment process difficult and distressing while others enthusiastically enter into the new situation with one eye to learning and growing. Therefore, depending in part on how the new culture is approached, it may be a healthy source of stress or a difficult experience.

up-or-out!

The force structure that legally exists for the Air Force leads to a somewhat unique set of circum-

stances and stresses in the promotional process. Because an officer must make each promotion to the next grade by a specified time or be mandatorily released from active duty, he is subject to great stress to be constantly at peak performance. It also places great stress on the officer effectiveness reporting system, since one or two bad OERs may result in a delayed promotion or failure to be promoted.

The system is not a uniformly bad system even though it places substantial stress on each person moving toward a promotion. While this individual is experiencing stress, the system simultaneously removes potential barriers for junior and field grade officers by providing advancement opportunities. Without the regular and systematic force structuring, this natural pattern of advancement would not exist.

For those who are not selected and are therefore forced out of the Air Force, the distress of the experience is somewhat eased by the amount of lead time provided to the member. This time provides a basis for planning future activities. However, if the individual does not use this time effectively for planning, the results may be more than a little distressful. An Air Force major who was mandatorily retired at 24 years of services conducted an in-depth study of six fellow officers who were similarly retired. Of these six fellow officers, three were dead from heart attacks within two years after retirement. These three had done no planning for their post-Air Force lives and had actively resisted their mandatory retirements, wasting their final months in the Air Force doing little if anything.

The other three officers had used their final active-duty months following their notification constructively planning a post-Air Force life. They actively sought out new career options and were making successful adjustments to new careers five years following retirement. These three exemplify the healthful ways in which the stress of up-or-out may be managed so as to elicit growth and productivity. However, leaving is not necessarily the most stressful aspect of Air Force life.

the boss and his style

Commanders, bosses, and other supervisors are in a unique position to cause stress for their men either wittingly or unwittingly. For example, the leadership style adopted by a manager has long been seen as a potential source of tension for subordinates.[6] Authoritarian behavior on the part of a leader tends to cause pressure and tension for subordinates because of the high number of influence attempts undertaken by the leader. This underlying tension among subordinates under authoritarian leadership tends to be expressed in one of two ways. One way is for the subordinates to become very outwardly calm and passive, repressing much of the tension and hostility which they experience. This repressed (as opposed to expressed) anger will be converted into elevated blood pressure over extended periods of time.[7] The second way is for the tension to be expressed in spontaneous outbursts of conflict and aggression in the workplace. While it may be healthier for individuals to express anger and tension, as Doyle Gentry and his associates point out, the conflicts will generate some stress for others around them to cope with.

The effects of authoritarian supervision were observed in a combat-support unit several years ago during an organizational diagnostic procedure. Part of the diagnosis involved a group of seven supervisors who worked for an autocratic division chief. When asked what their boss expected during an intensive group interview, a supervisor using crutches responded humorously by saying that he had ordered pontoons for his crutches. Another supervisor, in describing his perceptions of the work environment, related his recurring night dreams of hurricanes, tornadoes, and ocean storms that constantly raged over him (his boss?) and around him (his tense, fellow supervisors?), though he was never seriously hurt by the storms. Virtually no overt signs of conflict and tension were exhibited in the workplace. Rather, a deceptive calm existed that could be seen through during in-depth interviews with the supervisors. The emotion-ally turbulent, stressful work environment was apparently attributable to the interpersonal behavior of the division chief, since supervisors working for another division chief in the same unit and did not have similar descriptions of the work environment.

The use of less authoritarian and dictatorial tactics certainly does not mean that the commander or supervisor is any less "the boss." As in the unit observed earlier, the nonauthoritarian division chiefs were very clearly in charge of their sections with good morale and good mission effectiveness. This parallels results found by Rensis Likert studying the productivity of work units managed by nonauthoritarian leaders.[8]

Managing Stress

As we mentioned before, the typical Air Force officer is already doing many things to manage these and other stresses of Air Force life effectively. Our purpose here is to reinforce what you are already doing that is healthful, supplement your current ways of managing stress, and suggest things to do that you are not currently doing. The purpose in effectively managing stress is not to eliminate it but rather to achieve a healthy state of *eustress* while preventing the onset of distress with its adverse consequences of poor performance, depression, and cardiovascular disease. Three major activities for preventing distress are exercise, nutrition, and relaxation.

the Air Force physical fitness program

The Air Force program for physical fitness is among the best stress-managing activities in which one can engage. Regular physical, aerobic exercise has been found to be very conducive to promoting good health, well-being, and stress management.[9] Cardiologists such as Kenneth Cooper have been advocating physical fitness for strengthening the heart muscle as well as improving overall physiological functioning. Physically fit individuals are physiologically better equipped to cope with stress than

individuals who are not physically fit. This is because they have lower resting levels of catecholamines in their blood, and these are the triggers which set off the entire stress reponse. In other words, fit individuals are not as "wired" as unfit ones. In addition, fit individuals use oxygen more efficiently and recover physiologically from emergency situations more quickly than unfit individuals.

Civilian industry is now taking the lead from the Air Force physical fitness program and other service-related fitness programs. Kimberly-Clark Corporation, Xerox Corporation, and Texas Instruments are among the industry leaders in advocating physical fitness. Recently, Tenneco has also followed this lead by completing construction of an $11 million physical-fitness complex in Houston, Texas.[10] The central role of physical exercise in better stress management is found in the preventive preparation it affords the body for managing stressful situations.

Exercise may be overdone, however, by either getting too much or attempting to establish a program too quickly. One young lieutenant we know realized that he had fallen woefully out of shape in the two years since officer training school. As a result, he resolved to reestablish a high level of fitness and initiated that with a first-day back regimen of 2.5 miles of run-walk. Unfortunately, he overdid it and strained a few muscles, making his next few days difficult. He need not have done that to begin his fitness program. By contrast, we know a dentist who began very gradually at the age of forty and hardly ever had a sore muscle. Within a two-year period, he had gotten to the point of comfortably running a half marathon in less than 1 hour and 50 minutes. He also coupled his exercise program with a weight loss program.

nutrition and weight control

When the dentist began his exercise program, it was in part motivated by 25 excess pounds. The excess weight he carried was causing him two difficulties. One difficulty was that by the end of the day he experienced fatigue as a result of carrying around so much "excess baggage." The other difficulty, though asymptomatic, was the stress the excess weight was putting on his heart and blood pressure. His heart had to work harder to carry the load. Responsible weight control and proper nutrition are integral elements in proper stress management. They are also directly related to fueling the body effectively and efficiently for physical exercise. It has been pointed out that the average American diet is hazardous to your health.[11] Not only are we suffering from a variety of health problems associated with obesity but our reliance on processed foods has also brought on massive malnourishment. According to Dr. Michael Colgan, the more we overeat the fewer nutrients we get so that we can actually starve while wallowing in fat.[12] The diet of the average American is between 60 percent and 70 percent fat and sugar, leaving no room for other needed nutrients.[13] Thus, it is possible to eat more and get less.
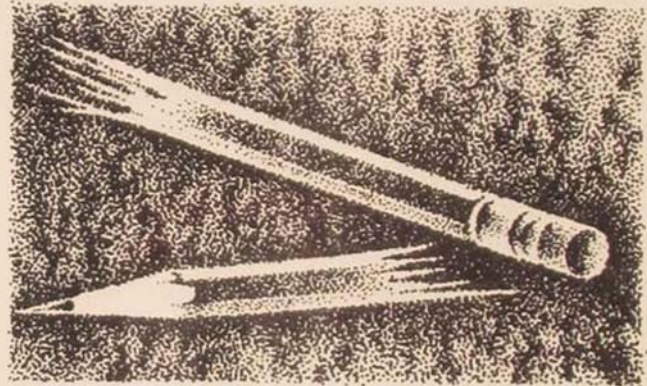
The problem becomes even more critical when the individual experiences an increased stress level. In his description of the stress response syndrome, Selye points out that the body calls on reserves of nutrients for a repair process to maintain body functioning.[14] However, if the nutritional raw materials are insufficient, a stage of exhaustion and disease can develop. Consequently, it is important not only to consider one's usual diet, being sure to include nutritional food, but also to consider vitamin supplements. The vitamin B complex and vitamin C seem to be the most heavily used during stressful times, and they can easily be

taken in addition to one's food, boosting the level of availability to the body.

relaxation

While good nutrition, responsible weight control, and physical fitness are all related to preparing the body to manage stressful situations as well as dispose of excess stress-induced energy, they alone are not often enough. We frequently need to counterbalance this activity approach to stress management with an inactive, passive approach. This approach is sometimes found in the prayer practices of various Judeo-Christian denominations as well as the nonreligious practice of the relaxation response, such as transcendental meditation. If the stress response may be thought of as the general mobilization of the individual's physiological and psychological processes for an emergency situation, the relaxation response may be thought of as its natural counter.

The effects of the relaxation response on the body have been investigated by Herbert Benson of Harvard Medical School and others.[15] The findings suggest that the following changes occur with the relaxation response: lowering of the heart rate, blood pressure, and respiration rate; reduction in muscle tension; shift of the brain-wave pattern to alpha; reduction of alcohol consumption (when practiced over time); and increased sense of health and well-being. These changes are associated with practice of the relaxation response on a daily basis.

There are four key components of the relaxation response: a quiet environment, a comfortable position, a passive attitude, and a mental device. Benson describes how these may be combined into a simple procedure for eliciting the relaxation response: Select a quiet environment, sit in a comfortable position, close your eyes, deeply relax all your muscles, breathe through your nose, and continue this practice for 20 minutes.

The ability to relax has proved to be a valuable skill to people in all walks of life; inventor

Thomas Edison and Prime Minister Winston Churchill come to mind. Some of our past military leaders have used this ability to let go of tension to help them get through very difficult situations. For example, it has been reported that General Dwight D. Eisenhower was able to rejuvenate himself through the most tense time of the invasion of Europe by utilizing catnap-type relaxation breaks. Consequently, he was able to remain alert and on duty for extended periods of time.

Once you have learned the skill of deep relaxation, you can use momentary relaxation as an on-the-spot skill when dealing with stressful situations. Simply pause for a few seconds and turn your attention to your body, allowing yourself to relax as much as you can. You will find by using this brief unstressing technique that your thought processes will be much clearer, enabling you to deal more flexibly and creatively with the situation.[16] You may also want to use momentary relaxation as a way of unwinding after a stressful situation is over.

ALTHOUGH THE APPROACHES to managing stress described here will not prevent stress from being a part of your military life, by using these ideas together with your already developed ways of management, you can increase your ability to manage stress. The adding of exercise, nutrition, and relaxation can prevent the development of chronic anxiety known as stress buildup. By preventing this buildup, you are then preventing health hazards and promoting a sense of well-being.

One of the principles of preventive management suggests that individuals and organizations respond differently to stress; that is, each of us has unique and specific points of vulnerability to stressful life experience. As a result, what may cause one person cardiovascular disease will cause another ulcers and a third individual deep depression. The adverse consequences of distress therefore manifest themselves in quite individual ways, depending on one's physiolog-

ical, genetic, and psychological life history.

As a result of this realization, we may suggest only general guidelines for managing stress on a tentative basis. Individuals must modify and adapt these general approaches to suit their particular circumstances and personalities and also supplement these general guidelines with the personalized activities that work most effectively for them. To propose a universal and dogmatic approach to managing stress would be as irres-

ponsible and ineffective as giving all people a universal drug to take on a regular basis.

University of Texas at Arlington and
Duke University, Durham, North Carolina

Notes

1. Figure 1 is adapted from J. C. Quick and J. D. Quick, *Organizational Stress and Preventive Management* (New York: McGraw-Hill, forthcoming).

2. John House, *Work Stress and Social Support* (Reading, Massachusetts, 1981), pp. 15-26.

3. Hans Selye, *Stress without Distress* (New York, 1974), pp. 25-32.

4. E. K. Eric Gunderson, "Organizational and Environmental Influences in Health and Performance," in B. T. King, S. Strevfest, and F. E. Fiedler, *Managerial Control and Organizational Democracy* (New York, 1978), pp. 43-60.

5. House, pp. 84-85.

6. Kurt Lewin, Ronald Lippitt, and Ralph K. White, "Patterns of Aggressive Behavior in Experimentally Created Social Climates," *Journal of Social Psychology,* 1939, pp. 290-93.

7. W. Doyle Gentry, Alan P. Cheney, Howard E. Gary, Roger P. Hall, and Ernest Harburg. "Habitual Anger-Coping Styles: I. Effect on Mean Blood Pressure and Risk for Essential Hypertension,"
Psychosomatic Medicine, 1982, pp.195-202.

8. Rensis Likert, *New Patterns of Management* (New York, 1961), p. 95.

9. Kenneth H. Cooper, *The Aerobics Way* (New York, 1978), pp.81-85.

10. Personal Interview with J. W. Streidl, Director of Management Development, Tenneco, Inc.

11. John W. Farquhar, *The American Way of Life Need Not Be Hazardous to Your Health* (New York, 1978), p. 103.

12. Kathleen Stein, "Dr. C's Vitamin Elixirs," *Omni,* April 1982, p.69.

13. Rudolph Ballentine, *Diet and Nutrition: A Holistic Approach* (Honesdale, Pennsylvania, 1978), p.10

14. Selye, pp. 23-26.

15. Herbert Benson, *The Relaxation Response* (New York, 1975), pp. 46-53.

16. Karl Albrecht, *Stress and the Manager* (Englewood Cliffs, New Jersey, 1979), p.199.

Early death, nervous breakdowns, alcoholism, poor health, family and social tragedy are some great rewards to look forward to after a life of hard work, dedication, professionalism, and career excellence. It doesn't have to be that way.

Donald D. Baines
"9 Steps Toward Beating Executive Stress"

When I look back on all these worries I remember the story of the old man who said on his deathbed that he had had a lot of trouble in his life, most of which never happened.

Winston Churchill

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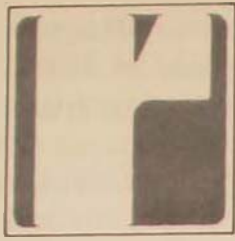
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TOWARD A REARMED FORCE

COLONEL LARRY J. RUNGE, USAF (RET)
LIEUTENANT COLONEL JON M. SAMUELS

PRESIDENT Reagan's trillion-dollar defense buildup is under way with an imposing array of programs proposed or promised. Not unexpectedly, public comment has centered on cost-benefit ratios and basing strategies—questions of national import stimulated by gargantuan undertakings like the B-1, MX, ground-launched cruise missile (GLCM), or the Space Transportation System. Even as they follow this debate, Air Force planners are struggling with another, more mundane matter—how to protect these invaluable defense and space systems. Security may lack the cannonball impact of the "big issues," but its bird-shot effect
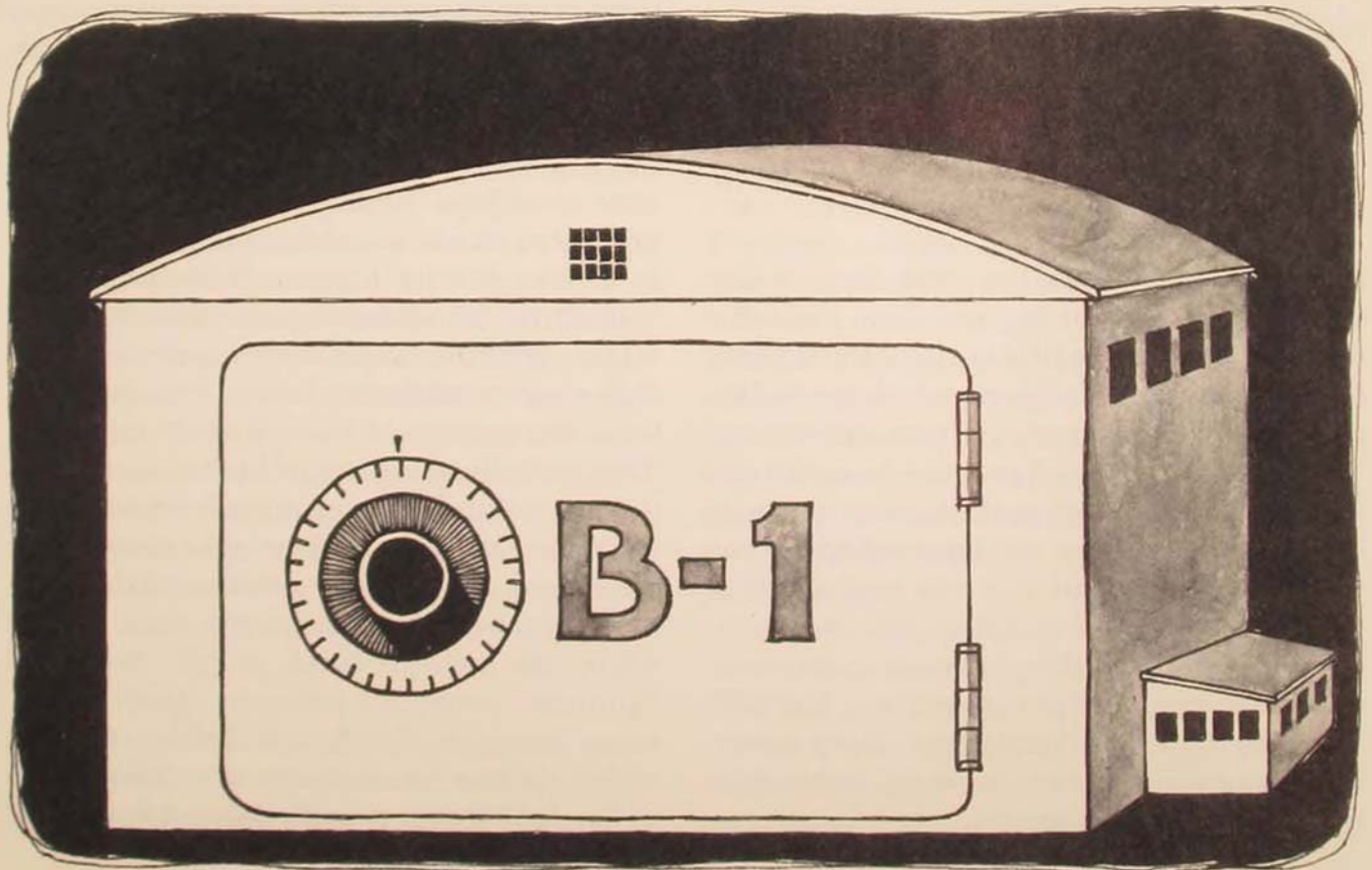
can produce costs that cut into operational capability.

Until now, the Air Force has successfully protected its weaponry with concentric rings of sensors, barriers, policemen, and alarms. Four new factors, however, are complicating security planning for tomorrow's systems.

• First, there is ample, documented evidence that terrorist groups and superbly trained unconventional Warsaw Pact and North Korean forces will menace one or another of these systems.

• Second, resources that terrorists have ignored in the past are now threatened and must be protected. For example, $45 million worth of lightly protected Air National Guard A-7s were destroyed at Muniz ANG Base, Puerto Rico. Extending minimum security to similarly configured active duty and Air Force Reserve ramps will require some 4000 additional authorizations.

