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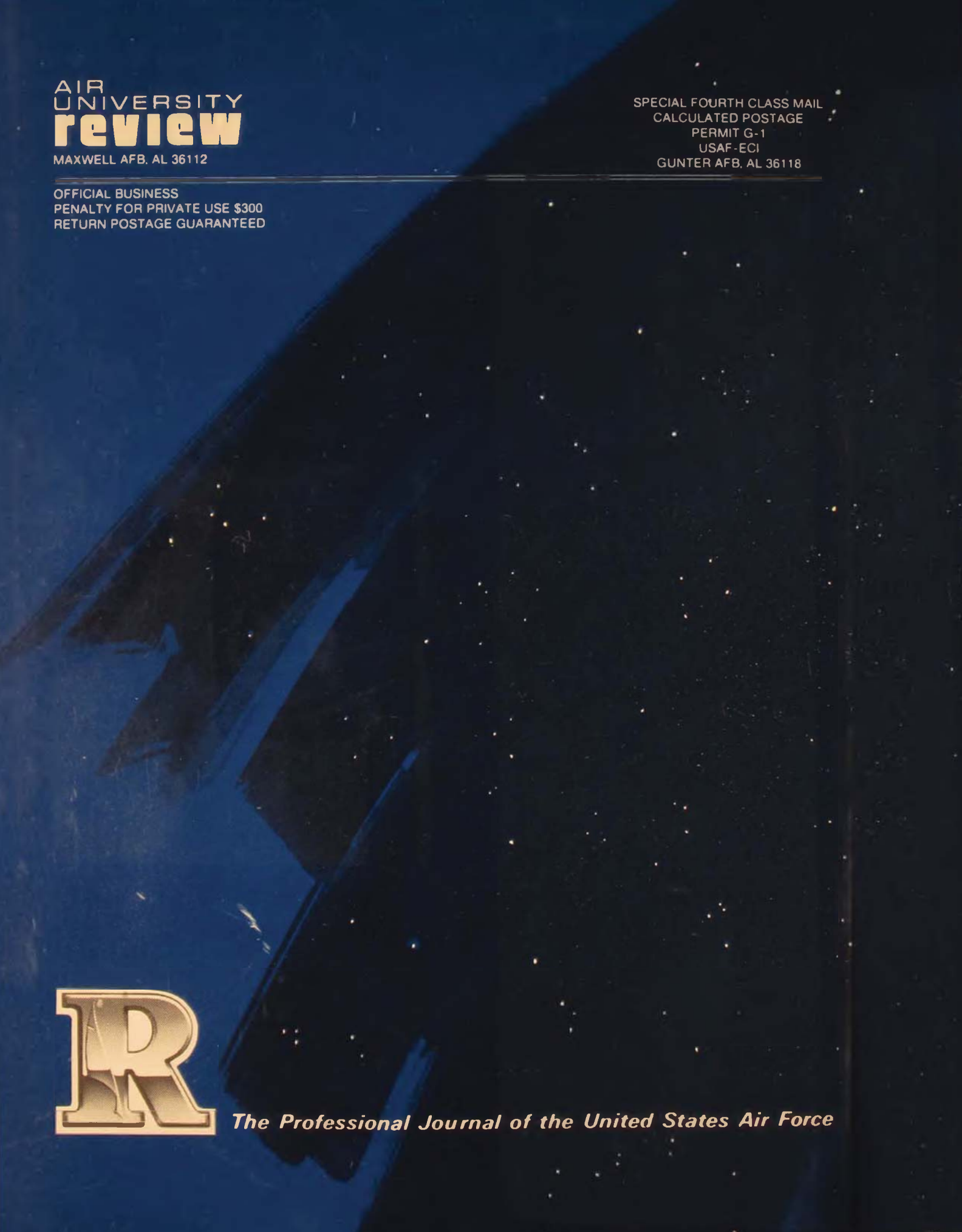

The Professional Journal of the United States Air Force

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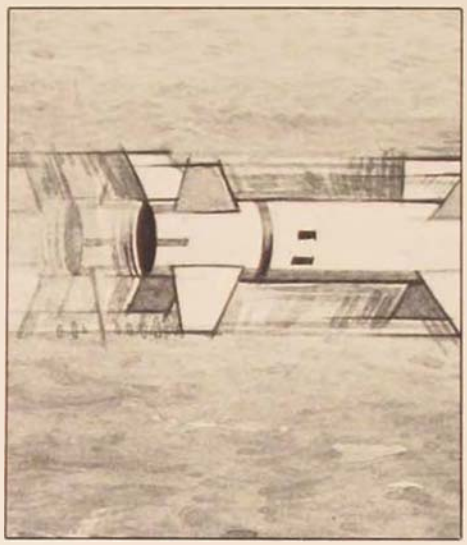

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the cover

A postdiluvian Crombot. Eons ago, when antediluvian Crombots ruled in far-off galaxies, no one could have fathomed the shape of Crombots to come.

". . . one cannot fight successfully a war for which one is not organizationally and doctrinally prepared."[1]

WAR, DOCTRINE, AND THE AIR WAR COLLEGE

some relationships and implications for the U.S. Air Force

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THE U.S. Air Force exists for one reason: war. Its immediate tasks are to understand war, prepare for it, and deter it. But the ultimate task of the U.S. Air Force is to wage war, appropriately and successfully, across the broad spectrum of conflict. Viewed at a basic level, this phenomenon of war probably is the most odious act a man commits against his fellowman; it is gruesome, inexplicably brutal, and horrendous in its cost of human life and other resources. But to cope with this persistent feature of man's history, it is insufficient to merely understand war. At a minimum, the planning and conduct of war require one to approach it at the level of analysis, for only then can its essential elements and their interactions become reasonably clear.

The first step in such an effort should be to address the nature of war, but its enormous complexity defies all but rudimentary analysis. To obviate this complexity, war is often cast in simplified molds or equations; such efforts, however, produce not analysis, but the illusion of it. Some individuals attempt to grasp the essentials of war by examining it in isolation from political reality; but that approach is doomed to failure, since it ignores the basic logic of war—namely, the reasons for which it is fought. Others seek to understand war by reducing it to principles or precepts, yet such efforts can yield only abstractions, themselves of limited value, thus providing little real comprehension. The most dangerous outcomes, however, are reserved for those who try to examine war in quantifiable terms. Using a methodology that assumes the existence of determinant knowledge concerning war, these individuals arrive at conclusions that have enormous appeal because they are adorned in the guise of mathematical and scientific respectability. But when subjected to the uncertainties and nonquantifiable aspects of war as it actu-