• Third, the hope that technology would replace some sentries with hardware failed to materialize when terrorist firepower and mobility necessitated the reinforcement of security police response forces supporting nuclear weapons.

• Fourth, security policemen have become exceedingly expensive to recruit, train, and maintain, costing about $21,000 per person in 1982.

Factor one establishes the immediacy of the security issue. Factors two and three make the security police career field, already the USAF's third largest, one of its fastest growing, and factor four makes this growth a costly experience.

If anything, this trend promises to accelerate. Recognizing the threat to their resources, tactical commanders have not hesitated to recommend the deployment of a new sensor system here and a supporting police post there. Although often small, these increases quickly add up to staggering Air Force-wide totals. The 4000 new sentries proposed in the post-Muniz survey represent only two new posts on active duty nonalert ramps and three on those belonging to

Air Reserve Forces. An additional 1500 security policemen are projected for the GLCM, 3700 for MX, 275 for the Space Transportation System, and 1166 for other programs.

Where will these people come from? Will the recruiting pool of the late eighties and early nineties support these numbers? Even the most parochial security police leaders admit a new approach is needed. The Air Force cannot continue to throw manpower at every security problem.

IN A SEARCH for options, an examination of how our allies have coped with similar difficulties offers some clues. Britain's Royal Air Force (RAF) divides its security and law enforcement responsibilities between two organizations, the RAF Regiment and the RAF Police. Both units are highly professional, reserve the most difficult tasks for themselves, and depend heavily on other base personnel to protect their stations.

Base defense, including short-range air defense, is the principal mission of the Royal Air Force Regiment. Additionally, this 2500-man organization is responsible for small-arms training, chemical and biological defense, and firefighting. However, the entire base is involved in these operations. Virtually every person on the station has an additional duty assignment within the base security structure. When an exercise is initiated, the readiness state increases, or an actual emergency occurs, these augmenters draw their weapons and man close-in defensive positions, key points, and lines of communication. They are fully trained in the limited tactics that they are expected to employ and have rehearsed their roles many times. They do the same job, in the same place, under the guidance of the same RAF Regiment personnel, every time. Meanwhile, the highly trained, mobile Regiment "gunners" screen the perimeter, block enemy access routes, and seek and destroy attackers within the base's tactical area of responsibility.

The RAF Police provide day-to-day security

of sensitive resources and basic law enforcement services. In emergencies, policemen supervise those augmenters assigned to defensive positions protecting the flight line and storage areas in an effort integrated with that of the Regiment.

This extensive augmentation program is not considered extra duty in the American sense but an essential wartime job. The British have accepted the fact that this deployment will involve long hours and might delay personnel actions, limit mess hall menus, or postpone road construction. When asked about the morale impact of this program, the Commander of RAF Wildenrath explained, "We are an armed force not a business enterprise. Our people expect to bear arms in defense of our mission." The group captain went on to quote Winston Churchill: "Every airfield should be a stronghold of fighting air-groundsmen and not the abode of uniformed civilians in the prime of life protected by detachments of soldiers."

The size of the RAF Police force is further limited by the substantial assumption of law enforcement responsibilities by station noncommissioned officers (NCOs) and officers. There are a few police patrols, but routine discipline, vandalism, domestic disputes, parking violations, and other minor offenses are matters these leaders handle within their squadrons. This allows the RAF Police to concentrate on serious crime in the manner of the Air Force Office of Special Investigations. Most British NCOs and officers view an increased police role as a usurpation of their traditional authority and prestige. By emphasizing the specialist nature of the missions assigned to the Regiment and the RAF Police, and by defining general sentry and law enforcement tasks as "military duties," the British have succeeded in limiting the manpower devoted to security operations.

Most allied, Soviet, and nonaligned air forces adhere to the British model. The USAF seems unique in its attempt to out-perform civilian police departments in the range of law enforcement services provided, and we alone try to spare our people the burden of bearing a weapon. While the difference in size between the RAF and the USAF dictate some managerial variances, our apparent inability to restrict the growth of our security force suggests the need for a second look at how we are doing business.

Could we expand the USAF security police augmenter program? Assuming two conditions were satisfied, the answer would seem to be yes. First, we must limit the scope of the duties assigned to these augmenters so the necessary skills can be mastered in short, intense training periods. Assigning a certain position to an augmenter and then providing specialist leadership appears to be as workable in the USAF as the RAF. The efficiency and enthusiasm of Red Horse squadrons operating in their base defense role argues powerfully in support of this premise. Second, Air Force personnel must accept that business cannot proceed as usual when the base goes on a wartime footing. Many support functions must be curtailed while the medics, civil engineers, and security police are reinforced.

Could base personnel assume additional security and law enforcement responsibilities? A better question might be, "Have we a choice?" The threat will not go away, and security must be enhanced. Adding more security policemen, however, entails a Hobson's choice between an increase in the Air Force strength or a transfer of authorizations from some other career field. On the other hand, if a limited number of maintenance supervision, communications, fuels, and munitions personnel were routinely armed and their presence obviated a need for more security policemen, the Air Force might be able to satisfy some of its security needs while adding to its maintenance, fuels, communications, or munitions forces (or at least avoiding losses).

The security responsibilities assigned to these augmenters might detract from their principal occupation, but this could be minimized. On a

day-to-day basis, only a few would be involved, perhaps three or four on any given ramp or one or two in a petroleum, oil, and lubricants area. Since these people are already responsible for security alerting and reporting, all that is added is a supporting role in a security police response to an incident. How an adversary views a security system—as strong and alert or weak and preoccupied—plays an important role in that system's ultimate success. Although the presence of armed augmenters will not produce perfect security, it will raise the ante for anyone wishing us ill. That perception could cause a terrorist to seek another target.

On the law enforcement side, if squadron-trained officers and NCOs were to perform minor investigations such as those involving petty theft and disorderly conduct, the growing demand for police services could be reduced. Yes, the assumption of greater investigative and disciplinary responsibilities by Air Force NCOs and officers would turn back the clock and place a substantial burden on their shoulders. But it would also reinforce the military command structure and certainly reverse any nine-to-five orientation within a unit's leadership.

IN THE END, these questions will be answered according to one's philosophical view of the Air Force. If a communicator, personnel clerk, or maintainer views him or herself primarily as a specialist, this proposal will be seen as a significant threat. Conversely, if those same people see their service in traditional military terms, they will welcome the chance to bear arms and assume an increased leadership role. Put simply, the USAF faces a Churchillian choice between existence as an armed force or as a group of uniformed civilians.

This question of dual utilization goes beyond the immediate concerns of any single individual or career field. There is a general national consensus that a stronger defense is needed, but that consensus is under assault and is fragile. It will not survive unless everyone enlists in the battle for greater efficiency and productivity. Adding thousands of security policemen without diligently searching for alternatives is a shot fired in behalf of those who would sacrifice the defense budget for other more politically attractive alternatives.

Argonne, Illinois
and
Seoul, Korea

> Doctrine is like a compass bearing; it gives us the general direction of our course. We may deviate from that course on occasion, but the heading provides a common purpose to all who travel along the way. This puts a grave burden on those who formulate doctrine, for a small error, even a minute deviation, in our compass bearing upon setting out, may place us many miles from the target at the end of our flight. If those who distill doctrine from experience or devise it by logical inference in the abstract fail to exercise the utmost rigor in their thinking, the whole service suffers. As the old Scot preacher put it, "A mist in the pulpit is a fog in the pews."
>
> Professor I. B. Holley, Jr., *An Enduring*
> *Challenge: The Problem of Air Force Doctrine,*
> Harmon Memorial Lecture, 11 March 1974

TOWARD A SURVIVABLE TANKER FORCE

the argument for realistic tactical training

Captain William T. Cahoon

WHAT does the future hold for the Strategic Air Command's tanker force? The case can be made that SAC tankers are the most important combat support aircraft in the U.S. Air Force inventory. Not a wartime, peacetime, or contingency deployment plan can be made that does not employ tankers.

The tanker mission involves more than the mechanical act of "passing gas." Equally important is the coordination of times, places, altitudes, fuel offloads, and receiver flight status. Timely response to short-notice requests for tanker services is imperative to the fighter or bomber pilot who finds he is riding on empty. Getting the fuel to the combat aircraft in wartime is vital. The security of the air refueling formation is paramount, and tankers are unarmed.

In exercises such as Red Flag and Bold Eagle, while every one of our aviation contemporaries—SAC bomber crews, Tactical Air Command fighter pilots, Navy and Marine fighter pilots, and Marine tanker crews—flies under wartime pressures, constraints, and threats, SAC's tankers operate at relatively high altitudes; they are under ground-controlled intercept (GCI) or air route traffic control center (ARTCC) clear voice control, immediately accessible to all "friendly " aircraft and completely immune to "enemy" attack. Of what real value is that kind of training? Granted, it allows other exercise participants to join in their mock air battles and provides them with more flying time. However, it could lead our customers to think that there will always be a convenient, secure tanker always ready to meet their needs. Furthermore, our tanker crews can develop a "noncombatant mentality" that has them ignoring threat briefings, forgetting that they are a legitimate part of the overall combat effort, and it deprives tanker crews of opportunities to develop judgment that may help them accomplish their mission when the balloon goes up.

Tanker operations during the Vietnam War were conducted in areas relatively safe from attack by short-legged MiG-21 interceptors. The situation would be drastically different in any war in Europe or the Middle East. Tankers would have to operate within range of enemy fighters to be of any use to our fighter and attack aircraft. The MiG-23 Flogger—with its combat radius of 520 miles and centerline fuel tank and minimal allowance for dash or fight—provides the primary threat to the tanker force. The Soviet Air Force has MiG-23s in virtually all the East European Warsaw Pact countries. Furthermore, Floggers serve in the East German, Czechoslovak, Hungarian, and Bulgarian air forces. A number of air forces in the Middle East are equipped with Floggers, with the Libyan and Syrian threat being most apparent.

The Marines are approaching the problem realistically. At the Weapons and Tactics Instructor Course, Yuma Marine Corps Air Station, Arizona, Marine KC-130 tankers routinely participate in low-level refueling exercises. Using the terrain to mask radar detection, KC-130s have refueled fighters and attack aircraft at altitudes as low as 200 feet. Rendezvous and refueling missions are regularly flown between 1000 and 1500 feet above ground level and are conducted without radio communications. Procedures for these types of missions have been incorporated in Navy/Marine refueling manuals. The Marine philosophy was related to me recently by a Marine tanker pilot, "Unlike you Air Force gas passers, we intend to live through the next war. We practice like we plan to do our job in combat."

The Marines use KC-130s with drogues, which are more adaptable to low-level refueling. Although C-130 was not designed for low-level flying, the Marines and our own Aerospace Rescue and Recovery Service have developed procedures for refueling at low altitude. The KC-135, like the B-52, could possibly be modified for low-level flight and refueling.

The Air Force should consider flying tankers in Red Flag and Maple Flag exercises under realistic threat and electronic countermeasure (ECM) environments. It would be interesting to see how many survive under present procedures. We need to know how far from the battle and at what altitudes tankers would have to operate to survive and provide successful refuelings. We also need to determine the number of fighters needed to protect tankers. What will be the effect on the fighter/attack force from missed refuelings?

If our tankers are going to have to operate within range of Soviet fighters, our crews need to be given a fighting chance for survival and success. There is plenty of room on board the KC-135s for ECM gear. If we want to exploit one advantage our fighters and fighter-bombers have over the Soviets, we have to keep our tanker force intact.

There is an assumption that tankers will not be attacked. The Warsaw Pact pilots will be concerned with dealing with the immediate threat presented by NATO fighters and attack aircraft. For the first few days of fighting in Europe, that may well be the case. However, once the war stabilizes, the enemy will have time and reason to attack tankers and thereby limit the range and duration of our combat aircraft, disrupt resupply efforts, and cause havoc with SAC plans for using tankers to refuel B-52s and FB-111s in their primary mission—should they have to be used. It is not unreasonable to expect that the Soviet Air Force will develop a refueling capability that will enable its heavier fighters like the Tu-28 Fiddler and MiG-25 to range out over the North Atlantic and attack our tanker force and transports.

SAC operational readiness inspections (ORIs) routinely deal only with the simulated war support for the bomber force. While this is a vitally important mission, it is only one of the missions that tankers must be ready to perform. Tankers will be used to refuel our tactical and airlift forces as well. We need to test our ability to mobilize and deploy a complete tanker squadron. Our crews should get the feel of flying in a cell of 12 to 15 aircraft with receivers in tow. How effective will we be at operating from locations with minimal support and limited communications? Although existing training procedures allow us to acquire some experience in small deployments and we do fly some cell formations, we are not getting that experience often enough nor in any suitable depth.

TANKER SQUADRONS should be randomly selected to perform no-notice ORIs in conjunction with full fighter squadron deployments to Europe or the Pacific area or, in the interest of saving resources, to a Red Flag exercise. The tanker single integrated operational plan capability could still be evaluated while valuable experience in executing rapid, squadron-size tanker deployments was being acquired.

The tanker force is not expendable. Realistic training and new procedures must be evaluated and adopted to make our tanker force combat ready. Our training has to catch up with the rest of SAC and the Air Force. The tanker force must test itself and evaluate itself under realistic combat conditions if we expect to perform our mission when there is no time left to get ready.

Laughlin AFB, Texas

AIR BASE SURVIVABILITY: A QUESTION OF STRATEGY

Colonel Harry L. Gregory

"CAN USAFE survive and fight?" After raising this critical question in his article,* Major Stephen C. Hall accurately exposed the vulnerability of runways/taxiways and the critical logistics support resources essential to combat operations as our Achilles' heel. Although the problem was well presented, the proposed solution (procurement of survivability equipment and facilities) fell short of the root cause, USAF basing strategy itself.

We have doggedly maintained our forward basing concept even though the technology of war has been revolutionized and Warsaw Pact capabilities substantially expanded. This forward basing policy has led to entrenchment of traditional support concepts despite compelling logic to the contrary. Consequently, more complex support requirements have been introduced, adding to the vulnerability and inflexibility of an already corpulent logistics tail.

War-fighting strategy must integrate two co-equal, interdependent elements: operations strategy and logistics. Logistics must be consistent with operations strategy; conversely, operations strategy must take into account logistics capabilities and, if necessary, be changed to maximize the combat potential of available resources. Logistics considerations now compel a change in two aspects of traditional USAF war-fighting strategy. First, an in-depth basing concept for all war scenarios (similar to the A-10 European forward basing concept), consisting of two generic types of air bases distinguished by operational function and distance from the forward edge of the battle area (FEBA), promises significant advantages. Forward fighting bases (FFBs) would be located within 250 nautical miles of the FEBA for the single purpose of rapid, high combat sortie generation with logistics support limited to dearm, service, refuel, load, and rearm. Primary wing infrastructure would be provided by main operating bases (MOBs) located beyond 250 nautical miles of the FEBA to support 6-10 FFBs.

Second, elimination of the traditional USAF three-level maintenance concept in favor of substantially reduced repair activities at the FFBs and

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MOBs would enhance war-fighting capability. The increased complexity of off-equipment maintenance has imposed fatal liabilities.

These two strategic initiatives would substantially ameliorate vulnerability and enhance flexibility removing forward deployed logistics assets from the field. Dispersal and extensive camouflage of logistics assets at forward fighting bases and hardened logistics facilities at MOBs would enhance survivability. Flexibility would also be enhanced by the opportunity to use a "chessboard" strategy, rapidly concentrating and dispersing forces at various FFBs in the increased depth of the modern battlefield. The primary advantage of the strategy to reduce off-equipment repair would be to permit a reallocation of investment resources to procure more of the assets used directly in war (e.g., spares) and correspondingly less of the assets used indirectly in war (e.g., support equipment, skilled technicians). In other words, greater combat leverage could be achieved for an equivalent logistics resource investment.

THE SOLUTION to the air base survivability problem, then, is not simply more resources but a strategy that employs our resources in a mode more sensitive to the realities of an environment characterized by a more lethal threat and a dynamic technology.

Hq Ogden Air Logistics Center
Hill AFB, Utah

Colonel Gregory is Director of Plans and Programs at the Ogden Air Logistics Center.

The military balance between the United States and its allies and friends on the one hand and the Soviet Union and the states subordinated to them on the other is not nearly so unfavorable as the denigrators of US military capability have been proclaiming for the last few years; but it is precarious enough. The United States must not fail to *take* advantage of the advantages that it has—economic, political, ideological, or any other. And among all of these, the US technological advantage is one of the most important and valuable.

Dr. Harold Brown, *Parameters*, March 1983

EUROPEAN INTEGRATION, NATO, AND THE COMMON MARKET: DESTINY OR DELUSION?

DR. DAVID R. METS

AT THE END of the holocaust we know as World War II, a theorem of Western ideology was that only the unification of Europe, if not the whole world, could lead to eternal peace and prosperity. In America that ideal was even more fondly held than it was overseas. Here we thought that our experience proved that a United States of Europe could release the West from the horrors of World War III, sure to be the worse because of the invention of nuclear weapons. What has become of that ideal? What is its future? Is continued U.S. support for it wise? If the ideal is sound, what can be done to improve its prospects? My purpose in this review-article is to move toward an answer to those questions through an evaluation of some new books on NATO, the European Economic Community (EEC), and the problems those two organizations face.

Changing Perceptions of the Problem

A reevaluation of U.S. policy toward European regional organizations is clearly in order. Not only is the dogma that European integration is a positive good for America now open to question, but the various factors that stimulated the creation of NATO and the EEC have

changed radically since the "creation" (a term taken from the title of Dean Acheson's *Present at the Creation*, 1969). Acheson stated at the time that the purpose of NATO was to build a security fence that would so restore the confidence of the Europeans that they would rebuild their prostrate economies. The Marshall Plan was deliberately designed to cause that to happen by means of a *unified* European effort, not a nationalistic one.

The European per capita gross national product (GNP) now approaches that of America, which is one of the themes of *The Common Security Interests of Japan, the United States and NATO*.† The book also asserts that the U.S. economy, though still larger than those of West Germany and Japan, has some weaknesses not shared by America's partners. Yet the security policies of the European allies continue as if the old economic imbalance were still there. Worse, *Common Security Interests* argues that the threat has become much more serious than it was in 1949. The Soviets have reached or passed strategic nuclear parity. The Warsaw Pact's conventional forces have been modernized and so expanded that deterrence in the European theater is not what it once was. In the Far East, though the U.S. drawdown has been halted, the Soviets have made massive conventional buildups in the islands to the north of Japan. *Common Security Interests*, an anthology of papers produced by a joint working group of the Atlantic Council of the United States and Japan's Research Institute for Peace and Security, presents an authoritative trilateralist view. The group, chaired by former American Ambassador to Japan U. Alexis Johnson, contends in the book that the Russian threat is real; some of the participants feel that NATO, Japan, and the United States cannot count on the long-term continuance of the Sino-Soviet split. Further, an entirely new theater has opened up in the Middle East because of Japan's and the West's growing dependence on imported oil, the collapse of Iran, and the Soviet aggression in Afghanistan.

As if the glum world view of *Common Security Interests* were not enough, Sherwood Cordier has come forth with a little book, *The Air and Sea Lanes of the North Atlantic: Their Security in the 1980s*.†† If the theater and strategic nuclear balances have shifted in favor of the Warsaw Pact since 1945, the threat at sea has worsened, also. Through most of its history, the Russian navy has never been more than a coastal defense force of little consequence on the scales of world power. So it was at the inception of NATO. According to Cordier, though, the Soviets have built a very respectable blue-water threat, and so far there has been no compensating change on our side. Cordier is quite obviously a pro-Navy man, but he is not nearly as alarmist as some of his colleagues. Unlike many, he is honest enough to point to the naval strength of our NATO allies that is not matched by the non-Soviet Warsaw Pact members. Further, he is quite clear on the limitations of the so-called Russian carriers, which are far from being in the same league as those of the Atlantic alliance. Perhaps that is why he is primarily concerned with the Soviet Navy's threat to the North Atlantic line of communications (LOC)—unlike many other naval experts who concentrate on its power projection capability. In any event, there can be no doubt that there is a real threat in the Atlantic under, on, and above the sea—though Cordier says that the picture is not altogether bleak in all its dimensions. Still, his excessive use of direct quotations from obviously biased sources is annoy-

†U. Alexis Johnson and George R. Packard, editors, *The Common Security Interests of Japan, the United States and NATO* (Cambridge, Massachusetts: Ballinger, 1981, $25.00), 232 pages.

††Sherwood S. Cordier, *The Air and Sea Lanes of the North Atlantic: Their Security in the 1980s (Washington: University Press of America, 1981, $6.25), 84 pages.*

ing, and there is little that is new in the book. Finally, the underlying assumptions that a war in Europe will last more than thirty days and that it will not go nuclear may not be valid.

Richard A. Gabriel, of *Crisis in Command* fame, has followed that work with a two-volume study, *The New Red Legions*.†This work explores another facet of the threat against the United States, NATO, and Japan. Gabriel, himself an officer in the U.S. Army Reserve, teaches politics at Saint Anselm's College in Manchester, New Hampshire. One should not prematurely cast aside *The New Red Legions* based on a hasty judgment of faulty methodology. The work at first seems to be based on the perceptions of a tiny sample of the Soviet armed forces. All the respondents are émigrés, most of them are Jewish, and a large proportion came from the Red Army of yesteryear. One suspects that Gabriel recognized his vulnerability, but I urge patience on the skeptic because Gabriel's use of his small sample seems to be conditioned by his mastery of an immense literature about the Russian armed forces. Gabriel does not make exorbitant claims for his findings—he knows that they can be no more than suggestive—and enhances the effectiveness of his arguments with a fine writing style and a persuasive logic.

The main message of *The New Red Legions* is that the Soviet soldier is decidedly less than ten feet tall, notwithstanding his ample equipment, the thoroughness of his training and largeness of his formations. However, his morale is bad, his noncommissioned officers are poorly motivated "short-timers," and his officers are aloof bureaucrats not much given to individual initiative, but that should not disarm the worries stimulated by these two books. Gabriel knows that early successes can stimulate morale,

and Hitler proved that a totalitarian organization can often get the desired behavior despite bad morale. Still, the author thinks that Western plans to administer early checks to the Red Legions may yield big rewards and that the Russian soldiers might not be reliable in power projection operations far from the homeland; though, of course, they are proven tigers when fighting at the gates to their inner citadels. Finally, the Red Army is huge, and it has abundant good equipment.

Unlike most anthologies, *Common Security Interests* has an enviable coherence, and its parts are of uniformly high quality; *NATO after Thirty Years* is quite the opposite.†† Editors Lawrence S. Kaplan and Robert W. Clawson made an effort to give the papers emerging from Kent State University's 1980 conference on "NATO after Thirty Years" some unity, but they did not succeed. The four papers in the section titled "NATO in History" are inadequate coverage of the subject and are not well interrelated, and are uneven in quality. The section titled "NATO in Arms" is also poor in terms of completeness, coherence, and quality—an exception being Thomas Etzold's fine essay, "The Military Role of NATO." Another section vaguely titled "NATO in the World" contains an excellent article by Scott L. Bills, "The United States, NATO, and the Colonial World."

All the contributors to *NATO after Thirty Years* except one are academics, and that may account for both the pedantry and the disunity of the book. No general theme is readily discernible, and few of the professors venture prescriptions for decision-makers to use in solving the problems described.

Some of the threats alluded to earlier are recognized in this book, too. Scott L. Bills gives

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†Richard A. Gabriel, *The New Red Legions: An Attitudinal Portrait of the Soviet Soldier*, 2 volumes (Westport, Connecticut: Greenwood Press, 1980, $44.95 for the set), vol. I, 246 pages, vol. II, 252 pages.

††Lawrence S. Kaplan and Robert W. Clawson, editors, *NATO after Thirty Years* (Wilmington, Delaware: Scholarly Resources, 1981, $8.95), 262 pages.

a lucid explanation of our troubles in trying to recruit the developing world to the side of freedom. The United States was the first "Third World" country to break away from the imperial yoke in 1783, and from then until the end of World War II, she was the leading champion of anticolonialism. When the Communist threat in Europe was perceived in the late forties, the United States gave up her old isolationism in favor of an alliance with the states of Western Europe. They happened to be the arch-imperialists for the Third World, and U.S. support for them in Europe entailed involvement with their affairs outside of Europe. Among other things, this association caused the United States to be the chief nemesis of the developing world. Scott Bills's explanation is particularly relevant to our involvement in Vietnam, and it was seldom seen in the mountain of literature searching for the devil who got us entangled there.

Walter Lipgens, a European professor, presents an interesting paper discussing NATO and the Common Market in terms of integration and what the attitudes of the United States should be on those subjects. He seems convinced that integration is feasible and would be a good thing for all concerned. At the outset, he argues, NATO and the EEC were complementary, but lately there has been a divergence—partly because of European nationalism and partly because the United States too often sees the EEC as a rival rather than a friend. Of course, an American might answer that that is a two-way street!

The theory underlying the Marshall Plan, the European Coal and Steel Community, and the Common Market is that poverty causes war, and prosperity and economic interdependence lead to peace, freedom, and political unification. Thus, NATO was a complement and perhaps auxiliary to the Marshall Plan

and the Common Market. Ultimately, many thought, it would all evolve into a federal United States of Europe.

Numerous publications in this country address the subject of NATO, but not many are concerned with its onetime complement, the European Economic Community (EEC). *The Common Market and How It Works*, by the English writer Anthony J. C. Kerr, provides a useful introduction for the generalist reader.† Both NATO and the EEC were born out of the experience of the first two world wars and fear of a third. Peace was to be achieved by the unification of Europe and, ultimately, perhaps the unification of the Atlantic community and even the whole world. Kerr explains that for a time progress in that direction was made, but as the perceived crisis waned and the old lions like Paul Henri Spaak, Konrad Adenauer, and Robert Schumann left the arena, the old nationalism reasserted itself. Although the EEC has continued to expand its scope steadily, neither the Parliament of Europe nor the EEC Commission has acquired any real decision-making power. The authority still resides in the EEC's council, where each of the members, even the smallest, has a veto. The borders between the member states are much more porous than they used to be, but the European states have not transferred any real police or taxing power to the EEC. The Common Market, then, is a cooperative arrangement and a successful one. Progress toward a centralized European government, according to Kerr, has slowed, and he does not hazard a prediction for the future. Notwithstanding the articulated hopes of the Europeanists, we may certainly infer that such a government will not come for a long, long time—if ever. The cultural and social differences of the various nations of Europe remain far greater than they were among the thirteen freed English colonies in

†Anthony J. C. Kerr, *The Common Market and How It Works*, revised edition (New York: Pergamon, 1980, $8.00), 227 pages.

1783. Moreover, the average European can no longer remember Hitler and World War II, for the majority of people have been born since then. Thus, though the Soviet military threat is far greater than it used to be and can reach into new theaters, and though the European and Japanese economic muscles are certainly more adequate to meet that threat than heretofore, the West *has not* changed its approach to the problem. The old patterns are too comfortable for everyone except Uncle Sam.

Changes in the Data Base

The world view that is the matrix circumscribing our decision-making process consists of facts and assumptions. No matter that the factual part of our data base has increased immensely; huge assumptions are still required. We know the details about the expansion of the Soviet military forces. We also know that they have narrowed the technological gap, and their forces appear in strange, new places. We know, too, that the Chinese for the time being are hostile to the U.S.S.R. and that the Soviets are easily able to reach into the oil regions of the Middle East and beyond.

The most important of the imponderables remain, however. What are the adversary's intentions? Are Soviet incursions in Africa merely taking advantage of post-Vietnam opportunities, or are they a part of a plan for world conquest? Is the Soviet invasion of Afghanistan only the defensive repression of instability on the Russian border, or is it the first step of an attempt to conquer the oil of the Persian Gulf? Is the Warsaw Pact's great increase in military forces merely due to the aimless momentum of a bureaucracy that never learned how to shut off the production of the arms manufacturing machine, or is it a deliberate attempt to shift the correlation of forces permanently in favor of the Communist world? Is the conversion of the Soviet Navy from coast defense to a blue-water force merely a result of shifting bureaucratic politics inside the Russian government, or is it

intended to carry Russian power to places where it was never seen before? Both *Common Security Interests* and *Air and Sea Lanes of the North Atlantic* are persuasive in their arguments that the intentions of the U.S.S.R. are indeed aggressive and that Angola, Ethiopia, Afghanistan, and the other things are not accidents. The threat, they say, is real, and the West must conceive real solutions to meet it. But we cannot know for sure.

Defining Objectives

In abstract terms there is little divergence of objectives among the democratic industrialized countries. The primary purposes of NATO and America's defense treaty with Japan are still security and peace. Those arrangements, along with the EEC and many other measures, also are aimed at sustaining the prosperity of all concerned. All of these books assert that a primary goal must be to preserve freedom, though none assert a need to propagate our ideology to hostile regions. The divergences arise with the application of general principles.

In the beginning, according to *Common Security Interests*, Western Europe and the United States were unanimous in their belief that security would have to be sustained by U.S. military strength while the Europeans concentrated on economic recovery. The goal is still shared by members of the Atlantic alliance, but economic recovery has long been achieved. Both *NATO after Thirty Years* and *Common Security Interests* state the American claim that Europe and Japan must assume a larger share of the military burden and take a broader view of the prosperity objective—to include the U.S. economy. If there is to be cooperation within NATO, then the same actors cannot logically assume an adversarial relationship when thinking about EEC. Of course, that would require higher taxes and less rapid growth in the living standards of Japan and Europe. Naturally, that is a hard thing to press on our allies, but the Russians are cooperating with their aggressiveness in Afghan-

istan and Africa. Also, the apparent threat to the Persian Gulf area may force our allies to take a more comprehensive view of security than heretofore. They need us even more than we need them in the protection of the oil, but the performance during the oil embargo of 1973-74 does not inspire much confidence. A basic thrust of *Common Security Interests* is that the democratic industrialized states must take a more global, unified view of their national objectives than they have, and it is hard to argue with that.

Possible Solutions

In all instances, one possible option is to do nothing—to continue the old, comfortable policies. Though Anthony Kerr is not explicit, his book seems to suggest that further *real* integration is not in the offing—and that is not a bad thing, for mere cooperation has thus far resulted in unprecedented security, prosperity, peace, and freedom in Europe.

Another possible option for the United States, at least, would be to wash her hands of the problems of her allies, to abandon the internationalism of the last forty years in favor of a return to isolationism. That seemed to be the trend of the proposed Mansfield amendments, the War Powers Act, the Nixon Doctrine, the drawdown in Korea, and the Carter policy of nonintervention and arms-sales limitations in Africa. None of the books reviewed here are proposing that, but there doubtless could be found a good deal of sentiment in favor of it in America's heartland.

Another possible solution, according to *Common Security Interests*, would be the continuance of present policies in Europe and the Far East and a massive U.S. military buildup in the Middle East, the new theater. Of course, many proponents of that view could be found in Europe and Japan—arguing economics in NATO regions and ideology in Japan. Another means that might make this and other options more feasible would be to increase both military and economic efficiency through weapon standardi-

zation, or at least making weapons interoperable. The Warsaw Pact has an immense advantage over the West because it is made up of dictatorships dominated by Moscow and by standardization that has always been mandated. James Carleton in *NATO after Thirty Years* examines the history of standardization in the Atlantic alliance and finds the record a dismal one. Though sporadic progress has been made, it has not been commensurate with the effort, and great theoretical potential for new efficiencies remains.

Another possible solution put forth by Ambassador Johnson and his associates is that the West and Japan maintain the currrent deterrent forces in the older theaters and develop a new joint force in the new theater of the Middle East Japan could assume a compensating proportion of the economic burden, the larger European NATO members could deploy some military units—Britain and France have already done so unilaterally—and the smaller European NATO powers could compensate by picking up a larger part of the burden in Europe.

Yet another conceivable solution, also cited by *Common Security Interest*, would be for European allies to increase their military contribution there, for Japan to build real military forces in the Far East, and the United States to redeploy substantial forces from both theaters to the Middle East.

Of course, many in Europe and among American liberals, with perceptions of the threat at variance with the world views of these present authors, would discount any East-West military solutions in favor of North-South economic options. They feel that a world crisis is impending, and the only way to avert such a crisis is through a massive transfer of wealth from the industrialized democracies, especially the United States, to the developing world. Only in that way, it is argued, can the recovery of the Third World be capitalized.

Finally, some have argued that we cannot meet the threat if we acquiesce in the adversary's choice of the field for struggle, and we must

transfer the conflict to arenas where the West holds a better hand. We must use linkages to modify Soviet behavior by connecting something they want (say arms control, grain imports, technology transfer) to something we want (say, better Russian behavior in Africa and Afghanistan.) The Persian Gulf is so far from our base and so close to the Russian homeland that we can never hope to compete with them in a military way in that region.

Speculations on the Best Option

Doing nothing does not appear a viable choice—the world has changed too much since the NATO alliance was founded, the Japanese treaty was signed, and the economic integration of Europe was first undertaken. The United States can no longer manage the problem without more help or the reduction of the objectives.

At about the time of the Nixon Doctrine, both the United States and her allies appeared to look in the face of a return to isolationism; both were repelled by the notion. The Russians seemed to grasp immediately the opportunity that provided: Angola and Ethiopia, among other things.

A U.S. military buildup all around seems out of the question. The nation already spends more of her GNP on defense than do Japan and all of her European allies (grossly more than many of them), and the old disparity in standards of living no longer exists to justify that, even were it possible for the United States to do more.

If the others were to build up in their own theater and the United States redeploy to the Middle East, two major problems (and many other lesser ones) would arise. First, both Japan and the European members of NATO would lose the physical guarantee of American participation in their defense. Second, the United States might look over her shoulder in a Middle East contest and see nobody there—just as was the case in the Middle East in 1973.

The economic option applied in response to a North-South threat perception certainly would do little to inhibit demonstrated Soviet aggres-

siveness even in the Third World. Moreover, such a solution could not be sold to all of America's allies nor to a large part of the U.S. electorate. As Guy Pauker of Rand Corporation and others have argued, the history of foreign aid so far supplied inspires little confidence that it would make any real difference even if the North-South threat perception is correct. Monstrous economic problems do exist in the Third World, and they may, indeed, portend disaster. But I agree with those who think that these problems usually arise from even more fundamental cultural difficulties that cannot often be solved with economic instruments—unless the powers trying to solve them have the power and the will to impose the remedies by force, and that is something that the West will never do. Humanity is not famous for making decided cultural changes except under the duress of disaster. If such a disaster lies ahead, the West will not improve its ability to meet it by weakening its own economic and military base attempting to solve an insoluble problem with the economic instrument.

Attempting to modify Soviet behavior with linkages does not seem promising. The wheat embargo did not slow them down much and caused political problems in the American farm belt. Denying the U.S.S.R. technology transfer does not seem to inhibit her aggressiveness; it improves employment and dividends in Western Europe, but does nothing for the hungry people of Detroit or the hungry investors of Wall Street. Holding back the ratification of SALT II seems to mean little in Afghanistan.

Thus, by an oversimplified process of elimination, we arrive at the least bad solution: the adoption of a global view of deterrence, which would be founded on a basic strategic nuclear balance maintained mostly by the United States. This solution would be complemented by improved joint conventional deterrence in all three theaters. It would have to be accompanied by a greater assumption of the cost by the West Europeans and Japan in recognition of the great economic changes that have taken place since

World War II. Europe would have to see that a threat in the Middle East *is* a European problem. Japan would have to see that instability on the Central Front in Europe and unemployment in Detroit *are* Japanese problems. Institutions would have to be built by the United States, Japan, and Europe that would facilitate the development of new joint solutions and the selection of the best ones.

In the absence of disaster, the industrialized democracies will be very reluctant to lower the rate of growth in the standard of living as all this implies. New joint deployments to the Middle East will be hard to sell to pacifist segments of the electorates.

T HE solution posed earlier as the "least bad" is essentially the one recommended by *Common Security Interests,* which is good notwithstanding the fact that it is a group effort. It is one that should be read by the professional officer, and he should look forward also to a sequel with a greater input from Europe.

Like most group efforts, though, *NATO after Thirty Years* lacks continuity, and its parts vary in quality. The busy officer would find Scott L. Bills's chapter on NATO and the colonial world rewarding, but he need not tarry with the rest.

Sherwood Cordier's *Air and Sea Lanes* solution to the problem with the Atlantic line of communication is to build up the F-14 and A-6 forces and go forward with VSTOL and its supporting ships. That could be funded by cancellation of the F-18 program and reduction of the Aegis cruiser purchase plans. Cordier's arguments seem logical, but many Air Force officers would wonder whether the assumption that any war would last long enough for the sea LOC to make any difference is sound enough to warrant the changes in priorities that he suggests. The subject is quite specialized, and there is not enough really new in the book to justify the expenditure of reading time on it.

The Red Legions is worth the study time of the professional. It is well written and will give valuable insights to the strengths and weaknesses of the adversary. The second volume tabulates the responses Gabriel received from his subjects and is therefore of limited interest, but the first volume is definitely worth reading.

The Common Market and How It Works is less directly relevant to the air officer. However, it is interesting, easy to read, and would be a useful addition to his general education. The revisions for the 1980 edition are inept but do not greatly inhibit understanding.

MOST OF THESE BOOKS support my assertion that the dream of European unity has faded considerably, and all that can be expected for the present is peaceful cooperation. But Americans need not be unduly distressed about that. The continuance of the present situation guarantees that our European allies will need us as much as we need them to guard against potential threats on the Central Front and the Middle East. That, in turn, guarantees that in the last extremity our allies will at least consider the unemployment problem in Detroit. On the other hand, it is not difficult for the American skeptic to envision a truly united Europe, led by another Charles de Gaulle or worse, that would *relish* the impoverishment of the entire U.S. auto industry— and much else on this side of the ocean.