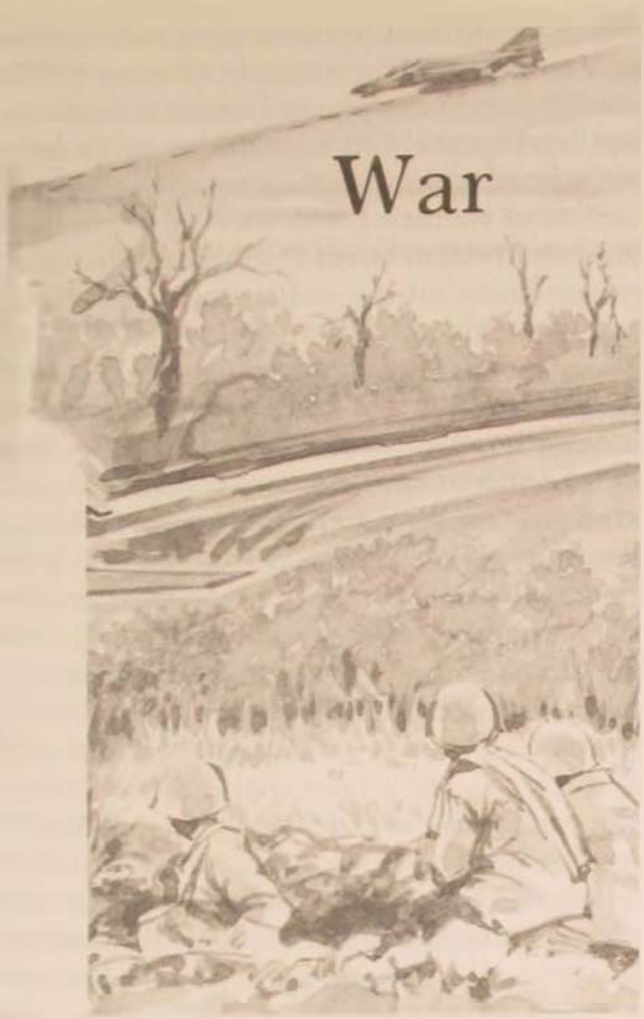
ally unfolds in combat, the disastrous consequences of this approach become painfully evident. Thus, there are no quick and easy approaches to the study of war. If one wishes sincerely to make the essence of war an integral part of his thought processes, he must grasp it at two different levels. One of these is within the domain of rational intellectual thought; the other, *which is of equal importance*, is at the level of instincts and intuition. In psychological terms, both *left* and *right* brains must deal with this phenomenon. Only when both domains are probed can the necessary synthesis take place; only then can one truly "think war."

The effort to understand doctrine demands no less. It requires the Air Force officer to take a long and arduous journey to gain experience in war. Ideally, some of that experience will be acquired by direct combat, but much of it will be assimilated vicariously, with history serving as the primary medium. Also necessary will be exposure to bureaucratic influences, because only through it can one begin to appreciate the final shape and structure of official doctrine and the rationalizations offered for it. To their great credit, many professional officers take this doctrinal journey. But although they travel the same pathways, they do not always proceed in exactly the same sequence, nor, after completing the journey, do they agree on what they have seen. The result, predictably, is extensive and serious controversy.[2]

Currently, the meaning, substance, and output of doctrine are the subjects of a vigorous, vital, and necessary debate of enormous importance to the role of the U.S. Air Force in U.S. national security matters. Although not generally recognized, the stakes in the debate are enormous. Ostensibly the debate is about doctrine, but in reality the controversy centers on the meaning of war and its relationship to doctrine. War and doctrine are inseparable, and attempts to understand doctrine by isolating it from war as it occurs on the battlefield is likely to result in formulations that are (to paraphrase Will Rogers) neat, plausible, and wrong.

The complexity and importance of these two interrelated matters of war and doctrine are such that one would find it difficult to understand and assimilate them on an individual or independent basis. Although all military professionals study war, only some few are privileged to gain direct exposure to it; the remainder must rely exclusively on indirect exposure. With regard to doctrine, all military professionals concern themselves with it, but they do not necessarily agree on its meaning or importance. Part of the effort to overcome these shortcomings is made at the Air Force's senior service school, Air War College (AWC), by offering a structured approach to the study of war, doctrine, and their relationships to the broader concerns of national security affairs.

Although the need for this formalized study appears obvious, considerable disagreement seems to exist, even at the highest levels, about its intrinsic value for those who attend AWC and, by inference, its utility for the Air Force's future. The results are a continual introspection within AWC and periodic assessments at a higher level of authority in order to judge the overall effectiveness of an AWC education. The basic questions asked are who is being taught, what are they taught, and who does the teaching? Also probed, yet never really answered, is the basic question: namely, what is the purpose of an AWC education? Do we seek to graduate senior staff officers or senior combat commanders? Do we educate colonels or future generals? None of these groups, of course, are mutually exclusive; and therein lies the problem. Should the curricula be broadly based and, as a consequence, exhibit a measure of superficiality? Or, alternatively, should it have a relatively narrow focus with emphasis on depth of understanding and analysis? Arriving at answers, of course, is a far more difficult task than raising the questions. However, one might suggest, as a point of departure, that without a basic understanding of war and doctrine, valid answers are not possible.



The most fundamental and vital task for the professional officer is to understand war; this obligation takes precedence over all others. Although one can argue that the deterrence of war is the more immediate task faced by the professional officer, it should be relatively obvious that one cannot comprehend deterrence, let alone achieve it, without a clear grasp of what is to be deterred. The obligation of the professional officer to understand war, moreover, is universal; no officer qua officer can be exempted from this responsibility. Line officers in particular, but nonline officers as well, must demonstrate an understanding of war. Even junior officers, whose professional education and socialization are in the earliest of stages, must possess at least a basic knowledge of this phenomenon so central to the profession.

Regrettably, however, comprehension of war does not appear to be the sine qua non of the professional officer corps—a condition widely recognized by astute observers both within and without the officer corps. Not very long ago, for example, the editor of *Air University Review* reminded his fellow officers that "the basic function of the peacetime military is to prepare for war" and argued that today's officers do not view their combat responsibility with clarity. He further suggested that although a hallmark of the military professional is expertise at war, "today's Air Force officer corps seems to be regressing to the preprofessional status that prevailed in the American officer corps during the first half of the nineteenth century," when technical skills took precedence over the ability to conduct war.[3]

To these internal criticisms, one must add observations offered by competent nonmilitary analysts. Perhaps one of the most insightful comments in this regard was made by the late Bernard Brodie, who, in his last major work *War and Politics*, argued that "soldiers usually are close students of tactics, but only rarely are they students of strategy and practically never of war!"[4]

The key to understanding war is to begin with its nature. In that respect, no greater clarity and value exist for the professional officer than that offered by Carl von Clausewitz in *On War*, which was acclaimed by Bernard Brodie as "not simply the greatest but the only truly great book on war." *On War* provides an analysis of war whose relevance transcends time, weapons, and technology.[5]

At the outset, Clausewitz defines war as *"an act of force to compel an enemy to do our will."* The operative word is *will.* Clausewitz likens war to a duel on a grand scale, the objective of which is to impose one's will on the enemy. Reduced to its fundamentals, therefore, war in essence is a contest of wills.[6] But to grasp fully this disarmingly simple notion, one must examine war in two separate and distinct ways.

First, one must consider abstract or theoretical war. In such a war, no limits exist on the application of force; war escalates to the extreme as each side attempts to exceed the efforts of the other. This type of war is a perfect textbook war in every respect. The political objective for which the war is conducted is established in clear and unambiguous terms and is understood perfectly by every individual directly or indirectly involved. In this type of war, complete knowledge exists about one's will as represented in society, government, and the military. The capability of one's military force, having been quantified by analytical techniques, is known with precision. Space and time are known variables that can be factored into force alerting, deployment, and employment actions. Moreover, the outcomes of force employment can be determined with a high degree of certainty in advance because war, when reduced to valid fundamental principles, lends itself to quantification. Obviously, given these tools of measurement, one can determine whether a favorable force asymmetry exists. Should that be the case, it is then possible to exert increasing amounts of military effort and escalate the war to the extreme, with the certain knowledge that the adversary will crack first and thus lose the test of wills.

It should be obvious that such a war does not—indeed, cannot—exist. Because of its implausibility, Clausewitz defines this type of war as theoretical, i.e., it can exist only in the abstract. Such a war bears no relationship to reality; it is war on paper.

Real war, by contrast, is war as it unfolds on the battlefield or in combat operations in general. It is influenced and modulated by a variety of factors that collectively tend to reduce the effectiveness and efficiency of all military efforts. All of these factors, according to Clausewitz, can be grouped under the notion of general friction.

Much like the mechanical phenomenon, friction affects every effort in war, and as a result even the simplest of them become difficult. Stated differently, nothing in real war occurs as expected. For example, one can be assured that command, control, communications, and intelligence (C^3I) breakdowns will manifest themselves in any sizable combat operation because of systemic problems, equipment failures, and human errors. As those experienced in war know all too well, some participants will not "get the word," others will get it wrong, and some, for a variety of reasons, simply will not—or cannot—respond. Such failures are what Clausewitz had in mind when he said that "countless minor incidents—the kind you can never really foresee—combine to lower the general level of performance, so that one always falls short of the intended goal."[7] This persistent phenomenon of general friction, much like its mechanical counterpart, can be reduced but never eliminated. Thus it will always exist as an inherent characteristic of real war.

A component of general friction that distinguishes real war from war on paper is uncertainty. Defined as "a state of incomplete knowledge," it severely inhibits not only the conduct of war but the planning of it as well. Modern means and technology notwithstanding, one cannot know, for example, the actual disposition, capability, and readiness of one's own forces, let alone those of the enemy. One can draw some general conclusions about them, but there simply is no way to calculate these elusive characteristics accurately.

This phenomenon of uncertainty becomes particularly significant when one's approach to war places heavy emphasis on technology. At a given level of technological complexity and sophistication, it becomes virtually impossible (because of cost, environmental factors, and other reasons) to ensure a satisfactory level of technological certainty of new systems prior to their exposure to combat. Furthermore, the requirement to integrate such systems for offense, defense, and C^3 will create additional difficulty and compound the problem of uncertainty; moreover, it will do so in a geometric

rather than arithmetic fashion. The net result may be massive uncertainty about the actual, as opposed to theoretical, effectiveness of technological systems as yet untested in combat. Testing notwithstanding, however, the uncertainty will remain. It can be reduced but not eliminated. It too is an inherent characteristic of war.[8]

Other factors to contend with under the heading of general friction are chance and unpredictability. Modern-day warriors in the West, whose antecedents flow from the Age of Reason and whose educational backgrounds are dominated primarily by science and technology, tend to ignore or minimize subjective elements such as chance and unpredictability even though these profound influences are clearly established in military history. These elements often explain victory or defeat not only in single battles but in whole wars. (The history reader need think no further back than Vietnam.)

Since it is friction that largely leads to the occurrences of unpredictable events, one must be alert to any manifestation of friction within his own conduct of operations and be prepared to act accordingly. Moreover, the knowledge that friction on the other side will create unpredictable events should encourage one to take those actions that will generate additional unpredictability for the adversary. Where, when, and under what circumstances these events will occur are uncertain because they are governed not by calculations but by the providence of chance. Whereas uncertainty feeds on itself in a manner that can never be precisely foreseen, chance is a more fundamental part of nature. As such, it is an inescapable aspect of reality and thus is essential to an understanding of real war. Clausewitz recognized the role of chance when he argued that:

> . . . absolute, so-called mathematical, factors never find a firm basis in military calculations. From the very start there is an interplay of possibilities, probabilities, good luck and bad that weaves its way through the length and breadth of the tapestry. In the whole range of human activities, war most closely resembles a game of cards.[9]

Real war, therefore, is exceedingly complex. Consequently, the first essential step for all professional officers—and commanders, in particular—is to recognize that complexity and all of its implications. Education and training (in that sequence) are essential elements in this process. But—and this is a key point—they possess great potential for danger because they require order, structure, and method. War, by contrast, is bedlam. Uncertainty, chance, and unpredictability, to which one could add danger and exertion, all combine under the rubric of general friction to present conditions other than those expected. Under such circumstances, axioms, rules, and principles are of marginal utility, primarily because the confusion and chaos of war frequently are such that insufficient knowledge exists to suggest what to apply. War, in other words, is not a managerial enterprise. It is, as stated earlier, a test of wills; but more completely, *war is a contest of independent wills dominated by friction.* The task of the combat leader, therefore, is to impose his will on that of the enemy while contending with the effects of general friction. One cannot eliminate friction, but its adverse effects can be lessened by coming to grips with war at both the intellectual and intuitive levels. And it is the latter that Clausewitz refers to as the inward eye, which instinctively permits "the quick recognition of a truth that the mind would ordinarily miss or would perceive only after long study and reflection."[10] But in addition to intellect and intuition, one must include such qualities as determination, courage, and spirit because only the collective weight of all these elements can limit the adverse effects of friction that can permeate every aspect of war. More significantly, they form the essence of one's effort in war. In a word, they constitute one's will. But their vital importance notwithstanding, "they will not yield to academic wisdom. They cannot be classified or counted. They have to be seen or felt."[11]