Troy State University, Florida Region

WHITHER NATIONAL DEFENSE?

WILLIAM S. LIND

AS A PROFESSOR of strategy at the U.S. Naval War College, Dr. Thomas Etzold is well placed to observe both the lesser and greater follies in current U.S. defense policy. *Defense or Delusion? America's Military in the 1980's* chronicles a number of them.† While the attempt to cover almost every defense issue in 259 pages results in some superficiality and stylistic problems, the book nonetheless makes an important contribution to the defense debate.

Its greatest merit is that Etzold looks beyond the question of the size of the defense budget to qualitative issues. He asks not just how much defense we need, but what kind. In doing so, he voices many of the concerns of the military reform movement—a loose group of both liberal and conservative members of Congress, civilian defense specialists, and (mostly younger) military officers who believe many current defense policies are conceptually flawed and will result in defeat no matter how large the defense budget. While Etzold may not view himself as a reformer, his book is de facto part of the literature of the reform movement.

Defense or Delusion? begins with a discussion of today's defense environment: the emergence of the Soviet Union as a genuine superpower, competing effectively with the United States across the military spectrum; dramatic changes in military technology, recently illustrated in the fighting around the Falklands; and the rise of the military power of smaller nations relative to *both* superpowers. Although Etzold does not draw out this last point, its strategic importance is profound. Policies developed in the late 1940s, when there were two great powers and many

power vacuums, cannot be extended indefinitely in an era where many small powers can defeat a superpower in the small power's own backyard.

Etzold sets the stage for his reform diagnosis of our military ills toward the close of his first chapter. In discussing the Iran rescue mission, he notes, "the Iran raid did not show a military in the peak of condition doing its best against insuperable obstacles and odds. Rather, it portrayed a military in crisis, unsuccessful in small matters, unfit, perhaps, to attempt larger ones." Appropriately, he then looks at personnel issues, reflecting the reformers' contention that people are more important than weapons for success in combat. He notes that the draft is not the central issue despite the heated arguments it generates. The main problem is not recruiting but retention: keeping people with seven to ten years of service whose technical and leadership skills are vital for combat effectiveness. Until the recent recession, they were leaving in droves, driven out in part by pay and benefit deficiencies but also by profound social and professional issues: family separation, constant moves from one duty station to another, and increasing substitution of management for leadership.

Indeed, a stronger case than Etzold makes can be offered that the worst personnel problems are not among the troops but in the officer corps. Careerism, instances of institutional dishonesty (such as detuning the F-15's engines without telling the pilots), and the bureaucracy's demand that internal "ricebowls" be protected even at the expense of combat effectiveness are driving out the people with the character and

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†Thomas H. Etzold, *Defense or Delusion? America's Military in the 1980's* (New York: Harper & Row, 1982, $14.95), 259 pages.

talent for combat. None of this can be changed by a return to a draft or by increases in the defense budget.

Etzold begins his chapter on weapons by stating correctly that

> America's advanced technology, once the source of military advantage, is becoming a root of military malaise . . . American military equipment has become so costly and so complex that training is difficult, maintenance demanding, and reliability doubtful. The inevitable result is a lack of readiness for war or crisis.

And, because our "high-tech" weapons cost so much, we cannot afford the numbers we need. As Senator Sam Nunn recently said, "We are pricing ourselves into unilateral disarmament."

The equipment chapter contains one of the book's more shocking revelations. At a time when the Navy wants two additional nuclear-powered carriers—at up to $17 billion for each carrier task force—Etzold writes:

> In the Navy's war games an unwritten rule prohibits the sinking of any American aircraft carrier. The carriers are so few in number and the Navy's tasks in war so great that to do without one is literally inconceivable. In more than five years of experience as an umpire and adviser in high-level war games, I have witnessed the unwillingness of senior naval officers to permit carriers to be sunk, even when taken under overwhelming attack . . . The carrier's sacrosanct role in modern naval thought prevents, in many if not all cases, the realistic assessment of possible results of combat even in the Navy's own internal games and analyses.

If the Navy's own war games are rigged in favor of the big carriers, then the Navy's advocacy of these ships comes into serious question. Are we being asked to build a grand fleet or a grand illusion?

As Etzold notes, nuclear weapons issues tend to raise intense emotions, and his chapter on the subject will probably do so. His discussion of the MX points out its major flaw—the inability to devise a satisfactory basing mode—though he dismisses the SUM alternative (putting the missiles on conventional submarines in coastal waters) too quickly. He advocates arms controls,

but he does not present them as a panacea, merely as useful components of our overall strategic deterrence policy, and that is a legitimate view. Overall, his treatment will probably prove too balanced for the hard-liners on either side, which suggests he is roughly on track.

The section on conventional—that is, nonnuclear—issues begins and ends on the right note: an emphasis on unpredictability and change as characteristic of war and therefore on the need to be able to improvise. Much of our defense planning today hinges on rigid scenarios, where the opponent is predictable and where his actions are repetitive. We strive for efficiency in set-piece situations, yet war demands *agility:* that combination of variety and rapidity which enables someone to turn uncertainty and change to his advantage, to see, decide, and act in war's fog and friction more quickly than the enemy.

When he gets into specifics, Etzold shows he is unfamiliar with much of the reform literature on ground warfare. He misses the essence of both the NATO issue—the fact that by making more effective use of trained European reservists we can have conventional superiority at little additional expense—and the Rapid Deployment Force problem, where again we can have superiority if we focus on light infantry warfare in the Zagros Mountains. His call for more readiness spending is correct, but he could make his point more strongly. Current defense plans call for a much larger percentage increase in procurement spending than in funds for operations and maintenance, meaning we are budgeting for *decreasing* readiness, despite all the hoopla about building up the military.

Etzold may "loose the bubble" on a few issues, but his book will stimulate thought among both professionals and laymen. He avoids the usual "spend less/spend more" trap and focuses instead on how to produce a better military—one that can win in combat. In view of our questionable military performance over the last three decades, it is an issue that deserves some attention.

Alexandria, Virginia

AMERICA AND THE WORLD ECONOMY

Major Steven E. Cady

FUTURE stability of the world economy will depend heavily on the specific economic programs of the United States and other nations. To hope for economic stability, Americans need to face some fundamental economic and political issues.

- What significant changes have already taken place and seem probable in the future?
- What are the current challenges to the American economy and the world economy?
- How do these challenges relate to foreign policy?
- What role will the United States play in trying to stabilize the world economy?

These and related concerns are addressed in six recent books dealing with economic issues.

Constitutional Change

At the time of the founding of the nation, *transfers** represented only a minor segment of our overall economy; now they constitute a significant portion of the gross national product. According to some authorities, Americans now live in a virtual transfer society. The consequences include decreasing productivity, the increasing devotion of resources to obtaining and maintaining transfers, and considerable social tension over the legitimacy and allocation of transfers. The development of today's transfer society was neither sudden nor the result of a conscious decision: it has occurred incrementally over time. During the course of the nineteenth century, the national economy came increasingly to be regarded as a pie with fixed boundaries.

This is the view of Terry L. Anderson and Peter J. Hill in *The Birth of a Transfer Society*.† According to Anderson and Hill, American public philosophy, as reflected in ideas about legal-political order and constitutional concepts, became confused about a century ago. The Founding Fathers had had the wisdom to know that governments have a natural proclivity for getting out of hand. Accordingly, they sought to keep the state productive by imposing severe constitutional limits on the state.

That basic concept changed dramatically late in the nineteenth century. Government's alleged pursuit of the public interest justified the initiation of transfer activity motivated by changing legal ideologies and newly dominant political coalitions. The entire complex of institutions and agencies that Americans now call government came to be recognized as a source of transfer profits.

In the late nineteenth century, the perceived maldistribution of income, the problems of organization, the deterioration of the environment, and the closing of the frontier contributed significantly to the changing role of government in the nation's economy. Since most citizens blamed their problems on imperfections in the market system, "not surprisingly they called

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*Nonproductive activities increasing the wealth of individuals but decreasing the wealth of the society; a current example would be the transfer of stock or registered bond ownership from the books of an issuing corporation or its agent.

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†Terry L. Anderson and Peter J. Hill, *The Birth of a Transfer Society* (Stanford, California: Hoover Institution Press, Stanford University, 1980, $6.95), 130 pages.

on government to use its coercive power to alter the results of the market allocation of resources." (p. 59)

By 1915, the major barriers erected by the Founding Fathers against large-scale legislative transfers had been weakened dramatically and the groundwork laid for the birth of a transfer society. The transfer society was "established by 1917" and "has grown in the last sixty years," but "its essential character has not changed." (p. 69) Recent Supreme Court rulings encourage the growth of a transfer society, strengthening the power of the federal government. The result, according to the authors, is that the United States is now characterized by "constitutional anarchy." (p. 92)

Current Challenges

While William Fellner's *Contemporary Economic Problems, 1980* is less pessimistic about the nation's future, his work recognizes that contemporary America has definite problems.† Most of the studies in this volume concern issues relating to the present inflationary environment and its damage to the American economy. Many of the studies, such as one by Fellner himself, analyze problems in which interest is reviving largely because of inflation. Fellner deals with corporate asset-liability decisions, maintaining that recent shifts are "shifts to a riskier position, since the inflationary environment that has developed no available mix of specific assets could convey the same assurance of maintaining its real value as do the safest liquid assets in a non-inflationary world." (p. 77)

The writers represented in this volume are not only concerned with a variety of specific economic problems but also about the possible failure of present inflation-fighting programs.

Many of the writers would agree that a gradualist anti-inflationary program has a good chance of currently succeeding. Such a program would gradually reduce the inflationary increase of America's gross national product, recently close to a 12 percent annual rate, to a noninflationary level of about 5 percent. To restore the credibility of "the pre-1965 policy posture" would take some time. However, there is still a good chance of eliminating the present inflation in roughly four years, with much less discomfort than that which would be caused by unalleviated "shock treatment." (p. 2)

What if gradualist anti-inflationary efforts should prove unsuccessful? According to Fellner, time has about "run out on gradualism ..." (p. 3) If present gradualist efforts should fail, the accelerating tendency of inflation would reassert itself. Before long, the only choice would be between restoring price stability abruptly or allowing the United States economy to become chronically inefficient.

If gradualism failed, the questions that would have to be given first consideration concern methods of absorbing the shock that would be caused by sudden stabilization. Any solution involving a legal adjustment of past contractual obligations "would be apt to hit and miss a good deal that it would be desirable not to hit or to miss." (p. 7) According to Fellner, this is all the more reason to consider the advantages of developing a policy of gradualism with "clearly perceptible speed." (p. 8)

In addition to the inflation problem, Robert L. Heilbroner and Lester C. Thurow's *Five Economic Challenges* deals with other significant contemporary problems.†† The authors point out that, like "great threatening clouds," five economic challenges—inflation, recession, big government, the falling dollar, and the

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†William Fellner, editor, *Contemporary Economic Problems, 1980* (Washington: American Enterprise Institute for Public Policy Research, 1980, $9.25), 342 pages.

††Robert L. Heilbroner and Lester C. Thurow, *Five Economic Challenges* (Englewood Cliffs, New Jersey: Prentice-Hall, 1981, $5.95), 140 pages.

energy crisis—"loom over our lives." These challenges "wrack America not just because of the damage they inflict, but because of the confusion they bring." Americans do not understand where the "great storm clouds come from or what gives them their enormous power." As a result, the challenges demoralize Americans and are not only assaults on "our economic well-being but on our psychological well-being."

According to Heilbroner and Thurow, "the real challenge—the challenge below the economics of inflation and unemployment, government spending and taxing, international competition and the energy crunch—is political." (p. x) The challenge is to find acceptable resolutions to these difficulties; it is not the economics of the five challenges but their politics that is difficult.

The authors believe that political decisions are inextricably interwoven with such problems and that every economic solution to the challenges is political because it will favor one group, region, or constituency more than another. There are numerous economic proposals that *might* be adopted to deal with the challenges. Whether they *will* be adopted "depends almost entirely on the political consensus we have achieved." (p. 131) Even a goal as seemingly bland and universally approved as raising American productivity depends on the political capacities of Americans. For example, the ability to shift resources from failing to promising regions and industries depends on the political determinations of Americans, for these resources include voting, perhaps protesting, men and women. In a word, therefore, "it is politics that sets the limits of economics." (p. 132)

Foreign Policy Concerns

There has been a conspicuous absence of effort by foreign policy specialists to focus their research on the relationship between political and economic factors influencing the foreign policy behavior of states. Stressing the predominance of political factors over economics, foreign policy researchers have come close to treating political factors as if they could be disentangled from economic factors. Rising global interdependence invites consideration of how foreign policies are formulated in response to this development.

Charles W. Kegley, Jr., and Patrick J. McGowan in *The Political Economy of Foreign Policy Behavior*, argue that "defense policy and foreign policy are two sides of the same coin, each aiming to adapt national societies to their own changing environments."† Their volume examines the relationships between defense and foreign policy. The global environment is characterized by "unprecedented change." Of all the many changes now taking place, none is more profound than the emergence of new levels of complex global interdependence among various states. As relationships among nations have become more closely intertwined, "the interplay of political and economic conditions has assumed increasing importance." (p. 7) According to the editors, the growth of international trade and the increasingly interlocking nature of the world's economy compel paying attention to the conduct of both political and economic transactions.

The many topics covered in this volume fall into several logical categories, which tend to delineate a clear relationship between the political-economic perspectives and the foreign policy postures of the nations of the North and those of the South and between the many issues associated with them. Widely varying degrees of congruence in foreign policy behavior between nations of the North and the South are discerned. This exercise leads to the conclusion

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that diverse world-system effects are to be expected and that these effects depend on levels of global growth and development, reflecting reorientation in foreign policy behavior. The concluding chapter uses Albert O. Hirschman's theoretical constructs of "exit" and "voice" options to conceptualize foreign policy options. Writer Kuniko Y. Inoguchi concludes that the "key to the game lies in the ability of developing countries to raise their voice option to a super-effective level, as well as in their efforts for partial exit policies." (p. 273)

Cooperative Proposals

In two final volumes, Walt W. Rostow, tries to analyze contemporary economic problems from a broad perspective and calls for cooperative ventures to resolve these problems. Rostow's *The World Economy* traces economic history since the eighteenth century and ends with the problems facing the world economy today.† The most critical period for industrial civilization according to Rostow will be the next 25 years.

The world economy has followed a path determined by the interaction among the forces operating within the international economic, political, and military arena, and the "national histories of modernization and failure to modernize. (p. 365) The world economy now includes nations at quite different points in the unfolding process of absorbing efficiently the pool of modern technology.

The Organization for Economic Cooperation and Development (i.e., the industrial world), according to Rostow, enjoyed one of its strongest surges during the boom which peaked in 1973-1974. However, certain significant economic sectors were struck hard by the "price revolution of 1972-1977." (p. 567) That price

revolution and its causes dramatized the fact that for a period the input required to sustain industrialized societies would have to be expanded. This expansion would constitute not merely the basis for necessary structural adjustments in the world economy but also the foundation for a return to high levels of employment and resumed steady growth.

As nearly as he can perceive "through the mists of the future, with imperfect data and imperfect understanding," Rostow believes that the hardest part of the transition facing Americans and the inhabitants of other nations is the one "on which we are now embarked." (p. 581) During the next 25 years, the people of the world will make or fail to make major changes in technology, public policy, and attitudes that will significantly determine the character of the next century.

Rostow therefore concludes that the political agenda required by this view poses a challenge to nations—to their domestic dispositions and to their capacity for cooperation. In the final analysis, the change required most is the gradual acceptance of the reality of common experiences, common dangers, and common goals. Gradually, the common goal of preserving industrial civilization may "come increasingly to suffuse the minds of men as well as the policies of governments." (p. 658)

Rostow's *Why the Poor Get Richer and the Rich Slow Down* elaborates on themes enunciated in Rostow's earlier work.†† The essays in this volume are unified by Rostow's insistence that neo-Keynesian and neoclassical theory are an inadequate basis for economic analysis and policy prescription. Rostow concedes that the Keynesian revolution demonstrated that unemployment is an act of man, not of God. It proved that man has the power to prevent depression and recession. However, "what Keynes did not

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†Walt W. Rostow, *The World Economy: History and Prospect* (Austin: University of Texas Press, 1978, $40.00 cloth, $20.00 paper), 877 pages.
††Walt W. Rostow, *Why the Poor Get Richer and the Rich Slow Down* (Austin: University of Texas Press, 1980, $22.50), 394 pages.

teach us was how in a democracy you maintain full employment without inflation." (p. 323)

Rostow presents a program designed to halt inflation. Evoking the image of Rousseau, Rostow insists that a "social compact must be sought." (p. 330) What is the substance of this compact? Labor must be confident that its real wages will be protected and that it will obtain a fair share of society's increases in productivity. At the same time, industry must be assured that the level of wages will not rise beyond productivity increases. Also, industry must be confident that wage guidelines will be maintained and that it will be able to operate in a stable environment.

The role of government must be to lead the way. Where government is involved in negotiations with labor, it must demonstrate that the link between wages and increased productivity will be maintained. Above all, government must set an example of efficiency where it has production responsibilities and in government expenditures, "so as to demonstrate at the heart of national life that the objective of the economy is to use resources efficiently." (p. 331)

Rostow's calls for international and domestic cooperation are thought-provoking. He offers some profound insights into America's economic problems and the world economy. Whether his observations prove to be realistic in the light of future events only time can demonstrate. Meanwhile, Americans must keep their options open regarding economic changes. The United States must stand ready to deal with events in the world economy as well as in its own. Even if events in the next quarter of a century do not prove to be as critical as Rostow believes they will be, global involvement will certainly be necessary, and new economic problems will surely develop. Therefore, Americans must remain alert for the emergence of new problems and be prepared to respond to them, regardless of whether the problems are in the domestic or in the world economy.

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The ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed, the world is ruled by little else.

John Maynard Keynes
The General Theory of Employment, Interest and Money, 1947

REFLECTIONS ON
THE STRATEGIC TRIANGLE

DR. ROBERT G. MANGRUM

SINO-SOVIET relations and their relationship to the United States in the western Pacific are the subjects of two new publications. The first, a historical study, *Soviet-American Relations in Asia, 1945-1954* by Russell D. Buhite, examines the United States' redefinition of its interests in Asia in the decade following World War II.† Buhite's study, based on recently released documents, focuses on China, Taiwan, Japan, Korea, and Indochina, which have been the objects of Soviet-American competition. The U.S.S.R. is portrayed as an aggressive and expansionist power whose aspirations included not only control of the Kuril and Sakhalin islands but also domination in Mongolia, Sinkiang, Manchuria, Korea, and Japan. Although Southeast Asia was beyond the reach of Soviet power, Stalin's objectives there included the eventual expulsion of the Western European colonial regimes.