One can ignore this approach to war, however, and examine it in a more systematic, less complex, and almost quantifiable manner. From a historical perspective, the individual who perhaps best symbolizes this approach is General Antoine Henri Jomini. He and Clausewitz shared some common ground in that they were participants and interpreters of Napoleonic warfare. Both viewed war as an instrument of policy and wrote about its theory and practice in similar terms.[12] Those similarities aside, however, they differed substantially on the substance and conduct of war. Whereas Clausewitz sought to explore the fundamental essence of war, Jomini attempted to reduce it to scientific principles; while Clausewitz emphasized chance, Jomini relied on calculation. In essence, Jomini argued that war could be abstracted into a small number of rules which could be applied in all situations. "There have existed in all times fundamental principles," he wrote, "on which depend good results in warfare. . . . Those principles are unchanging, independent of the kind of weapons, of historical time and place."[13] With this line of reasoning, Jomini offered hope to warriors who found their previous notions of warfare shattered by the political, industrial, and managerial revolutions of the late eighteenth and early nineteenth centuries. But instead of making those warriors concerned about the complexity of total war as it emerged following these revolutions, he made them feel comfortable by providing "a small number of fundamental principles of war, . . . the application of which has . . . been crowned in nearly every case with success."[14]

Jominian thinking applied to battle, however, proved wanting. In the U.S. Civil War, for example, it had a disastrous effect as commanders waited in vain for the ideal battle based on Jominian assumptions. Only after extended campaigns and numerous casualties did battlefield commanders slowly recognize the nonutility of Jomini's maxims. Indeed, two of the most decisive events of that war—Grant's unorthodox maneuvering at Vicksburg and Sherman's march through Georgia—stand as outright rejections of Jominian principles. And although Jomini "recognized that every maxim has its exceptions, the fact remains that the battles of the Civil War were won by generals who wrote their own rules."[15] (How the U.S. Air Force views this striking difference between Jomini and Clausewitz will be addressed further in the succeeding section on doctrine.)

But to understand the nature of war requires one to go beyond the Clausewitzian formulation of real war and his notion of general friction that brings it about. Necessary also is recognition of offense and defense as vital and interactive components of war. One might think that this relationship is sufficiently obvious to obviate more than the slightest mention of it, but that is not the case. Moreover, it misses the point: one can argue persuasively that defense possesses a natural superiority in war. From the philosophical standpoint, the evidence is rational. The objective of offense is to destroy, while the goal of defense is to preserve. From an operational perspective, defense appears intrinsically stronger since it is easier to defend than to attack, assuming equal forces on both sides.[16] Furthermore, trends in the modern period suggest that defensive capability is becoming significantly more efficient. As examples, far fewer men are needed to defend a mile of frontal area today than were required in the Napoleonic period (or, for that matter, in World War II). In contemporary warfare, new defense systems with substantial degrees of accuracy and lethality suggest, at least theoretically, high one-shot-one-kill probabilities. (Admittedly, similar systems also improve the attacker's capability, but because his task is more difficult, greater advantage accrues to the defender.) Moreover, significant advances in surveillance and reconnaissance tend to make the "other side of the hill" reasonably clear to both attacking and defending commanders, the net effect of which is to improve the latter's

situation, again for obvious reasons.

These trends notwithstanding, the centrality of both offense and defense as components of war remains. Although it can be argued that one or the other tends to dominate broad periods of conflict, neither can assert absolute primacy in combat. Rather, there exists in all combat operations a continuous interaction of both offense and defense (as anyone who has flown an "offensive" combat sortie over North Vietnam can attest).

Yet a further notion necessary to understand the nature of war is the relationship that exists between the objective of war and the means used to attain them. Clausewitz perhaps expressed it best with his analogy that war has its own grammar but not its own logic.[17] Grammar refers to the military means and methods used in war, while logic is a reference to the objective or purpose of war. This link between means and ends has two crucial dimensions. The first is expressed in another oft-quoted statement by Clausewitz, namely, "that war is simply a continuation of political intercourse, with the addition of other means."[18] The final phrase and its reference to "other means" is of utmost importance, since it makes clear that war is not an autonomous act that can be viewed in isolation from its political purposes. Clausewitz argued further that it would be absurd to subordinate the political point of view to the military; moreover, he extended this line of reasoning by stating that it is not sensible for governments to ask the military for *"purely military advice."*[19] He could have added that "purely military advice" simply doesn't exist.

The second vital aspect of the relationship between means and ends is that they must exhibit a sense of proportionality and compatibility. Attempting to achieve a major political objective with less than adequate means or, alternatively, using excessive means must be judged impolitic and immoral. Consequently, no decision made in the process of establishing political objectives or the level of means to be used can be viewed as a pure political or military decision. In any circumstances that might involve the commitment of force, pure political or military decisions simply do not exist.[20]

Understanding that war has its own grammar but not its own logic has further significance for the military because there are different types of war, which exist across a spectrum. Although the terminology for specific points on the spectrum are neither consistent nor uniform, three basic levels of conflict are selected here for the purpose of discussion: total war, limited war, and low-intensity conflict. Each is distinct; the logics (or purposes) are decidedly different, and the grammars (means and methods) vary sufficiently to warrant separate consideration.

Total war, the modern intellectual origins of which can be traced to the Napoleonic period and not the atomic bomb, is the most clear-cut. It is fought between and among governments (and in recent time on a global scale) whose objectives are to destroy the means and will of the adversary and to eliminate it as a political entity. The means can be unrestricted and thus could include nuclear, biological, and chemical weapons.[21] Historically, total war has resulted in mass mobilization of the respective economies and populations, but the possible use of weapons of mass destruction in future war may render such efforts impossible or irrelevant. Regardless of the weapons employed, but particularly if they are limited to conventional forces, the strategy for total war is rather straightforward. The primary military aims are to eliminate the military capability and potential of the opposing force structure; destroy the relevant economic capability, particularly any war-supporting capacity; and neutralize the ability of the political infrastructure to wage war. The goal, in short, is to destroy the adversary as a functioning political, economic, and military entity.

By contrast, the grammar and logic of limited wars are restrictive. Political objectives are intentionally limited (self-imposed or externally induced), few states usually are involved

(the superpowers may or may not be included), and conflict is confined to a restricted geographical area. The adversary's will, however, remains the objective. But instead of crushing it, the goal is to change it, thus suggesting a bargaining approach. The means of limited war are similarly restricted in order to keep the conflict under control. Only relevant portions of the force structure are employed, but all types of conventional capability may be used. Much debate exists about the use of nuclear weapons, primarily because their employment may result in escalation to total war. However, where the grammar of limited war really differs from total war is in its methods of force employment at the strategy level. Although the focus might remain on the adversary's force structure, relevant economic base, and political infrastructure, the military objective would not be to destroy them. Rather, one's efforts would be directed toward reducing the capability or potential of some or all of these elements to function effectively. The post-World War II conflicts in Korea and Vietnam remain as excellent examples of limited political objectives sought by constrained military means and methods. Yet, despite these experiences, compatibility and proportionality between the grammar and logic of limited war remain elusive and thus frustrating to the military officers.[22]