The United States refused to accommodate some of these aspirations. To the dismay of Stalin, the United States retained control of Japan and tried hard to achieve a non-Communist decision in the civil war in China because Washington assumed a Communist China would become a Soviet client state. Following the Communist victory, the State Department determined to keep Taiwan free of Communist control. In Korea and Indochina, the United States, out of fear of an ever-enlarging Soviet Empire, employed military force to contain Communist advances.

Buhite, answering the critics of American policy during these crucial years, contends that Washington was not intellectually bankrupt, paranoid, or imperialistic. The United States read Soviet intentions accurately; however, the United States must bear heavy responsibility for the intensification of the Cold War in Asia. In underestimating the willingness of the Chinese, Koreans, Indochinese, and others, to defend their interests and in overestimating Soviet capabilities and U.S. military strength, American officials, Buhite contends, made unsound judgments concerning where and how to restrain Soviet advances. Compounding this was the unconscious acceptance of generalizations concerning Soviet behavior and the Cold War mentality. Thus, "Post war American policy in Asia is the story of the flight of thoughtful and able men to the unquestioning acceptance of ... 'credibility,' 'domino theory,' and 'ideological imponderable,' and to a theory of interest largely predicated on these intangibles." (p. xii)

In applying the historical record to the future, Buhite asserts "major interests must not be militarized and that imponderables like credibility and prestige are not adequate grounds for military intervention. Even in this era of intercontinental missiles, multiocean navies, and global economic dependencies there must surely be geographic and dollar limits on American interest." (pp. 234-35)

EDITORS, Douglas T. Stuart and William T. Tow, of *China, the Soviet Union,*

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† Russell D. Buhite, *Soviet-American Relations in Asia, 1945-1954* (Norman: University of Oklahoma Press, 1981, $14.95), 256 pages.

and the West consider the strategic and political questions confronting the West in the 1980s.† The relationship between the Soviets and Chinese is of importance for security considerations in the coming decade. This volume is a collection of original articles by many respected Sinologists and Sovietologists and is based on a conference on Sino-Soviet relations held during May 1980 in Garmisch, West Germany. The various articles provide viewpoints, oftentimes conflicting, concerning the subjects of determinants of Chinese and Soviet foreign policy behavior, military determinants, regional competition, and policy considerations for the West.

In considering determinants of Chinese and Soviet foreign policy behavior, key background factors such as history, culture, and ideology were examined. Such factors have an indirect influence on policy, by structuring elite and mass public opinions and setting outer limits of political experimentation. Sources of the Sino-Soviet dispute would include the geographic factor (the long border and disputed areas), the ethnic element (with a profound anti-Chinese feeling on the part of the Russians), and ideology differences. During the Khrushchev period, the most important of all the issues inflaming Sino-Soviet relations were differences concerning the United States. Moscow had no direct conflict of national interests with the United States comparable to Beijing's resentment over U.S. protection of Taiwan. The Cuban missile crisis, relations with the Third World and relations between the Soviet and Chinese Communist parties also contribute to the dispute. "Earlier, the Chinese had been the more militantly anti-American of the two Communist powers; now the opposite was the case. The Soviet threat was beginning to drive China more or less into the arms of the Untied States." (p. 14) As a result,

China strongly supports NATO and opposes Helsinki-type détente in Europe because it does not want Moscow to feel confident in transferring military assets from its European to its Far Eastern front. With the advent of Nixon and Carter and normalization, the United States was ready to "play the China card" against the Soviet Union. This normalization "gave Moscow some reason to fear the emergence of a triangular anti-Soviet détente among the other major Far Eastern powers." (p. 20)

In the concluding section of the work, insight was provided into future policy considerations for the West. Drew Middleton, military correspondent of the *New York Times*, noted the "virtual impossibility" of establishing and following a coherent foreign policy in the United States. The new condition exposed by the various fluctuations of U.S. foreign policy is the perceived decline in the international position of the United States. What the United States does in the future will be critical in relations with China and the Soviet Union.

AN ANALYST at the Rand Corporation, Jonathan D. Pollack, concluded that "the Sino-Soviet rivalry ranks among the most enduring conflicts of the post war era." (p. 275) What began as a personalized and ideological dispute has evolved into a heated and bitter debate over the extent to which contemporary political and military conditions compelled or allowed accommodations with the West. The result is that China is now searching for a security that relies to a significant extent on close ties with the United States and the West. Three key concerns will dominate China's quest for enhanced security: the long-term competition with the Soviets, the domestic development tasks (the four modernizations),

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†Douglas T. Stuart and William T. Tow, editors, *China, the Soviet Union, and the West: Strategic and Political Dimensions for the 1980s* (Boulder, Colorado: Westview Press, 1982, $30.00 cloth, $13.95 paper), 320 pages.

and the task of becoming modern in the area of national defense.

On the other hand, the Soviets seem optimistic that the dispute with China will end and normalization of relations will be achieved. Whether this "strategic triangle" continues depends on the future relationship between China and the Soviets. Such an event could provide tangible benefits for both China and the Soviet Union. "This observation presents the West with a major dilemma, especially in the context of the present U.S. willingness to depart from a policy of evenhandedness between Moscow and Beijing." (p. 290) As a result, the West must maintain flexibility in their planning of foreign and security policies in order to continue to "play the game."

Howard Payne University
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POTPOURRI

The Global Politics of Arms Sales by Andrew J. Pierre. Princeton, New Jersey: Princeton University Press, 1982, 352 pages, $20.00 cloth, $5.95 paper.

New book jacket blurbs are usually extravagant. However, the publisher's claim that Andrew J. Pierre's *The Global Politics of Arms Sales* is "the first comprehensive book on this important, but little understood, subject," is probably correct. The later assertion that Pierre "clarifies the dilemmas in reaching judgments about arms sales and suggests a new approach to the vexing question of how to achieve international controls" is less persuasive.

For one long involved in the details of United States weapon sales, the book was difficult to review. Dr. Pierre has assembled an enormous amount of information—numbers, types, costs, and dates—from a wide variety of sources. Specifics such as these raise questions that defy memory and must be verified by research. That research, in some detail across a significant number of United States samples, found the material accurate in every case, which is a remarkable accomplishment for such a complex subject and marks the volume as one that will be of special and continuing value. Many specialists—historians, military planners, diplomats, scholars, journalists, political analysts—will find this wealth of information useful. That they all will probably interpret it differently should not be laid at the door of Dr. Pierre.

In the same sense, we should not uncritically accept the author's conclusions, nonspecific as most of them are. The *New York Times* reviewer took Dr. Pierre to task for "his many breezy generalizations," but the fact is that Pierre, far better than the media, understands the intricacy of the subject. While in one passage he states that he has "not hesitated to offer . . . [his] own preferences and policy judgments," he admits that "intuition rather than accepted wisdom must serve as guide" and remarks on the "circularity" of the arms debate, with its valid arguments pro and con on nearly all issues.

Accordingly, we must accept this Council on Foreign Relations Book for what it is, an extraordinary compilation of the basic information available on worldwide arms transfers. As such, it is exceptionally well done and deserves close attention. While we may quarrel with some assumptions—for example, I feel that in measuring the significance of European arms exports by their relation to employment or trade balance Dr. Pierre misses the more important point of maintaining a measure of national self-sufficiency (as in the case for Sweden's fighter export efforts)—nothing should detract from the fact that this is a one-of-a-kind book. There is no other source for much of the information he presents. *The Global Politics of Arms Sales* should, for this reason alone, be useful to most military professionals. At a time when it is difficult to imagine a full service career that does not entail important responsibilities relating to foreign forces, the book might well be considered a required reference in the officer's library.

General Bryce Poe II, USAF (Ret)
Alexandria, Virginia

Pak Six: A Story of the War in the Skies of North Vietnam by Gene I. Basel. La Mesa, California: Associated Creative Writers, 1982, 175 pages, $7.95.

In the mid-1960s, Gene Basel was a young fighter pilot itching to get into the Vietnam War and afraid the war would pass him by. In 1967, he got his ticket to the war and reported to Takhli for a tour in Thuds with the 354th Tactical Fighter Squadron. He entered the war eager for the excitement of combat. By the time he was shot down and severely injured on his 79th mission eight months later, he

had become a shaken, disillusioned man. Thirty-four of his missions were in the infamous Pak Six area, which contained the toughest, most heavily defended targets in North Vietnam. His most memorable missions into Pak Six form the heart of this account of the air war in Southeast Asia.

All the noise, excitement, fear, and horror of modern aerial warfare are vividly portrayed by the author. You roll in with Basel against targets surrounded by the ugly, winking eyes of antiaircraft guns. You watch Weasels play a macabre game of cat-and-mouse with surface-to-air missile sites as they seek to protect the strike force from SAMs. You fly through the deadly defenses of Hanoi, where exploding 85-mm antiaircraft shells produce instant layers of black clouds and the smoke trails of Thud-chasing SAMs crisscross the air.

Basel's narrative is fast and exciting, but this does not mean the book avoids all the issues of the war. The resentment pilots felt over some of the rules of engagement surfaces as does the dilemma the short-tour policy posed for the Air Force in Vietnam. On the one hand, people die needlessly when leaders try things that had been tried with disastrous results on a previous watch. On the other hand, you understand the necessity for short tours when at the end of 76 missions, Basel takes inventory of the 16 pilots with whom he had trained and gone to war—seven have been shot down in the eight-month period in which the 76 missions were flown.

There is more emotion than analysis, more feeling than cold observation, but it is a fascinating memoir of one of the least understood episodes in American air power history. Virtually everyone in blue will find *Pak Six* easy, enjoyable reading.

D.R.B.

Arms and the Men: The Arms Trade and Governments by Basil Collier. North Pomfret, Vermont: Hamish Hamilton, 1980, 315 pages, $35.00.

Basil Collier introduces this fine study with a chapter provocatively titled "Merchants of Death?" in which he recalls the arguments allegedly included in the 1921 Report of the League of Nations Temporary Mixed Commission on Armaments; namely, that armament firms had fomented war scares to persuade their own countries to adopt warlike policies, had tried to bribe officials at home and abroad, and inter alia, had accentuated the arms race and increased the costs of armaments by forming international armament rings. He writes that the League commission never stated that the arms firms had indulged in such activities, despite repeated public assertions over the years, and the accusations were in fact no more than general headings under which objections had been raised about private arms manufacturing. Collier, the author of five books about World War II, a wartime Royal Air Force intelligence officer, and experienced official historian, suggests that the case against the "merchants of death" is not proved.

The major portion of *Arms and the Men* is devoted to a chronological treatment of armaments, with chapters on

Armageddon (World War I), the U.S. intervention, the postwar period and rearmament in the 1930s, World War II, and the postwar world without peace.

Collier points out that the British arms industry, for 40 years before World War I, had existed on foreign orders and that it could not meet the demands placed on it by government, which soon decided how the private firms would use their assets, controlled their prices, and made them partners. Collier found no grounds for the popular belief that four years of trench warfare enabled the arms manufacturers to "wax fat on swollen profits" (p. 111), nor does he uncover evidence that British arms makers expected to profit by prolonging the war or that their influence was decisive in doing so. (p. 132)

In 1934, the American arms trade was noisily investigated by the Nye committee (The U.S. Senate Munitions Committee, chaired by Senator Arthur Vandenburg, one of whose assistant legal advisers was Alger Hiss). The committee's activities led to no significant change in the structure of the U.S. arms industry but did precede the enactment of legislation meant to prevent the U.S. government from embroiling the United States in any future European war. The Johnson Act (1934) and the Neutrality Act (1937) so restricted the scope of U.S. cooperation with our future allies as to seem surreal today.

Detailing the cooperation and rearmament of Britain and the United States during World War II, Collier finds both nations starting with a nucleus of specialty firms and government factories, expanding the productive capacity on the efforts of thousands of firms with little or no experience in the arms business, and by encouragement of subcontracting. By mid-1945, nearly 30 percent of the value of contracts was assigned to firms with fewer than 500 workers.

In the postwar world, the arms trade includes nearly every type of equipment or weapon as an article of commerce except nuclear arms. World War II surplus arms and material were distributed almost worldwide, and redundant or obsolescent equipment was sold at bargain prices. Now major industrialized nations supply high price world-class systems to ready buyers. Arms embargoes have been conspicuously unsuccessful (in Angola, South Africa, and Rhodesia, for instance). The control of the international arms trade seems unlikely, and it will continue to be an important means to achieve or alter balances of power.

Get this one from your local library. The price is too high.

Dr. James H. Buck
University of Georgia, Athens

General John Sedgwick: The Story of a Union Corps Commander by Richard Elliott Winslow III. Novato, California: Presidio Press, 1981, 178 pages, $20.00.

Having been mined for more than a century, the mother lode that is the Civil War continues to be worked by historical prospectors. That the ore is becoming less rich, however, is evidenced by this "Story of a Union Corps Commander." It is not that Richard Winslow has not done a

creditable job of researching and presenting information on General John Sedgwick. The problem is that with so little to work with there are few new insights to offer. The backdrop he provides to Sedgwick's role is standard fare for Civil War students (and who but such buffs are likely to pick up this book), much of it a rehash of material on the Army of the Potomac's activities with an extra spot on Sedgwick's command. Because Sedgwick wrote so little and was killed during the war, his biographer is often forced to rely on the stated attitudes and observations of others with the tagalong that "Sedgwick felt the same way."

This is not to say that the study lacks merit. The section on the Battle of Chancellorsville—Marye's Heights offers a different and useful perspective on this much-studied campaign. Moreover, the subject is of interest because Sedgwick did command the largest corps in the Army and was, based on his seniority, several times acting commander of the Army of the Potomac. Although Winslow strains at times to paint a more positive picture, the portrait that emerges rings true: an old man who would rather have been retired, who generally lacked imagination, who rarely questioned the questionable decisions of others, who did not always have a firm grip on his command, but who possessed "endurance and steadfastness." In short, a general who was conscientious and adequate but certainly not outstanding. During his pursuit of Lee after Gettysburg, Sedgwick at one point "decided to remain where he was and await orders." This decision probably typifies Sedgwick and in turn makes him typical of so many of the senior commanders of the Army of the Potomac. However useful they might have been, the "endurance and steadfastness" that marked the Army of the Potomac before 1864 were not in themselves sufficient to win the war.

Winslow correctly states in his introduction that "Sedgwick rightly deserves his own biography." Given the conscientiousness with which this biographer has mined the available vein and examined the scanty ore thus produced, it is unlikely General John Sedgwick will require another.

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Secretaries of War and Secretaries of the Army: Portraits and Biographical Sketches by William Gardner Bell. Washington: United States Army Center of Military History, 1981, 176 pages, $12.00.

Since the birth of our Republic, the military has been directly controlled by civilians. The interface of military-civilian relationship developed slowly in the process of our history. The functional development of this relationship took place in various American military headquarters. As military custodians for the defense of our country, we ought to be aware of the dynamics that occurred in our historical development and of the civilians who directly controlled our faith.

In his introduction, William Bell begins with a chronological look at the locations of the buildings that housed the decision-makers for the military's war-fighting capabilities. He begins with a description of the first Army Headquarters building, the Fraunces Tavern in New York City. Then he shows how these buildings evolved into our present-day Department of Defense headquarters, the Pentagon in Washington, D.C. With each, he gives a brief summary and illustration of the structure.

Bell next portrays the civilian leaders, the War Secretaries from Henry Knox to Kenneth Royall, and closes with the Army Secretaries from 1947 to the present (1947 was when the combined military secretaries became one, the Secretary of Defense). With each portrait Bell provides biographical sketches of each secretary and supporting captions of the artists who painted the portraits.

The book concludes with an appendix on interim officials, a chart of the Secretaries with their respective President(s), and a general bibliography of the department, the civilian leaders, and the portrait artists.

This book is not detailed enough for the individual doing intensive study or research. It does, however, make a fine browsing, tabletop book, interesting, and entertaining for the beginner in military history or for the individual who just wants a somewhat general summary.

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Inflation, Exchange Rates, and the World Economy: Lectures on International Monetary Economics, Second Edition, by W. M. Corden. Chicago: The University of Chicago Press, 1981, 174 pages, $15.00 cloth, $4.00 paper.

Inflation, Exchange Rates, and the World Economy is an important and timely book, inspired by the economic events of the middle-seventies. It deals with four topics in international monetary economics: balance-of-payments theories, inflation and exchange rates, the international adjustment to the oil-price rise, and monetary integration in Europe. The role of exchange rate variation as an instrument and measurement of economic policy is a central theme. Although these topics are not necessarily the most current in the study of international economics, W. M. Corden's approach is essentially analytical. Economic theory is used for the analysis of problems, and there is a great emphasis on the construction of appropriate economic models. Consequently, the contribution of this book lies not in judgments or assessments of the events presented but rather in its methods of analysis and as a framework for international economic theory.

The book is of particular value to those in operations research, war-game modeling, and strategic analysis. Wars are most often the result of economics with appropriate ideology used for its justification. The balance of payments has been a sore point with many countries around the world. It is a prominent issue in the affairs of the United States with respect to our allies in NATO and throughout the world. Balance of payments could significantly affect

continued viability of the United States in maintaining its current military presence overseas.

Chronic inflation problems have historically preceded the outbreak of hostilities. Exchange rates vary as a function of the inflation of the various monetary systems in the international money market. The book looks at these issues from both symmetrical and asymmetrical analyses as well as at the reserve currency issue of this country and the United States as a cause of world inflation.

The effects of the oil-price rise is analyzed with respect to macroeconomic effects and also builds on the balance-of-payments, inflation, and exchange-rate theories discussed earlier in the book. The viability of U.S. military operations is wholly dependent on the uninterrupted availability of oil resources. Possible disruptions to the flow of oil come not only from potential military interdiction by hostile forces but also from the strategic use of economic pressures.

Discussion of European monetary integration is relevant to our NATO alliance. Strategic U.S. planners must consider the possible effects on our military posture by economic pressures brought to bear on our NATO allies by other non-NATO countries in an integrated European monetary system. Many of our scenarios consider a European campaign extremely likely. A European monetary system could have significant effects on the economic abilities of various member-nations to conduct military operations effectively, if at all.

Inflation, Exchange Rates, and the World Economy is an analytical study and recommended reading.

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Professor Murray R. Berkowitz
Graduate School of Management
The University of Dallas, Texas

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information was passed on to those who were actually building the line.

The construction itself does not occupy much of Mitchell's attention in *The Opening of Alaska*. The book is essentially a collection of campfire anecdotes presented more or less chronologically with the line construction hovering in the background to tie them together. While it is partly a travelogue and survival kit for living in the Alaskan wilderness at the turn of the century, it is also a celebration of America's last frontier and the spirit of the men and women who learned to live with it. Mitchell obviously counts himself among these pioneers and regularly highlights examples of his own youthful determination, intelligence, leadership, and stamina.

As a historical document, the book would be less valuable if it were not for Lyman Woodman's careful editing. As he says in his preface, Mitchell was not a historian; his dates are often shaky, and the descriptions of some events are the result of hearsay rather than careful research. Woodman adds editorial details, explanations, and corrections to the text in an informative and unobtrusive way, putting the events in correct historical perspective while allowing the reader to enjoy Mitchell's style.