Since no completely adequate terminology appears available for the next level of hostilities, it is referred to herein, somewhat reluctantly and almost arbitrarily, as *low-intensity* conflict. It is conflict that encompasses several distinct types of hostilities and would include wars of national liberation, insurgency, revolution, and guerrilla war. In addition to these more traditional types of combat, low-intensity conflict would include sabotage, counterterrorism, and hostage-taking and rescues.[23] Thus there are several points on the spectrum at the level of low-intensity conflict, and each has its distinctive characteristics. Additionally, each has its own grammar and logic, although again considerable overlap exists. For example, wars of national liberation, insurgency, revolution, guerrilla war, and civil war normally would have a similar objective, i.e., overthrow an existing government, and thus they would employ similar means. The government's objective, by contrast, would be survival and elimination of the threat. Its means, however, could differ significantly from the opposing force simply because established governments do not ordinarily maintain irregular forces as central elements in their force structures. And unless a threatened government wishes to fight with dissimilar forces (i.e., conventional ones), modification becomes necessary.

Likewise, the methods for low-intensity conflict differ considerably from those of total or limited war. Concepts of employment for total war that might be suitably altered to fit the condition of limited war may be not only totally irrelevant but counterproductive if applied to low-intensity conflict. Although not readily apparent, it seems reasonably clear that substantially more differences exist between low-intensity conflict and limited war than between limited war and total war. The implications for the professional officer are far-reaching.

If one assumes that the contest of wills remains operative at the level of low-intensity conflict, then how to change or modify the adversary's will remains as a fundamental goal. However, a government attempting to resist insurgency, for example, must proceed with great care, since the wrong approach might escalate the situation from insurgency to revolution; moreover, if dealt with inappropriately, the domestic nature of insurgency could become international in scope, should other states accord belligerent status to the insurgents. Therefore, the concepts of employment become of prime importance, and the questions they raise have no easy answers.

- Can one attack the opposing force structure if it is subsumed into part of the popula-

tion and thus indistinguishable?

- Can one attack the political infrastructure if it and its members are vague and obscure?
- Can one attack the economic base if such an effort might result in the destruction of one's own means of support, while simultaneously creating the risks of disaffecting part of the population base?

Assuming the development of appropriate concepts, equally serious questions arise concerning the capability of one's force structure to conduct effective operations.

- Can one assume that weapon systems, designed for limited or total war, will be suitable for low-intensity conflict?
- Would one's C^3I and other supporting systems possess sufficient flexibility for adaptation?
- Are one's forces adequately trained and equipped for such conflict?
- Are they capable of effective interface with the forces and equipment of a host nation?
- Is deterrence operative at this level? If so, can one articulate any specific conceptual underpinnings, or does one merely extrapolate from limited war deterrence theories?
- If the latter, does it matter that one's earlier concept of massive retaliation proved inadequate for the deterrence of limited war?
- If yes, what are the implications for deterrence of low-intensity conflict?

As these questions should make clear, low-intensity conflict possesses its own grammar and logic, and thus it differs significantly from other types of war. It also should be obvious that efforts to cope with low-intensity conflict that ignore this fundamental fact are unlikely to succeed. Indeed, it is precisely this point that Clausewitz had in mind when he argued that "wars can have all degrees of importance and intensity, ranging from a war of extermination down to simple armed observation." Indeed, it is this salient fact which leads to one of his most profound (and most ignored) conclusions that

> the first, the supreme, the most far-reaching act of judgment that the statesman and commander have to make is to establish . . . the kind of war on which they are embarking; neither mistaking it for, nor trying to turn it into, something that is alien to its nature.[24]

In light of the foregoing, what then can be said about the approach to war as exhibited by the U.S. Air Force? First, the evidence suggests that the Air Force is devoid of any real recognition of war's true nature. From the pre-World War II period to the present, it clearly has accepted notions of theoretical war, or war on paper, while simultaneously ignoring the dominant influences of general friction in war. The theory of daylight, high-altitude, precision bombing, formulated at the Air Corps Tactical School prior to World War II, and the actual conduct of strategic air operations during the war are clear examples of a Jominian, mechanistic view of war—a view of war as a mathematical equation whose variables can be selectively manipulated to achieve success.[25]

This penchant for ascribing magic to mathematics remains quite evident in current Air Force thinking, and one need not look much farther than the extended debate on MX basing. A few years ago, a small number of Air Force officers, whose competence in physics and statistics exceeded by several orders of magnitude their understanding of war, apparently convinced the senior leadership that there existed a "window of vulnerability." By using numbers to create "reality," these officers, specialists in Air Force uniforms, were able to demonstrate a high level of ostensible vulnerability for fixed-based ICBMs. But although their calculations suggested a mobile basing approach for the emerging MX, none of the thirty-some schemes devised were able to win congressional or public support. As it became obvious that MX deployment in fixed Minuteman silos presented the only attainable alternative (and, incidentally, one that could be justified on the basis of real war), the earlier vulnerability arguments based on numbers then called into question the advisability of procuring the MX in the first

place. As a consequence, an extended debate on the MX ensued and has continued, and ironically the major argument used against MX procurement is the one provided by the Air Force, i.e., vulnerability.

The MX, of course, will be vulnerable to a certain extent, simply because all systems possess a degree of vulnerability. But there ought to be enough blue-suiters with Ph.D.'s in physics who understand the basic statistical arithmetic sufficiently well enough to demonstrate that a Soviet first strike against 1000 fixed-based silos will not result in the destruction of 80 percent to 99 percent of these, as frequently postulated by the Air Staff. By the same token, within the blue-suit community (particularly at the senior officer level), there should be enough understanding about the waging of war to distinguish between real war and war on paper. That there does not appear to be such understanding, should come as no surprise, but it remains, nonetheless, tragic. It is entirely possible that had one senior Air Force leader expressed a single, clarifying thought—that war is not numbers—the entire MX controversy might have been avoided.[26]

At a different operational level, additional evidence exists to demonstrate the Jominian, mechanistic thinking that prevails in the U.S. Air Force. Our notions of possible war in Central Europe, for example, require centralized command and control of Air Force assets, which, in turn, demand an elaborate C³I superstructure. In this system, combat decision making, which is the essential action in war, is tied to a perceived capability to assess—accurately, comprehensively, and continuously—the unfolding and constantly changing battlefield situation. This perceived potential for collecting and synthesizing relevant data from multiple sources, moreover, has led to the belief that "sufficient automation and intelligence 'fusion' can render future battlefields 'transparent.' "[27]

This technological potential notwithstanding, these notions downplay significantly the reality of modern war and probable Soviet employment concepts. Fighting or deterring modern war in NATO (as much as some would like it to be otherwise) means adequate recognition and response to the probable effects of nuclear weapons on NATO's C³I systems. Despite ongoing and planned improvements to make high-frequency and ultrahigh-frequency systems in Western Europe more secure and reliable,[28] the fact remains that NATO's C³I system and fixed-site facilities are highly vulnerable to nuclear effects. For example, transient radiation (including gamma and x-rays) can destroy integrated communications systems and large-scale integrated systems, thereby crippling communication systems, sensors, and computers. Furthermore, electromagnetic pulse is capable of destroying solid-state electronics, and those that might be spared would remain vulnerable to the relatively small overpressures generated by low-yield warheads. These effects can be limited to a certain degree (through the use of shielding, special filters, hardening, etc.), but they cannot be eliminated. Vulnerability of the system, therefore, is and will remain a fact of life; the only question is how much.