Generously illustrated with original photographs, *The Opening of Alaska* is an entertaining glimpse at life both in the northern wilderness eighty years ago and at a middle-aged Mitchell's view of himself at the beginning of his military career. While the student of military communications technology will find very little of consequence in this book, historians interested in Alaska and in Billy Mitchell will find a good deal more.

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Major Bruce L. Ullman, USAF
Air Command and Staff College
Maxwell AFB, Alabama

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The Opening of Alaska 1901-1903 by Brigadier General William L. "Billy" Mitchell, USAAC, Lyman L. Woodman, editor. Anchorage, Alaska: Cook Inlet Historical Society, 1982, 111 pages, $8.25.

Although written by General Billy Mitchell in 1935, "... these reminiscences of his experiences while working on the military telegraph line in Alaska during 1901-1903" have been published before, once in a much-reduced version (*American Heritage*, February 1961), and Ruth Mitchell, the general's sister lifted large portions of it in writing her brother's biography. They cover Mitchell's early career with the Signal Corps, during which he had no connection with air power at all. He served in Cuba and the Philippines from 1898 to 1900 laying telegraph lines, and in 1901 he went to Alaska at the request of Brigadier General Adolphus Washington Greely, USA, the Chief Signal Officer, to report on the progress of military telegraph construction.

Most of Mitchell's two years in Alaska was spent troubleshooting and trailblazing. His first report showed that progress was possible on the line year-round instead of just during the short summer months. He surveyed possible routes and learned a great deal about the territory and ways to deal with it from Indians and sourdoughs alike. All this

The Morality of Terrorism: Religious and Secular Justifications edited by David C. Rapoport and Yonah Alexander. New York: Pergamon Press, 1982, 377 pages, $30.00.

The chief contribution of *The Morality of Terrorism* is to remind us of the religious roots of terrorism and focus attention on religious and secular justifications, or lack thereof, for terrorist activity. David Rapoport provides a brief general introduction, an introduction to each of the three parts, and a substantive chapter. Alexander's contribution is neither apparent nor discussed.

Part I, Religious Terror, maintains that religious studies can throw light on secular terrorism either by drawing appropriate analogies or by calling attention to theological concepts used to justify terror. Religious terror, we are told, first appeared in Judaism (the Zealots), later finding expression in Islam (the Assassins) and Christianity (the Taborites) as well.

Part II, State Terror, offers discussions of terrorism in revolutionary France, Fascist Italy, Nazi Germany, and Stalinist Russia. Curiously, the Soviet case consists exclusively of a "document" whose authenticity is not estab-

lished and whose author is not known.

Part III, Rebel Terror, examines the morality of or justification for terrorism from varying perspectives. At one pole, some consider the very idea of terrorist activity as inherently immoral. On the other hand, to the terrorist mind, terrorism is always justified, even though at times he or she may be called on to pay a "moral price" by risking death or actually dying in the process. In calling attention to one's moral rectitude and in demonstrating sincerity in suffering, the terrorist attracts public sympathy and support. Similarly, by provoking the government into overreaction and indiscriminate terror, the terrorist succeeds in guilt transfer.

The Morality of Terror succeeds in its objectives. On the other hand, Part II is sorely disappointing and incomplete—disappointing because the cases treated are among the most familiar; incomplete because one looks in vain for discussions of state terror under routine rather than exceptional circumstances: contemporary Argentina, Brazil, Chile, South Africa, South Korea, and Taiwan come immediately to mind. Moreover, Rapoport has a tendency to exaggerate the novelty of some of his own notions, such as the old distinction between violence and terror or between state terror and rebel terror.

<div align="right">Dr. Mostafa Rejai
Miami University, Ohio</div>

USSR: The Corrupt Society by Konstantine Simis. New York: Simon & Schuster, 1982, 316 pages, $14.95.

Konstantine Simis has written an informative, nonpolemical, and eminently readable book that gives the reader an unusual insight into Soviet life. Drawing on seventeen years as a practicing attorney, Simis presents an anecdotal, entertaining account of the corruption endemic to Soviet society. The original manuscript of *USSR: The Corrupt Society* was seized by the KGB in 1976, and the author and his wife—a noted attorney in her own right—were forced to emigrate. An early draft of the book survived in the West, and the author has spent the last few years preparing it for publication. One can readily see why the KGB wanted to seize this book as it is a devastating indictment of the Communist Party's misrule.

For Simis, the U.S.S.R. is one large Potemkin village where behind a façade of socialist equality is the reality of an utterly corrupt and venal oligarchy—the Communist Party of the Soviet Union. Private enterprise flourishes in this environment as everyone from top to bottom seeks to compensate for the consistent material shortages and pervasive economic mismanagement. Private enterprise ranges from outright capitalist entrepreneurs (known as *shabashniks*), who are engaged in manufacturing, distribution, wholesaling, and retailing, using their own time and equipment sometimes on a massive scale, to "left-hand" capitalists, who work on state time using state-owned equipment. These activities can be perilous, and the author sorrowfully notes how quickly the Soviet regime has inculcated its citizens with ". . . the notion that executing people is an honorable thing, whereas engaging in commerce is ignominious."

Simis describes how the supralegal position of the Communist Party has destroyed the principle of legality in the Soviet Union. All Soviet legal bodies are bound to obey orders from the Party *apparat* irrespective of the law's requirements. As a consequence, Soviet society is a place where practically anyone and anything can be bought. Misuse of position and bribery reaches as high as Politburo members and down to the meanest functionary. Bribes are given to secure food, a place in the hospital, a university degree, or a better place to live. Bribery is so widespread that Simis had to use bribes to ease his own KGB-ordered expulsion from the country. Simis believes that ". . . corruption has become the organic and unchangeable essence of the Soviet regime . . ." and therefore cannot be brought under control as long as the Soviet regime remains Soviet. "It is as simple as that."

<div align="right">J.M.S.
Washington, D.C.</div>

Army Brat: A Memoir by William Jay Smith. New York: Penguin Books, 1982, 225 pages, $5.95.

Army Brat should be in the permanent collection of every base library in the Army and the Air Force, for it is that rare breed, a book that celebrates the special nature of life on a peacetime military base. William Jay Smith, naval officer in World War II, Rhodes scholar, distinguished poet, and member of the prestigious American Academy of Arts and Letters, grew up on an Army post, Jefferson Barracks, near Saint Louis, as the son of an Army corporal, a musician whose band was permanently attached and whose dependents consequently did not move about as others did. The memoirs reflect the twilight era between the two wars but also show us the coarse underbelly of poverty, gambling, and excessive drinking that characterized the Depression Army as the author knew it.

But the book is not at all negative, for it principally celebrates the freedom of adventurous youngsters who found their own entertainment in the mysterious local woods. They took delight in the military system that brought them such luxuries as crusty, fresh-baked bread, Army blankets their mothers made into winter overcoats, and issue longjohns cut down for smaller sizes. The book is highly recommended for young people; it is indispensable to an understanding of the roots of our collective and rich modern base life, which many may otherwise be tempted to take for granted.

<div align="right">H. F. Lippincott
Montgomery, Alabama</div>

Jane's Weapon Systems, 1982-83 edited by Ronald T. Pretty. London: Jane's Publishing Company, Ltd., 1043 pages, $140.00.

While one can place too much dependence on technologically sophisticated weapons, and winning or losing in warfare is a function of the interaction of a myriad of

elements, physical, intellectual, even spiritual, in nature, "high tech" is a fact of military life. No weapon books are more comprehensive than those produced by Jane's Publishing Company, Limited, of London. They are the ones against which all others must be measured, and most will pale by comparison.

From the Foreword through the country-by-country and type-by-type description of weapons to the analytical tables of comparisons, *Jane's Weapon Systems* is good. The editor, Ronald T. Pretty, notes that weapons must work in combat to be useful. Accordingly, weapons are analyzed against the background of battles in places like the Falklands, Afghanistan, around Khorramshahr, and in the Bekka Valley.

Throughout the book, the editors have provided useful photographs, line drawings, and tables of capabilities to help the reader understand each weapon system. The volume runs the gamut of weaponry from strategic systems to training simulators. There is no unclassified source that is more authoritative.

At $140.00 per copy few individuals can afford to purchase this or many of the other excellent but expensive Jane's volumes. Nevertheless, throughout the force, the applicable Jane's reference work ought to be found in the appropriate duty sections. Although the high price of *Jane's Weapon Systems* will discourage most individual purchasers, one has to consider that with this book the money will be well spent.

F.H.T.

The Unknown Battle: Metz, 1944 by Anthony Kemp. New York: Stein and Day, 1981, 261 pages, $14.95.

British author Anthony Kemp, a lecturer at the University of Southampton, has written the first detailed study of the capture of Metz by the U.S. Third Army since the 1950 publication of Hugh M. Cole's *The Lorraine Campaign* in the Army's official history of World War II. Unfortunately, *The Unknown Battle* does not represent any great advance over the earlier volume. Kemp, an expert on fortifications who examined the ground thoroughly, follows Cole's description of the fighting very closely and does make minor revisions in the description of the defenses and the German order of battle. However, Cole gave a much fuller explanation of why XIX Tactical Air Command could not intervene decisively in the action; he often eschewed judgments, except those visible between the lines, on the actions of higher headquarters.

Kemp devotes considerable effort to an analysis of the generalship of George S. Patton, Commander of the Third Army, Walton H. Walker, Commander of the U.S. XX Corps, and Hermann Balck, the German commander of Army Group G. Kemp's critique of American operations follows very closely the line of argument developed by von Mellenthin in 1956: Patton was justified in attacking off the march in September, but he should have paused to reorganize instead of continuing ill-planned and ill-coordinated attacks in October that only wasted good infantry. (Kemp believes that the American infantry was very good indeed.)

Kemp is even more critical of the Germans, particularly Balck who neglected to rearm the Metz forts. Blaming Balck for not conducting a more "active defense," however, ignores the tremendous equipment losses the German Army suffered in France. Interesting as these speculations are, they are not grounded in thorough research.

In sum, Kemp relies too heavily on Cole, whose study focused on operations at the division level; Kemp puts greater emphasis on actions at army and corps headquarters. Compounding the problem, Kemp never clearly explains American command and control doctrine at division, corps, or army levels. *The Unknown Battle* is an interesting book that complements but does not supersede *The Lorraine Campaign*.

Dr. Edgar F. Raines, Jr.
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An Officer and a Gentleman directed by Taylor Hackford. Paramount Pictures, July 1982.

According to trade publications, *An Officer and a Gentleman* was a surprise hit of 1982. The basic plot—a spirited youth tamed and coming to respect military discipline—has been overworked in a score of movies. *Tom Brown of Culver*, *The Long Gray Line*, and *The Boys of Company C* come quickly to mind.

If the highbrow reviewers are to be believed, there is little superior acting, directing, or production. There are no outlandish sexual or aggressive scenes appealing to prurient tastes, although there are several moments one might spare an impressionable adolescent; the movie does not deal with fads of our "global village" such as videogames or jogging; and there is neither an established star nor a "hot newcomer" to grace the screen. Yet, *An Officer and a Gentleman* has attracted a large following. Why? Because it is right for the times.

If the 1960s were a time of social turmoil and concern and the 1970s a time of social apathy, then the 1980s must be a time of social need. People are seeking to belong, to believe, to survive in an era of uncertainty. *An Officer and a Gentleman* offers traditional military virtues as one solution.

The protagonist, Mayo, comes from a broken home, has seen the seamy side of life, and craves direction. In his eyes, becoming a naval aviation officer is not only a job, profession, a way of life but the only way to avoid the aimless drinking and whoring that characterized his father. At one point, nearing physical and emotional exhaustion, Mayo screams, "I have nowhere else to go."

To the Puget Sound Debs, marrying a naval aviation cadet is the only way to avoid the grim, meaningless routine of a dead-end factory job in a dead-end factory town. So serious is this quest that one girl precipitates the suicide of a cadet. First, she lies that she's pregnant. Then, after the cadet washes out of training, she confides that she was only "late." When he still professes his love and desire for marriage, she rejects him; she would rather seek another cadet than share her lover's future as a department store floor manager.

To the tough training instructor (TI), military service may have been a way to escape racism and a limited future.

More likely its attraction lay in beliefs, standards, and accolades resulting in self-respect. Note, though, that race is not an issue in the movie. The only color of value in Pt. Rainier is that of the "Holy Grail"—the gold of Navy wings. (Air Force wings, the cadets chant, are made of lead.)

The military has long been a source of opportunity in the United States and elsewhere. Today, perhaps, its attraction lies not so much in material as in existential or spiritual gain. Although I'm not suggesting that there's a mass craving for the "Military Way," I do feel there's a strong need at present for meaning. *An Officer and a Gentleman* offers a diversion, a taste of what for many of us is "the only way to go."

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Vietnam: The Other War by Charles R. Anderson. Novato, California: Presidio Press, 1982, 218 pages, $13.95.

For the most part, *Vietnam: The Other War* will shatter views held by those who did not serve in that war. Television, movies, newspapers, and personal accounts by relatives have contributed to the impression that all who served in Vietnam were involved in continuous military action against fanatical Vietcong and North Vietnamese. Unfortunately, there was another side of Vietnam, about which little has been written and most military professionals prefer to forget.

Charles R. Anderson, a former Marine Corps officer, served the first half of his thirteen-month tour in Vietnam as a brig company executive officer, Third Military Police Battalion, stationed at Da Nang. The purpose of this company was "to restore what was diagnosed as a breakdown of discipline" among Marine prisoners who were serving sentences from six months to a year for offenses committed under the Uniform Code of Military Justice. These prisoners, according to the author, illustrated what happens to the character of personnel recruited for military service ". . . when a nation pursues an unpopular war or a war continues longer than the policy planners expect."

Drawing from personal experiences, Anderson presents a very vivid description of the prisoners, their offenses, and the members of the Third Military Police Battalion. The hard fact of life was that prisoners were not rehabilitated, and few members of the battalion had jobs that required more than three to four hours of work per day. Accordingly, Anderson touches on themes which the headlines have never focused on, e.g., boredom, racism, excessive drinking, corruption, black-marketeering, whoring. For many assigned to rear echelon duty, such conduct and actions became a way of life. The author's comments are candid and forthright and convey moments of humor and sadness.

Vietnam: The Other War should prove informative to the general reader. For those who served in the Vietnam War, memories will be rekindled, reflecting a myriad of experiences.

<div style="text-align: right">

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The History of Dive Bombing by Peter Smith. Annapolis: Nautical and Aviation Publishing Company, 1981, 253 pages, $17.95.

Peter Smith has written numerous books on aviation and military history, including a study of the Ju 87 Stuka. This present book is a readable survey, featuring the European and Pacific theaters of World War II. It has long been a matter of faith that the U.S. Marines pioneered dive-bombing techniques and carried out the first combat demonstration in Nicaragua in 1927, during the Sandinista rebellion. Smith reports that a British flier, Second Lieutenant William Brown, probably made the first officially planned and executed dive-bombing attack in March 1918. Flying an SE-5a, of 84 Squadron, Brown successfully attacked some ammunition barges anchored in a canal. Other planes in 84 Squadron were later equipped for dive bombing and made several sorties.

But the Royal Air Force, after several postwar trials, decided that dive bombing would be too costly, a conviction that hampered RAF dive-bomber attempts throughout World War II. As Smith points out, Spitfires in this role performed reasonably well, although there was no automatic "pull-out" device in the Spitfire, which reportedly approached 600 mph in a dive. The casualty rate in one RAF squadron was "ghastly," according to a survivor. (p. 189)

The author does a good job of characterizing tactics, exploits, and weaknesses of two of the best-remembered dive bombers of World War II, the Stuka and the Douglas SBD Dauntless. There are also pertinent discussions of Japanese operations and a variety of other lesser-known aircraft types, such as the Royal Navy's Blackburn Skua and the Russian Pe-2. The book concludes with comments on dive bombing in Korea.

The index is arranged by topic (actions, aircraft, personnel, ships, units). Smith makes good use of many quotations, although citations referring to archival sources in the United Kingdom do not inform the reader whether documents are in the Imperial War Museum or some other location. Photos are not always sharp, and there is a bothersome frequency of typographical errors. But these are minor faults in a book that many readers of the *Review* will find both interesting and informative.

<div style="text-align: right">

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Maritime Strategy and the Nuclear Age by Geoffrey Till et al. New York: St. Martin's Press, 1982, 274 pages, $35.00.

The increasing role of naval activities in international politics has stimulated several new books on maritime strategy. Geoffrey Till, a member of the history department at the Royal Naval College, Greenwich, England, offers an interesting, concise, and workmanlike review of the role of navies in peace and war, adding several essays by qualified contributors from both sides of the Atlantic. A review of the literature from Thucydides to Soviet Admiral Gorshkov offers a useful introduction to maritime thought. His discussion of the decisive battle and its role in gaining and exercising command of the sea is quite well done. Alfred

Thayer Mahan saw the decisive battle as the primary goal of fleets to gain command of the sea and protect sea communications. Till, however, sees the purpose of sea power as the destruction of any force that could threaten sea communications, whether or not a decisive battle is fought. Command of the sea is a means to an end: Mahan stresses the means—Till the end.

The discussion of "Old Tasks for New Navies" develops the effect of new technology, primarily air power, on traditional maritime doctrine. He finds

> a semantic fallacy of monumental proportions in the rigid distinction between sea power and air power. By taking aircraft to sea with them, sea power would be able to take on and perhaps defeat land-based air forces. Air power, in other words, could be part of sea power; it could strengthen it and increase its reach.

The advent of nuclear weapons again threatened the demise of surface fleets, but, citing Admiral Gorshkov, "the absolute and relative significance of combat at sea in the overall course of a war has unquestionably increased." Even in a nuclear war, what navies did would become more, not less, significant. The fear of a hot war on NATO's Central Front would lead to consciously limited and local wars elsewhere, making maritime power vital for worldwide tasks.

Having established the contemporary relevance of some of the classical concepts, however, "New Tasks for New Navies" falls short of what would be expected, perhaps because diplomatic roles such as the naval presence mission and strategic deterrent roles are themselves not well understood. The full operational and strategic significance of the nuclear missile submarine is not fully realized, and this, perhaps, highlights one of the main questions that arise in the reader's mind.

The book is an excellent, highly readable, and jargon-free history of maritime thought. *Maritime Strategy and the Nuclear Age* may have more current sales appeal as a title, but it is not really the book the author wrote. Second, more careful editing would have eliminated annoying errors. Mahan (1911), apparently referring to his *Naval Strategy*, is cited over a dozen times in the text but not further identified in the footnotes; Admiral Stansfield Turner, USN, is indexed by his first rather than his last name; last and far from the least, despite the generally high quality of the analysis, two omissions must be noted. The review of the literature on "Maritime Strategy in the Age of the Galley" fails to include the superb analysis of sixteenth-century warfare in the Mediterranean, *Gunpowder and Galleys* by John F. Guilmartin, Jr. (1974), and the transition from the galley to the age of sail. Second, Till fails to give an adequate treatment of Clausewitz and his influence on naval strategy. Clausewitz's analysis of the political objectives toward which all strategic conceptions must be aimed would have helped the discussions of both the diplomatic role of maritime power and the use of sea power in limited war. Perhaps more attention to Clausewitz would have contributed to a conclusion more challenging than Till's: "worthwhile parallels can still be drawn between past and present maritime experience."