There exists an astonishing belief that one can calculate effects and results of nuclear weapons never tested, let alone used, in a combat environment; and it is here that the anti-Clausewitzian, Jominian approach becomes manifest. We are basing our C³I decisions on presumed knowledge about a type of conflict that has yet to occur and in the belief that our knowledge about outcomes of past conflicts offers an adequate basis for determining future outcomes. Although this approach is not without merit, the real value in examining previous conflicts lies in the proof they offer about the persistence and effects of friction in war. These factors would suggest the need for C³I systems that are extensive, redundant, and mobile. But more important, they would make clear the requirement for adaptability and creativity by commanders at all levels in order to cope with

the constantly changing and unpredictable circumstances in war.

It is the Jominian view of war that encourages us to rely on elaborate and complex C³I systems in the belief that we can direct war with some measure of precision. The Clausewitzian view, by contrast, suggests that we should rely on commanders who understand war and who can respond instinctively in the absence of C³I. Our Jominian bias has led us to think that we can calculate answers; Clausewitz, by contrast, would have left us with difficult, perhaps unanswerable questions. Professionally, we have allowed ourselves to be comforted by ostensible knowledge and thus need to be reminded of a recent comment by the eminent historian Daniel Boorstin: "The great obstacle to progress is not ignorance, but the illusion of knowledge."[29]

In addition to its Jominian, mechanistic bias, Air Force thinking about war seems to lack the all-important quality of discernment. With one significant exception, there appears to be an inability or unwillingness (or both) to accept that war occurs at different levels and that each demands specific preparation and response. The exception, of course, is the recognition that strategic nuclear war differs substantially from other forms of war and hence has its own force structure and employment concepts. But beyond that obvious difference, there is little discernment about gradations—a point made all too clear by our combat history. For example, we went to war in Korea with the intellectual baggage and a force structure extrapolated from our World War II experience, only to find that we were mentally unprepared and physically ill-equipped to fight that kind of war effectively. Not learning the lesson caused us to repeat the course in Vietnam, and our failure to receive a passing grade there clearly raises fundamental questions about our professional competence.

If anything, our military concepts, procurements, and training policies prior to Vietnam demonstrated an even greater lack of discernment. For example, one highly respected and knowledgeable commentator on Air Force issues has described our tactical fighter outfits in the Pacific during the late 1950s and early 1960s as a "sort of bush-league Strategic Air Command."[30] Because of the circumstances under which they would carry out their primary mission of nuclear delivery, assigned F-100 aircraft required 450-gallon drop tanks and electronic countermeasure pods.

> Then came Vietnam, for which they were decidedly not ready. The huge 450-gallon tanks were useless in a tactical war, and the ECM pods emerged from classified storage only to prove equally useless against the radar in North Vietnam. As for the pilots, all their nuclear training was also useless. They were not ready for what they were being called to do, any more than the B-52s were ready for their conventional role.[31]

This unpreparedness for Vietnam (and Korea earlier) is not simply a matter of poor planning or bad judgment. Rather, it reflects a basic institutional inability to discern different levels of war, and it suggests a mistaken notion that the training and force structure requirements necessary for the most demanding level of combat are adequate for war at lower levels. One cannot take issue with the belief that maximum flexibility in the force structure can overcome a host of problems if one is called to fight under unexpected circumstances. But one can argue that maximum flexibility in the force structure may be totally irrelevant without a corresponding degree of mental dexterity about the type of war in which one is engaging.

Given the complexity of war, how we plan to wage it across a spectrum of conflict becomes a fundamental question. The real answer to that question cannot be found in existing or projected force structures, strategic plans, or tactics manuals. Nor can the answer be a definitive one, since war, at whatever level it occurs, will be profoundly influenced by friction and thus will not unfold as expected. How we plan to wage it, therefore, can be stated only implicitly, based on the collective wisdom expressed in our doctrine.

In his 1971 work *Ideas, Concepts, and Doctrine*, Robert Frank Futrell stated that from its creation the Air Force has been involved in "a never-ending quest for doctrine."[32] Approximately a decade later, a serving Air Force officer would continue this refrain by writing that "a fundamental problem with Air Force doctrine is the absence of any real consensus as to what doctrine is and just what it is supposed to do."[33] Later yet, an editor of *Air University Review* would introduce two diametrically opposed articles on doctrine by referring to doctrine as "Unfinished Business."[34] This inquiry would persist as Air Force officers continued to produce articles questioning doctrine and challenging its process of formulation.[35]

A review of this literature indicates that two diametrically opposed doctrinal schools of thought exist. On the one hand, there is an abstract-Jominian view: it places emphasis on precise definitions of doctrine; argues for a formalized process for its formulation; categorizes doctrine by type or level of application; and tends to view war in mechanistic terms. In stark contrast, there exists an operational-Clausewitzian view: its central focus is the reality of war and how professional officers respond to its uncertainty by relying on a set of shared assumptions and beliefs.

The abstract-Jominian view can be seen among statements published during the past several years in the *Air University Review*, which seek, as Jomini himself did, to reduce the degree of uncertainty. Jomini understood that the task of military schoolmasters after Napoleon would be to explain to lieutenants and captains, themselves lacking Napoleon's innate genius, how to go about things. The requirement then became, for Jomini but not for Clausewitz, to lay out the rules we should bear in mind.

This approach, it seems to me, is a mechanistic one. By implicitly assuming that war is characterized by structure and continuity, one is free to argue that what has worked best in the past is appropriate for the future. Doctrine can then be used to explain the best way for one to conduct military operations. The Clausewitzian approach, by contrast, would seek not to explain but to explore. It would not provide answers; rather, it would merely remind those who must fight what questions to ask of the situation, of existing plans, of resources, and—not the least—of themselves.