Dr. Paul R. Schratz
Arnold, Maryland

Cruise Missiles: Technology, Strategy, Politics edited by Richard K. Betts. Washington: Brookings Institution, 1981, 612 pages, $32.95 cloth, $15.95 paper.

In welcome contrast to the simplistic assertions of any number of contemporary "reformist" commentators, Richard Betts has produced a rich and thorough study of cruise missiles: what they are, what they seem to be, and what they might become. Assembling with impressive discipline the diverse work of nineteen chapter authors, Betts has edited an excellent portrayal of the complexities of defense decision-making.

Cruise Missiles: Technology, Strategy, Politics shows how technology yielded cruise missiles; how it competes with them and provides obstacles to their successful employment. It addresses the strategic contribution of cruise missiles viewed from the regional, strategic nuclear, conventional, and, perhaps a bit enthusiastically, the arms control points of view. It analyzes the political decision-making environment surrounding cruise missile development in federal bureaucratic, congressional, alliance, and Soviet terms. It recognizes the need for and competition among different types of cruise missile platforms.

Finally, it delivers with real impact Betts's own conclusion: "One thing is clear: neither the benefits nor the disadvantages of cruise missiles are as revolutionary or as simple as either advocates or opponents originally believed." While *Cruise Missiles* may be more than you thought you ever wanted to know about the subject, Betts's work should be on the "must read" list of any serious student of defense policy.

Colonel John J. Kohout III, USAF
Blytheville AFB, Arkansas

Carrier Air Power by Norman Friedman. New York: Rutledge Press, 1981, 192 pages, $30.00.

Norman Friedman's book on carrier air power is definitely a classic—the further you read, the more you become engrossed in the development of naval sea-based air. It is a must for those interested in the genesis and evolution of carrier air power and should be required reading for prospective carrier commanding officers. Other books may be as comprehensive and interesting, but I have not yet seen them in my 28 years of naval service. For example, how many of us in naval aviation know that until 1944 U.S. carriers were fitted with arresting gear both forward and aft so that aircraft could be recovered over the bow or stern? Why was aircraft operating capacity equated with multilevel hangar deck capacity in some navies?

These revelations are more than simple trivia when one begins to speculate on the development of new VSTOL carriers that perhaps could be designed with similar innovations to lessen the vulnerability of parked aircraft and increase flexibility in deck operations. Those currently arguing the merits of large versus small deck carriers and conventional versus nuclear power would certainly benefit from the historical analysis of economies of scale—many of which are addressed in terms a layman can comprehend. As a natural extension of the carrier debate, the rationale for design of various aircraft and deck loading is also discussed in interest-

ing and enlightening terms. The extent to which the U.S. Navy is beholden to British innovations in carrier development is amazing. In retrospect, it is ironic that the Royal Navy now finds itself with such a limited carrier air capability.

Friedman also explains the historical role of the Naval War College in evaluation of earlier carrier air concepts, which is particularly interesting since the Center for Naval Analysis here at Newport is again reemphasizing strategic and tactical research.

Especially revealing, in light of current discussion on carrier vulnerability, are the U.S. and Japanese concerns regarding this matter prior to World War II. The U.S. Navy realized a need for some form of airborne early warning in the form of scouting aircraft as early as 1930. The Japanese also appreciated the problem early but waited until after the Battle of Midway. It was at this point the carrier advocates recognized the need for organic aircraft capable of missions other than those the fighter-bombers handled. This was the beginning of the age of specialization in the design of carrier aircraft for reconnaissance missions to gain tactical intelligence.

The appendixes are also interesting and revealing. For example, to realize the impact of contemporary cost growth and inflation on military aircraft procurement, the carrier aircraft data indicate that between 1948 and 1960, a period of 12 years, there were 15 new models of fighter/attack aircraft developed for carrier naval air. During the next 22 years, from 1960 to 1982, about two-thirds fewer aircraft—a total of six—were developed for carrier operational use in the fighter/attack categories.

Carrier Air Power teems with such provocative data. It could be quite enlightening to read this very detailed and stimulating book.

Captain William Sullivan, USN
Naval War College
Newport, Rhode Island

China Facts and Figures Annual, Volume 4, edited by John L. Scherer. Gulf Breeze, Florida: Academic International Press, 1981, 422 pages, $46.50.

This volume is undoubtedly an indispensable reference for both the casually curious and the China expert. With topics ranging from government personnel to the use of the abacus, *China Facts and Figures* is perhaps the most complete collection of data on the People's Republic of China that is readily available to the general public.

Categories covered in this book include the following: government, Communist Party, armed forces, demography, economy, energy, industries, agriculture, trade and aid, transportation, publications and culture, institutions, health, education and welfare, and special topics. Under the heading armed forces are such items as estimated defense expenditures, deployment of People's Liberation Army divisions by military regions, the F-8 and A-5 Chinese fighters, and the CCS-X-4 missile.

Also included in the annual are four articles: Arthur J. McTaggart on relations between China and Korea; Leo A. Orleans on China's population; Olin L. Wethington on law reform; and Terry E. Lautz on recent Chinese images of the

United States. This latter article is of particular interest because of the different approach it employs.

Dr. Gerald W. Berkley
Auburn University at Montgomery

The Quest for Victory: The History of the Principles of War by John I. Alger. Westport, Connecticut: Greenwood Press, 1982, 318 pages, $29.95.

Improving on Santayana's famous adage, Thomas Fleming, editor of *The Southern Partisan,* recently observed:

> The trouble with giving up the past is that it subjects us to Cicero's condemnation that ignorance of the past makes us eternal children. By ourselves, in a single generation, we can do little or nothing of value. When we fail to preserve what our ancestors have handed down to us, we find ourselves refighting their wars, rethinking their thoughts, and rediscovering their wheels.

In *The Quest for Victory,* Army Lieutenant Colonel John Alger has given substance to Fleming's observation. In his analysis of the evolution of the Principles of War with emphasis on the nineteenth and twentieth centuries, Alger demonstrates how the "wheel" has been rediscovered by military theorists time and time again. Mirroring the intellectual ferment that marked the Army (including the Army Air Forces) in the mid-1930s, the Armed Forces have again discovered the importance of military history, and the value of military theory, including the worth of the Principles of War. For this reason, Alger's analysis, which includes an extensive bibliography and a compendium of 68 versions of the Principles of War, ranging from Sun Tzu through Jomini, J. F. C. Fuller, Liddell Hart, to some twenty American versions concluding with the Army's 1978 version, could have been particularly timely. Unfortunately, although the book was published in 1982, the research evidently ended about 1979. Consequently, Alger misses the current impact of Clausewitzian rather than Jominian military theory that somewhat ironically took root first in the Navy and Air Force in the mid-1970s and, thanks to the pioneering efforts of Lieutenant Colonel David MacIsaac and others at the Air War College, spread to the Army War College in 1980. This influence is reflected in the 1981 Army version of the Principles of War which, for the first time in half-a-century, include both their strategic and tactical dimensions.

More important, the 1981 version is presented not as fixed and arbitrary rules—as answers to tactical and strategic problems—but as "military planning interrogatories": a series of questions designed to provide a frame of reference for military analysis and decision-making. What makes this omission particularly unfortunate is that throughout his text Colonel Alger demonstrates the conflict between the essentially Jominian view traditionally held by the French, British, and American military that principles provide answers and the Clausewitzian view reflected in German military doctrine that principles are more descriptive than prescriptive.

But even though this conflict has been largely resolved by current Army doctrine, work remains to be done if the Principles of War are to provide us a useful frame of reference in

the future. Alger notes that during the Vietnam War "an infantry colonel [was prompted] to call for a tenth principle: public support." It is interesting to note that that colonel (now retired Army Major General Herbert E. Wolff) has not given up the fight. In the draft of the 1981 Principles prepared at the Army War College, this principle was incorporated. Although it met with the approval of the then Deputy Chief of Staff for Operations and Plans on the Army General Staff, it was deleted from the final version. As we continue to analyze the shortcomings that led to our failure in Vietnam, it is becoming more and more apparent that General Wolff's tenth principle must be incorporated into both our doctrine and our strategic planning. We must constantly be reminded that our Constitution created the American Armed Forces as an instrument of the American people, not of the State.

This caveat notwithstanding, Colonel Alger has rendered a valuable service by "preserve[ing] what our ancestors have handed down to us," and as a consequence should help us to avoid "refighting their wars, rethinking their thoughts, and rediscovering their wheels."

Colonel Harry G. Summers, Jr., USA
Army War College
Carlisle Barracks, Pennsylvania

Eurocommunism between East and West edited by Vernon V. Aspaturian, Jiri Valenta, and David Burke. Bloomington: Indiana University Press, 1980, 373 pages, $32.50 cloth, $9.95 paper.

The Soviet Union's continuing problem with Poland during recent years has brought into the forefront the relationship of the U.S.S.R. with the western European Communist parties. Recent stands by the Communist parties in Italy (PCI), Spain (PCE), and France (PCF) are only the tip of the Eurocommunist iceberg. This collection of 15 essays is an excellent addition to the literature available on this topic.

Vernon Aspaturian introduces the study with an essay examining the concepts and origins of Eurocommunism. His piece, along with others by Herbert Dinerstein, Stephen Cohen, and Jan Triska, provides a good framework for reference during the remainder of the book.

Part Two includes eight essays, which discuss in-depth the Eurocommunist parties and each of the eastern European countries. Jiri Valenta sets that section off with an overview of the Eurocommunist groups and the Soviet Union.

The concluding section considers Eurocommunism with respect to NATO, the People's Republic of China, and Japan. The last chapter is specifically about the anti-Soviet posture of the Japanese Communist Party.

Eurocommunism between East and West is an excellent, though tentative, examination of an area of concern that may hold increasing significance in the future.

Captain Don Rightmyer, USAF
Mountain Home AFB, Idaho

The Origins of Autocracy: Ivan the Terrible in Russian History by Alexander Yanov. Berkeley: University of California Press, 1981, 352 pages, $19.95.

Alexander Yanov, a Russian émigré journalist, has previously published two other books on the Soviet Union: *The Russian New Right* (1978) and *Détente after Brezhnev: The Domestic Roots of Soviet Foreign Policy* (1977). The latter, in particular, is an especially timely and intelligent piece of work, though quite controversial. Yanov, far better than most émigrés, has succeeded in getting the attention of the American academic public. His works have been widely read and discussed, and his views are well known in Washington. His émigré colleagues, on the other hand, have reacted to his work with near unanimous antagonism.

There is no more hotly debated subject in all of the historiography of Russia during the past ten to twelve years than the history of Ivan IV. It is almost a science unto itself. Yanov's contribution is by no means a conventional history of Ivan. In fact, there is frustratingly little about Ivan in it. Rather, the work in the main is an analysis of the origins, development, and tragedy of autocracy in Russia. Yanov bases his work on the literature in the field far more than on the historical sources, and much of his text consists of a critical discussion of the literature itself. It is an essay— *distinctly* an essay—not only in history but in historiography. The work is almost Toynbeean in its presumption. It is too ambitiously ecumenical. He compares China in 500 B.C., France in 1789, Russia in 1560. He displays his usual penchant for categorization and for catchy and tricky metaphors, which range from the slick to the clumsy. The interpretation rests on a heavy structure of contingencies. It is a kind of pontifical collage of judgments about Russian history and historians. The book is not long, but the argument is very long, and the style and argument are too hyperbolic.

Yanov's thesis is that ugly absolutism was not inevitable in Russian history. He draws ponderous parallels between ancient developments and contemporary Soviet politics. The book is not scrupulously academic, but it is sometimes downright scholastic, and it is relentlessly polemical. In particular, he does not understand that absolutism brings freedom as well as slavery.

In essence, *The Origins of Autocracy* is what generations of Russian intelligentsia would call historiosophy. The wisdom of history marches here in militant array. Taken in small doses, it is sometimes stimulating; in larger ones, it is tiresome. The editorial work and proofreading are of indifferent quality.

Dr. Hugh Ragsdale
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Soviet Strategic Power and Doctrine: The Quest for Superiority by Mark E. Miller. Washington: Advanced International Studies Institute, 1982, 298 pages.

My first reaction on seeing articles and books bearing titles such as "Soviet Strategic Power" and "Soviet Military Doctrine" is a plaintive: "Oh, no, not another one!" Although this book has both "strategic power" and "doctrine" in its title, the author has kept the "view-with-alarm" sermonizing within decent bounds and on the whole lets the facts speak for themselves.

Mark Miller has organized his book into three parts and a prologue: In the prologue he briefly sketches the military

system that Stalin bequeathed his successors. Then, he goes on, in Part One, to deal with the 1953-64 period, or the Khrushchev era, when Soviet military theorists were able to throw off the incubus of Stalin's "permanently operating factors for victory," a codification of Soviet strategy in the Great Patriotic War with its emphasis on hordes of men and artillery as the God of War. Miller, however, points out that Stalin's doctrine may have been a "device to mask feelings of vulnerability and inferiority." By 1954, the Soviets had the nuclear weapon and were about to unveil the Bear, Badger, and Bison bombers, all of which encouraged an open discussion of the role of surprise in nuclear war. During the late 1950s and early 1960s, Soviet military pundits ruminated endlessly about how to offset an American surprise attack. Khrushchev, enamored of his new ICBMs at the end of the decade, alienated a large segment of his military by cutting back on conventional forces and then, in 1962, found that reliance on ICBMs alone put him in the position of engaging in all-out war or capitulation.

In Part Two the author describes how the Soviets went from the humiliating inferiority of the early 1960s to parity in the 1970s, with a long discussion of SALT I. In Miller's view, SALT I was a key factor in Soviet strategy. The decision of the Nixon administration to deploy the Safeguard ABM system to the protection of the Minuteman fields threatened the heart of future Soviet strategy predicated on their heavy-megatonnage missiles' being able to take out the U.S. land-based missile system; and the Safeguard was far ahead of the Galosh system, a system that had been made impotent by the MIRVing of the U.S. missiles. Thus, the ABM Treaty was a bonanza for future Soviet strategy.

In Part Three, the reader is given a relatively brief historical account of the Soviet march toward military superiority in the 1970s and is then plunged into the esoteric nuances of Soviet military thinking about *deterrence, surprise,* and *preemption,* and the validity in the nuclear age of the Clausewitzian dictum that war is politics in a more violent form. The reader is subjected to a veritable barrage of citations from Soviet sources ranging from the restricted *Voyennaya mysl'* to Brezhnev's speeches. Emerging from the analysis is the conclusion that the Soviets are convinced that deterrence is inherently unstable, and in the event of its failure, they would like to be in the position to attain victory in a nuclear war. Nonetheless, excerpts from Brezhnev's speeches and other sources would seem to indicate that at least some Soviet leaders are not entirely convinced that nuclear war is not the equivalent of mutual suicide.

As one might expect from a writer who has previously dealt quite extensively with the intricate connection between Soviet technology and military doctrine/strategy, his descriptions of the Soviet weapons acquisition process is one of the highlights of the book, especially chapter 7. For anyone who has neither the time nor access to the extant literature, Miller's discussion is an excellent introduction to the subject.

On the whole, *Soviet Strategic Power and Doctrine: The Quest for Superiority* is a very good history of Soviet progress from strategic inferiority of the late 1940s to parity in the 1970s and then onward and upward toward superiority in the 1980s. There are some good tables and figures, while the footnotes (at the bottom of the page where they ought to be)

buttress the author's points more than adequately. A bibliography, however, would be helpful in guiding the still-curious reader to further reading.

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Weather and Flight by Don R. Dickson. Englewood Cliffs, New Jersey: Prentice-Hall, 1982, 186 pages, $16.95 cloth, $7.95 paper.

Thunderstorms and Airplanes by Richard L. Collins. New York: Delcorte Press/Eleanor Friede, 1982, 280 pages, $14.95.

Both of these books deal with the relationship between airplanes and weather phenomena. The first, *Weather and Flight*, provides the reader with a general introduction to meteorology for pilots. The second, *Thunderstorms and Airplanes*, treats the specific issue of thunderstorms and how they affect airplanes, including how to avoid them. Weather knowledge varies greatly from pilot to pilot, particularly in the general aviation field. The factor of pilot judgment introduces yet another element of uncertainty in the delicate equation of safe flight operations balanced against the vagaries of the weather. While we cannot shape the weather to suit our flight operations, we can improve pilot knowledge and skills to facilitate safe and professional airmanship. Both of these books mark a significant contribution toward that end.

Weather and Flight begins with a description of the atmosphere and the influence of heat and pressure. Moisture, clouds, precipitation, and other hazards logically follow. Satellite technology has given cloud structure and coverage a much greater role in aviation meteorology, and pilots must have a better understanding of what Don Dickson terms "signposts in the sky" to avoid danger. Covering only 26 pages of text, the chapters on thunderstorms and turbulence contain much valuable information but treat the danger element in a rather clinical manner. A subsequent chapter on icing and IFR weather provides the reader with a fine summary of the specifics and dangers of icing conditions. A summary list of "a few specific points to remember concerning icing and frost conditions" is particularly useful and instructive. Weather and terrain flying information fit nicely behind the information on icing and provide practical application for information in the foregoing chapters.

Concluding topics include weather for soaring (sailplanes) and a general treatment of aviation weather assistance. Again, the author makes the extra effort by providing an abbreviated weather briefing checklist and a glossary of weather terms. Don Dickson has succeeded admirably in writing a book that provides much useful information for pilots and will instill a healthy respect for weather in all who read it. Although *Weather and Flight* presents a rather expansive treatment of a complex subject in a relatively few pages, the book provides an excellent overview and a framework for subsequent serious study. Dick Collins's *Thunderstorms and Airplanes* should be included in that subsequent study. This book focuses on the specific, and it provides the

reader with a detailed analysis of one of the most spectacular and dangerous weather phenomena to confront the aviator.

Thunderstorms and Airplanes is a frightening title, and it treats a frightening subject in fearsome detail. Dick Collins is determined to provide a "complete guide for flying defensively in thunderstorm country," and he is eminently qualified to discuss the subject particularly from a general aviation perspective. He is the Editor of *Flying*, general aviation's leading magazine, and has over twenty years' experience as an instrument-rated pilot. He writes as a highly experienced aviator and provides very valuable information for the novice and expert alike.

The first eighty pages include basic data ranging from general weather information and thunderstorm research to storm forecasting. This material complements the chapter on thunderstorms in *Weather and Flight*, and it also provides an excellent setup for the real lesson in *Thunderstorms and Airplanes*. Subsequent chapters are liberally laced with thunderstorm-related aircraft accidents described in pointed detail. The cases cited range from tiny Cessna 150s to huge Boeing 757s, but the lessons are identical. Knowledge and avoidance coupled with sound judgment are the keys to safe flight.