This operational-Clausewitzian approach to doctrine has been expressed recently by a small group of young officers. Among them are Lieutenant Colonel Barry D. Watts and Major James O. Hale, who have argued that abstract definitions "have turned the doctrinal enterprise into a sterile scholasticism too little related to the concrete activities of war itself."[36]

These officers argue persuasively that "a formal definition of doctrine that explicitly captures all its particulars and nothing more cannot be given."[37] Their overriding concern is clearly with war-fighting competence. Consequently they characterize doctrine as *"the implicit orientation with which a military culture collectively responds to the unfolding circumstances of war."* Colonel Watts and Major Hale are Clausewitzians, strictly because they are persuaded that Clausewitz's ideas are more useful in coping with the uncompromising realities of battle than Jomini's or anyone else's.[38]

A similar view is expressed by Dr. Williamson Murray, a major in the Air Force Reserve, who argues that doctrine must give "commanders and subordinates on the battlefields *a set of shared assumptions that enable them to know intuitively what others might be doing* under the confused pressures of combat."[39] Thus the central focus of the operational-Clausewitzian school of thought is war and the uncertainty associated with it; and it is the latter, as evidenced on the battlefield under the reality of friction, that demands from doctrine a set of shared assumptions or an implicit orientation about the application of force in combat. There can be no best way or approved way to do a job in war; war's nature simply does not permit everything to be spelled out in advance.

This striking contrast between the abstract-Jominian and operational-Clausewitzian views forms a suitable backdrop for an assessment of the official Air Force approach to doctrine. That it clearly falls into one of these categories should not come as a surprise, but which category may come as a rude awakening to those who accept that the essential mission of the U.S. Air Force is to fly and fight.

By all measures of merit, the latest version of AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force*, published in 1984, is a major improvement over its 1979 predecessor, *Functions and Basic Doctrine of the United States Air Force*. Gone are the comic-book style, quotations from prominent individuals whose doctrinal competence is not obvious, and irrelevant observations about managing people.[40] More substantively, the entire thrust of the revision represents a serious effort to make AFM 1-1 the basis for thinking seriously about how to employ air power in war. Despite these obvious improvements, however, the document remains inadequate.

The first and most serious failure is its acceptance of war on paper as a suitable paradigm for the use of air power. Instead of confirming that general friction is the most crucial challenge ever to be faced by a combat leader, AFM 1-1 tells us that the "essential factors in warfare [are] man, machine, and environment."[41] Instead of basing air doctrine on war as it unfolds in battle, AFM 1-1 argues that doctrine flows from the principles of war, "which have been proved successful in the art and science of conducting war."[42] This emphasis on the principles of war clearly establishes the abstract-Jominian nature of AFM 1-1 and, regrettably, also provides evidence of its superficiality. The principles are important, but they are not war, and knowing them cannot ensure victory in war. Indeed, as military history makes clear, success on the battlefield is owed just as frequently to their violation. To its credit, however, AFM 1-1 does state that the principles of war "are not a series of checklist items" and that the understanding of war goes "far beyond mere principles."[43] But since there is no attempt to provide that understanding, and in light of the extended treatment given the principles, we are left with a clear inference that indeed they are the basis for air power doctrine.

It appears, moreover, that the discussion of the principles of war serves as a vehicle to add further emphasis to the Air Force's penchant for centralized command and control in the conduct of war. Eleven principles of war are established, and in five of them the specific need for effective C^3I is made clear. The C^3I requirement notwithstanding, however, the net effect of this litany will be to drive us

further into a centralized control mind-set that, realistically, may well be our first and most serious combat loss.[44] Under such circumstances, those whose knowledge of war is limited to its principles had better hope that there are others around who understand war's nature and can act accordingly. If we expect success in battle, every Air Force officer must understand our basic views about war to the extent that even the most junior among us can conduct meaningful operations instinctively in the absence of C^3. Real war demands no less.

An equally serious failing of AFM 1-1 is its nearly complete disregard for the conduct of war across the spectrum of conflict. No meaningful distinctions are made about the various levels of war and the differing challenges they present. Thus, AFM 1-1 ignores the Clausewitzian admonition that the profound act of judgment is to establish, at the outset, the type of war upon which one is embarking. Indeed, the entire document, like its 1979 predecessor, is written as though the Vietnam War never occurred. Why? Is it because we judge that war to have no relevance for Air Force doctrine? One way or the other, how would we know, since we have yet to complete a comprehensive analytical and conceptual study of air power application in that war? Do we basically ignore Vietnam because we believe the U.S. Air Force will not be called on to fight that type of war again? Or is it that we merely assume that should such a war occur, we can satisfy the conceptual requirement for fighting it by making straight-line extrapolations from conventional war? And would we assume further that the hardware requirements would be met simply by making the war fit the weapon? One would hope not, since we tried that approach in Korea and Vietnam and failed both times. With regard to Air Force planning before Korea, the preeminent air power historian, Professor Futrell, recently wrote that

> the emphasis . . . was in making war fit a weapon—nuclear air power—rather than making the weapon fit the war. [It] was a weapons strategy wherein the weapons determined the strategy rather than the strategy determining the weapons.[45]

If we are inclined to rely on superior technology for that type of war, we should do so with the utmost caution.

> Too little thought [is] given to the fact that strategy can outwit technology; . . . one may also speculate that for technology to be . . . decisive it must be a vast superiority, possibly on the order of Western gunboats versus aborigines in colonial times.[46]

With regard to low-intensity conflict, the current AFM 1-1 makes it reasonably clear that the U.S. Air Force has little serious interest in it and, moreover, views special operations primarily in terms of conventional warfare.[47] This focus amounts to a modification in Air Force thinking, but one that is not universally accepted within the officer corps. Colonel Kenneth J. Alnwick, a knowledgeable officer with special operations combat experience, has argued recently that:

> there has been a clear shift in Air Force thinking away from classic special operations of the past and toward a special operations force with a much narrower focus. Thus, either by accident or design, . . . the U.S. Air Force no longer possesses a strong institutional capability to conduct effective counterinsurgency or psychological warfare campaigns.[48]

In a swift rejoinder, another officer speaking from an Air Staff perspective agreed that a shift in thinking had taken place but attributed it to a unified command strategy. And in that context, he suggested, "special operations forces are no different from other Air Force forces."[49] But one can make that statement only by ignoring the conceptual and hardware demands of counterinsurgency, which is part of but not synonymous with low-intensity conflict. AFM 1-1 makes clear that a conceptual void exists with regard to counterinsurgency, and the paucity of the existing force structure visibly demonstrates a very limited capability. In combination, these two factors would suggest that

the Air Force either does not intend to conduct counterinsurgency warfare in the near future or, if forced to do so, will "make the weapon fit the war."[50]

A shift has occurred in Air Force thinking about counterinsurgency, and it becomes quite evident if one examines past doctrinal expressions. As Air Force doctrinal manuals go, perhaps the best yet promulgated is the 1964 version written during General Curtis E. LeMay's tenure as Chief of Staff. The chapter titled "Employment of Aerospace Forces in Counterinsurgency" offers a valid conceptual base for developing a collective Air Force response to that type of conflict. Perhaps it should be reexamined in the light of events in such areas as the Philippines, all of Central America, parts of South America, and various countries in Africa and Southwest Asia. That we have yet to do so is evidence of a professional lapse of the gravest proportions. It is reasonably obvious that our current thinking is clouded by the "never again" syndrome of Vietnam, but, in that respect, we are confusing a poorly executed example with a valid concept of modern war. One would hope that sound doctrinal thinking could distinguish between the two.