Considered together, *Weather and Flight* and *Thunderstorms and Airplanes* constitute one of the most significant and useful contributions to aviation literature in recent years. Considerations of general airmanship are impressive, but the considerations of safety are invaluable. Both books are "must" reading for airplane pilots, regardless of their level of experience. I commend the authors and heartily recommend their books.

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Decline of an Empire, the Soviet Socialist Republics in Revolt by Helene Carrere d'Encause. New York: Newsweek Books, 1979, 304 pages, $10.95.

The title, *Decline of an Empire*, and the advertisements by its publisher seem to describe a book that forecasts the imminent breakup of the Soviet Union as a result of ethnic differences among its peoples. Unfortunately, the title is little more than a come-on to get one to purchase the book. The information in the book is more concisely presented elsewhere (e.g., in Harriet Fast Scott's article "Russia's Growing Minorities Problem," *Air Force*, October 1979). The book shows promise in its early chapters, but it quickly becomes a monotonous series of demographic statistics from which the author draws few conclusions.

Chapters 1 and 2 relate the historical beginnings of the U.S.S.R. and describe the ethnic differences between the various states composing it. Chapter 1 shows Lenin's desire to liberate the Czar's so-called "prison of the peoples" and create a federated union of semiautonomous states with Russia, more precisely the Russian Soviet Federated Socialist Republic (RSFSR), as first among equals. However, the only real tie between these states was their relationship under the old Russian Empire. The author traces the evolu-

tion of this colonial empire through the restrictive military measures Stalin used to hold the confederation together and the easing of these restrictions under Khrushchev. Both leaders and their actions only increased the desire among the states outside Russia for more autonomy. This chapter gives an excellent view of the relationship between Russia and the other states in the U.S.S.R. It also forms the basis for understanding the ethnic differences between these states, which is described in chapter 2.

The last six chapters of the book do not fulfill the promise of these first two. The final chapters detail the demographic differences between the peoples of the Soviet Union, particularly the differences between the Slavic peoples (Russian, Ukrainian, and Belorussian) and the peoples of Central Asia (Uzbeks, Kirghiz, Turkmen, and Kazakhs). The author concluded by projecting the decline of the Slavic populations in relation to those of Central Asia as well as other nationalities and that this decline poses a threat to Russian dominance of the U.S.S.R.

These same conclusions, including the military implications associated with them, are reached in five pages in Scott's article and with fewer detailed tables of statistics. For this reason I would recommend Harriet Fast Scott's article to the military man who wants to become familiar with the military and political implications of the ethnic and demographic problems in the Soviet Union. On the other hand, if your interest lies in detailed demographic statistics and their many varied interpretations, then the *Decline of an Empire* is for you.

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Harrier by Francis K. Mason. Annapolis, Maryland: Naval Institute Press, 1981, 185 pages, $18.95.

It must be a most galling experience to write the history of a plane that has already seen 14 years of service—only just to miss its finest hour as it defends the British fleet in the Falkland Islands War. That is the misfortune which has befallen Francis Mason and his authoritative study *Harrier*.

Few people could be better qualified than Francis K. Mason, a former Hawker Siddeley senior projects designer, to write about an aircraft that had already carved for itself an unchallenged place in aeronautical history, as the world's first operational jet V/STOL fighter. Mason does the Harrier full justice with his book, which takes the reader back to the very earliest days of the P1127 prototype and its potential rivals in both Europe and the United States. With a wealth of previously unpublished detail, the author chronicles the difficult gestation and birth of the revolutionary Harrier, vividly illustrating the official apathy, lack of funds, and political chicanery that had to be overcome along the way. Francis Mason is strongest on these aspects and in his technical descriptions. The narrative of the Harrier in service with the Royal Air Force, the Royal Navy, the U.S. Marine Corps, and the Royal Spanish Navy is more superficial, presumably because of the author's less personal involvement in these stages of the fighter's development.

The book is not without editorial errors—the description

of a vertical landing could lead a would-be Harrier pilot badly astray with its directive to "maintain . . . height control with the control column"! (p. 159) Yet, it is written in a clear and simple style, explaining all the fascinating technical and aerodynamic features of this unusual aircraft without baffling even the lay reader with science.

Well illustrated and entirely readable, this slim volume is as close to a definitive version of the first chapter of the Harrier's story as we are likely to see. I hope Francis Mason is already working on the second installment.

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Closing the Circle: Wars in the Pacific, 1945 by Edwin P. Hoyt. New York: Van Nostrand Reinhold, 1982, 192 pages, $14.95.

Edwin Hoyt, a former journalist and more recently a part-time professor of journalism at the University of Hawaii, has written many books about World War II. The Pacific campaigns have perhaps been his strongest interest and have led to such publications as *Blue Skies and Blood*, *Storm over the Gilberts*, and *To the Marianas*.

In *Closing the Circle*, Hoyt brings to a conclusion his study of the Pacific War by following events between the termination of the Okinawa campaign and the beginning of the occupation of Japan. Proceeding chronologically, Hoyt moves back and forth among several themes: the almost unresisted air force and naval bombings of Japan, the growing realization by certain Japanese leaders that peace must be achieved, preparations for the atomic bombings of Hiroshima and Nagasaki, and the surrender itself. He also calls attention to the increasing divergence of American and Soviet aims in the Far East.

For those who want a brief account of the momentous months from June to September 1945, *Closing the Circle* has much to recommend it: readability, accuracy (save for the author's bewildering insistence on locating Hiroshima on the island of Kyushu), and a willingness to render judgment. For instance, in recent years Admiral William Halsey has been viewed in a highly critical light, most notably by historian Clark Reynolds. In *The Fast Carriers* (1968), Reynolds charged that the weary Halsey—"an embarrassment to the Pacific Fleet after . . . mid 1944"—was incapable of handling the large and complex fleet and air actions that characterized the operations of the U.S. Navy in its triumphant years, 1944-45. (p. 387) Hoyt, however, praises the aggressiveness of Halsey and his principal air commander, Vice Admiral John S. McCain (whom Reynolds also criticized), and makes one wonder whether the two have been unjustly treated. If only Hoyt had documented his assertions, his case for the two admirals might be more persuasive.

Simply put, *Closing the Circle* is not for everyone. Hoyt attempts to disarm his likely critics by stating in his preface that his book is not for the academic historian. It is, he contends, primarily a synthesis based on secondary sources. (In this he is correct.) It is most definitely not a book that will have value for the academic. One wonders, however, if the

military professional will find it of use either, for the author bases his synthesis primarily on action reports and war diaries of the Third Fleet, two volumes of the official Japanese history of the Pacific War, and a handful of secondary sources. He ignores such obvious monographs—to name but a few—as the aforementioned study by Reynolds, E. B Potter's *Nimitz* (1976), Thomas B. Buell's *The Quiet Warrior* (1974) and *Master of Sea Power* (1980), and Akira Iriye's *Power and Culture: The Japanese-American War, 1941-1945* (1982). Incredibly, he also overlooks the pertinent fifth volume of Craven and Cate's *The Army Air Forces in World War II* as well as unpublished Air Force sources. In short, it seems unlikely that many recipients of this journal will find *Closing the Circle* rewarding as anything but leisure reading.

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Dr. Lloyd J. Graybar
Eastern Kentucky University, Richmond

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To Establish the United States Academy of Peace, Report of the Commission on Proposals for the National Academy of Peace and Conflict Resolution. Washington: Government Printing Office, 1981, 386 pages.

Since the Progressive Era, there has been a tendency to rely on legislative bodies to create legalistic organizations empowered to affect changes in patterns of human behavior. In a century so wracked by human suffering as this one has been, it is not surprising that, at various times, individuals have called for the creation of federally sponsored institutions dedicated to peace. This has been especially true since the 1940s, with the growth of a big-power nuclear stalemate, the rise of widespread conflict in the Third World, and the proliferation of terrorism.

This document is the final report of a commission created by Public Law 95-561 (legislation cosponsored in 1978 by Senators Mark O. Hatfield, Jennings Randolph, and Spark M. Matsunaga) to examine in depth the rationale, justifications, historical precedents, and proposed structure of a "United States Academy of Peace." Under the chairmanship of Senator Matsunaga, the commission members (including two members of the House of Representatives, two community and urban planners, the president of the New York Urban Coalition, a sociologist from Dartmouth, a hotel president, and the president of the Christian College Consortium and Coalition) quickly concluded that "there is a necessary and proper federal role in serving the Nation through international peace research, education and training, and information services." (p. xiii) Not surprisingly, these three major functions form the core of the charter for the proposed academy that the Matsunaga commission advocates. This academy, it is suggested, should be federally funded, nonprofit, and independent. In the judgment of the commission, the academy would "provide the nation with a balanced and cost-effective institution that will make the field of peace learning accessible and useful to scholars, analysts, policymakers, and decision-makers in international affairs, conflicts, and war." (p. 188)

This report will be of interest to anyone schooled in a military academy, for such institutions must be recognized

as the flip side of academies such as the one proposed by this commission. In fact, the most disturbing aspect of this document is in its implied tone of a dichotomy between the goals, desires, and needs of the military community and the goals, desires, and needs of those seeking peace. Do we, in fact, require such an institution to develop a fuller appreciation of peace and peace studies? The answer cannot be discerned in this document, which does little to justify the existence of such an organization. As written, this report shows little evidence of a deep and studious attempt to evaluate the effectiveness and need for such a peace academy. Indeed, only Chapters 7 and 8 are concerned with the academy itself. The arguments found in Chapters 3, 4, 5, and 6, while often informative on the feelings and attitudes of the commission participants themselves, offer little in the way of substantive argument. The problem with this report is one that, in all likelihood, affected the commissioners themselves: it is difficult to find evidence that there were ever any disagreements that, in almost dialectical fashion, might have helped to forge a convincing document. This report contains an excellent bibliography on conflict resolution and peace studies. Aside from this, however, partisans favoring a "United States Academy of Peace" would be well advised to regroup and rethink their proposal.

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Resort to Arms: International and Civil Wars, 1816-1980 by Melvin Small and J. David Singer. Beverly Hills, California: Sage, 1982, 373 pages, $30.00 cloth, $14.95 paper.

Authors Melvin Small and J. David Singer admit that their volume has "no dominant theoretical strand, no culminating argument, no recurrent cadenza." Rather, this monograph is a compilation of data on war since 1816, which the authors hope will need no additional revision. If history is a guide, however, war will reoccur and a revision will be required.

The book's purpose is to establish the horrendous human cost of war, both international and civil, measured only in terms of military fatalities.

Since 1816 the authors have identified 67 interstate and 51 imperial and colonial wars of international character, which resulted in 31 million fatal military casualties. During the 165-year period, the average decade experienced 7.9 wars with 2 million battle casualties. Both the victors and losers suffered nearly the same amount of fatalities. There was no evidence to support theories that there was a cyclical pattern to war or that the number of international wars was on the increase, but that there has been a 15-20-year period between peaks in the amount of war under way at a given time. As expected, Europe proved to be the most war-torn region, and France, England, Russia, Turkey, and Italy were the most war-prone nations.

Civil wars were costly, also. Since 1816, Small and Singer identified 106 major civil conflicts resulting in 9 million battle deaths. Each decade averaged 7 civil wars, although there has been no tendency toward increase. Asia has been most prone to civil war. China, with 11, Spain and Colombia with 7 each have been the nations most afflicted by civil conflict. The nations with the highest battle fatalities have been China, Nigeria, Spain, the United States, and Russia.

Trivia buffs will find much to occupy their time. For example, 1917 and 1943 were the most warlike years; 1914 and 1939 were bloodiest in terms of lost military personnel. The years 1860, 1946, and 1967 saw the start of civil wars that resulted in at least one million casualties.

If one were to add civilian casualties, wasted raw materials and industrial energy, and ravaged agricultural lands, the cost of war becomes even more horrendous.

The volume has impact, but upon whom? As long as military strategy remains a tool of diplomacy in interstate rivalries and among nations competing for power within a state, the cost of war will have little impact. For one nation, or a group, to abandon the military option while adversaries maintain it, the elimination of war will remain an ideal.

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With the Old Breed at Peleliu and Okinawa by Eugene B. Sledge. Novato, California: Presidio Press, 1981, 326 pages, $15.95.

With the Old Breed at Peleliu and Okinawa is a personal account of a young Marine, Private First Class Eugene B. Sledge, thrust into those two Pacific battles of World War II. The first half of the book deals with the little-known struggle on Peleliu. This battle marked an important point in the annals of the Pacific war, for it was here that the Japanese abandoned their conventional tactic of defending the beach in favor of defense in depth. Mutually supporting, fortified positions consisting of hundreds of interlocking caves, pillboxes and bunkers extended deep into the interior of the island of Peleliu. There was no one main line of defense: the entire island was an intricate fortress. It was a very successful tactic, and the Marines paid heavily.

The 1st Marine Division at Peleliu, where the author fought as a mortar-man, suffered more than twice the casualties of the 2nd Marine Division that fought at the more famous battle of Tarawa. The skillful Japanese defense-in-depth system first employed on Peleliu set a deadly precedent for the rest of the war. Okinawa, another grim example of its further use and perfection, is discussed in the second half of this book.

However, the author spends little time on fighting tactics, grand strategy, or overall politics—and rightly so. As an ordinary Marine infantryman, his thoughts are not of the strategies in Tokyo or Washington. He barely mentions the hundreds of kamikazes pounding the supporting fleet off Okinawa and gives only a line or two on the death of Roosevelt. Sledge is mainly concerned with one thing: relating his experiences of those terrible battles from the viewpoint of a common soldier, the one who does the fighting, the suffering, and the dying. And this is the power of the book. In simple yet vivid prose, he boldly tells of the gruesome realities of war. Yet in his grim narrative of these conflicts, there emerges one redeeming theme: his unflag-

ging pride and devotion to the Corps. According to Sledge: "Marine Corps training had taught us to kill efficiently and try to survive, but it had also taught us loyalty to each other. This sustained us."

Eugene B. Sledge tells a tale that must be constantly retold—that war is truly hell.

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Strategic Air Command: People, Aircraft, and Missiles edited by Norman Polmar. Annapolis, Maryland: The Nautical and Aviation Publishing Company of America, 1979, 226 pages, $17.95.

Here in slightly modified form is the informative chronology written by J. C. Hopkins and his associates in the history office at Headquarters Strategic Air Command (SAC) and issued during the bicentennial as the *Development of the Strategic Air Command, 1946-1976*. To this original work, Norman Polmar has added some photographs, descriptions of SAC weapon systems drawn from the open literature, and a copyright.

Prospective buyers deserve to know that this publication is available at a fraction of the cost from the Government Printing Office.

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Between Peace and War: The Nature of International Crisis by Richard Ned Lebow. Baltimore, Maryland: Johns Hopkins University Press, 1981, 350 pages, $24.50.

Berlin Wall, Cuban missile crisis, Gulf of Tonkin, Tet offensive, embassy takeovers, Afghanistan, Polish situation, terrorist incidents—all are crises of the types that have affected every USAF member. Dr. Richard N. Lebow, in *Between Peace and War*, discusses thirteen international crises from 1898 to 1967 to illustrate and analyze the interplay of various aspects of international crises including the underlying and immediate causes of hostility, justification of hostility, brinkmanship, perceptions and misperceptions, negotiations, and crisis management.

The proliferation of nuclear and thermonuclear weapons of mass destruction makes it imperative that those involved in any area of the national security process (intelligence, planning, diplomacy, military operations) become very familiar with the various factors such as: time pressures; ambiguous and mixed signals; incomplete intelligence; domestic political, economic, and psychological pressures; role of the media and multinational concerns which can propel a fairly minor, isolated incident into a crisis fraught with the potential for armed hostilities.

Dr. Lebow, who has taught at the City University of New York, Naval War College, and National Defense University, has been able to meld the historical, social science, political science, and international relations schools of thought into this thoughtful analysis. It is recommended reading for those in posts such as plans, intelligence indications, and watch centers, airborne battlefield command and control centers, and command, control, communications, and intelligence so they will be better sensitized to the multifaceted aspects of international crisis development and resolutions.

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Lieutenant Colonel John A. Hurley, USAFR
Hq USAF

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Kerry: Agent Orange and an American Family by Clifford Linedecker. New York: St. Martin's Press, 1982, 240 pages, $12.95.

The details of Michael Ryan's exposure to Agent Orange in Vietnam; the courage and fortitude of Maureen Ryan to mother and raise Kerry, a child with eighteen serious birth defects, deserve the attention of all Americans.

Maureen Ryan testified before the United States Senate:

> Michael and I believe that the United States is the greatest country in the world, blessed by God, a country to be defended, if need be, with your last drop of blood. I was taught by my father, a World War II veteran, who was awarded the Bronze Star on the beaches of Normandy and again later in the Battle of the Bulge. Michael was taught this by his father, a World War II veteran, of five invasions with Douglas MacArthur in the Pacific.
>
> My husband Michael is a disabled Vietnam veteran, and a police officer for the last ten years in Suffolk County. Michael is tremendously like both of Kerry's grandfathers. He is fiercely proud of his service and the men who fought and died for this country. (p. 220)

The writer, Clifford Linedecker, who collaborated with the Ryans, seems overzealous in his determination to reveal their plight and champion their cause. However, his lack of objectivity will deter the military reader. Witness:

> Agent Orange, containing a contaminant, dioxin, long known to be one of the most potent carcinogens in existence, was used as an instrument of US military policy with a total disregard for its ultimate effects.

The next Linedecker passage sounds like an illiterate boob on a midafternoon radio talk show:

> What is a plant physiologist doing in the Air Force? They don't have potted plants on SAC bombers, so why do they need him? It is like having a birth control clinic in a convent. (p. 125)

Again, his emotionality reduces the effectiveness of the more objective fiber of the book:

> They felt as though the chemical companies who manufactured the poison and the generals in the Pentagon who permitted its use had broken into their home and deliberately mutilated their child.... God wasn't responsible for Kerry's maimed body: it was the American chemical industry and the Department of Defense. (pp. 136-7)

He fails to mention that the use of defoliants helped render American servicemen less vulnerable to perimeter Vietcong sniper-directed lead pollution.

Written with an eye to best-sellership rather than scien-

tific detachment, the book should in part ultimately serve the Air Force as well as Kerry and the Ryans.

THE AMERICAN PEOPLE must not be alienated from their military forces. It must be recognized that service people fight with whatever, wherever they are directed, to win. Basic doctrine *should* be amended to include the statement that wherever possible, particularly in limited war situations, the Air Force is prepared to operate within and, indeed, defend personnel and ecosystems against unnecessary (chemical) damage.

The Air Force of the future will be increasingly concerned with control of illegal aggression without ecosystems degradation. Ultimately, environmental protection will be one major purpose for deployment of force.

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Brooks AFB, Texas

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AWARD

The Air University Review Awards Committee has selected "A Lesson of History: The Luftwaffe and Barbarossa" by Major Lonnie O. Ratley III, USAF, as the outstanding article in the March-April 1983 issue of the *Review.*

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contributors

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