As one moves to the opposite end of the conflict spectrum, to so-called strategic warfare, the new AFM 1-1 exhibits further shortcomings. For example, the statement that "aerospace forces have the power to penetrate to the heart of an enemy's strength without first defeating defending forces in detail" reflects an almost total disregard for the history of U.S. aerial warfare.[51] In World War I, we learned that the first objective of air power is to "seek out, attack, and destroy the aviation of the enemy."[52] Experience in that war suggested that this objective could be achieved best by using bombardment aircraft to attack airfields, while pursuit would engage the hostile force in air combat. Indeed, for a full decade after the war, we believed and taught that pursuit's "principal role, in fact its only role [was] to gain and hold control of the air by seeking out and destroying the hostile air force wherever found."[53] Somehow, along the way to World War II, however, we forgot that lesson and accepted instead the notion that, in the main, an air force could ignore the hostile force and strike directly at the enemy's industrial base in order to destroy his means and will to resist. And despite evidence to the contrary during the first months of the U.S. air effort in Europe, we persisted in the belief that unescorted formations of B-17s were self-defending and consequently launched into a major air offensive against Germany. After we sustained staggering losses at Schweinfurt in August and October 1943, however, General Henry "Hap" Arnold intervened in the conduct of operations with a pointed message that clearly demonstrated his understanding of air warfare. Using language reminiscent of the World War I experience, he directed the Eighth and Fifteenth Air Forces to *"Destroy the Enemy Air Force wherever you find them in the air, on the ground and in the factories."*[54]

Even our most recent experience, Vietnam, would suggest the fallacy of the AFM 1-1 assertion that attacking aircraft can penetrate without first neutralizing or destroying the defenders. For example, during Linebacker II in December 1972, attacking B-52s experienced approximately a 4 percent loss rate. Although perhaps tolerable for an eleven-day operation, such losses compounded over many weeks probably would be unacceptable. Of greater importance, however, is that these losses were sustained despite an intensive suppression effort that, for all practical purposes, defeated "the defending forces in detail."

First, the raids were coordinated with attacks by other U.S. aircraft against the operating bases of MiG interceptor aircraft, and "the value of that one fact alone cannot ever be measured since an integral formation (of B-52s) proved to be . . . an essential element in a successful B-52 assault."[55]

Second, the attacking B-52s received strong defensive support from other U.S. aircraft.

Tactical fighters flew escort for the B-52s, and other fighters patrolled certain areas for MiG interceptors; F-105 Wild Weasels and F-111 aircraft conducted defense suppression raids against SAM sites immediately before and during the B-52 raids; EB-66 aircraft provided ECM support by jamming enemy radar; and additional aircraft dispensed chaff to degrade the capability of enemy radar.[56]

Third, when the B-52 crews determined at the outset that their ECM capability against enemy SAMs did not provide the expected level of protection, hurried tests and evaluations conducted in the United States led to adjustments in ECM equipment. The "quick fix" reduced losses during the remainder of the operations.[57]

The final noteworthy characteristic of Linebacker II is that, after eleven days of attacks, the enemy depleted his reserves of SAMs and had no access to additional supplies. Thus, Linebacker II operations were conducted in a unique and not a representative environment, and consequently one should not conclude that he can penetrate sophisticated defense with acceptable losses.

The real lesson is that both offense and defense remain as interactive elements of war and that neither can assert absolute primacy. The AFM 1-1 assertion that we can penetrate to the heart of the enemy without neutralizing defending forces, particularly when viewed in the context of World War I, World War II, and Linebacker II, is both bad history and faulty doctrine.

At least superficial and perhaps misleading is the AFM 1-1 approach of listing vital targets for a strategic offensive, while providing only a limited discussion of the need to destroy the war-fighting potential of the enemy.[58] Calling for attacks against the means and will of the enemy is a statement of the obvious. Needed instead are some discussion of the difficulties of conducting such operations in the turmoil of real war and some acknowledgment of the limitations of air power under such circumstances.

In this regard, discussion of our basic assumptions and how they might be affected by the friction of real war would be of far greater value to those who might be called on to fight. For example:

- Can we assume the existence and availability of adequate forces for a future war?
- Can we assume that our forces can penetrate enemy defenses, locate the assigned targets, and achieve the desired level of destruction?
- Can we assume, further, that weapon systems never before employed in combat, such as ICBMs, ALCMs, and nuclear bombs, will function as expected? In that regard, does it matter that the B-17 did not do so?
- Can we assume the existence of so-called vital targets in a nuclear or a conventional war?

Moreover, what are the interrelationships among these assumptions? *The mere fact that each of them, when viewed independently, may exhibit a fair amount of validity does not ensure their collective validity.*

During our World War II air offensive against Germany, for example, B-17 availability turned out to be far less than that expected (largely due to diversions that were not unrelated to the realities of coalition warfare); bombing accuracy did not reach planned levels; and German defenses proved to be far more formidable than assumed at the outset. It is unlikely that any one of these factors, taken by itself, would have adversely affected the outcome of the bombing campaign; but when one compounds the effect of a reduced force structure with lowered bombing accuracy and then further compounds the outcome by an inability to penetrate defenses with acceptable losses, the entire concept then comes into question. How to deal with the collective nature of such factors, both in our training and planning for war and our subsequent execution of it, is one of the real issues of doctrine. Thus far, however, we have chosen to ignore serious study of it.

In yet another area, AFM 1-1 does us a disservice. On the all-important issue of offense and

defense as elements of war, overwhelming emphasis is given to offense, despite the fact that each aspect inseparably permeates the other. The limited discussion of defense in AFM 1-1 is almost apologetic;[59] and when defense is discussed as a principle of war, the word *security* is used as a euphemism.[60]

It is entirely possible that this doctrinal shortcoming is extracting a price in a way perhaps not fully realized yet. For example, although almost three years have passed since the President announced his Strategic Defense Initiative (SDI), we apparently have yet to offer a sound conceptual argument for SDI based on the nature of war and the inherent requirement for both offense and defense. Instead, and as a consequence, we are debating the issue on terms dictated by the opposition. Ironically, we are fighting for SDI in a defensive mode by answering charges about its effect on deterrence, arms control, stability, technology, costs, and other related factors. These considerations are of enormous importance, but in the larger scheme of things, they are second-order issues. The preeminent factor is war. We should be arguing that even imperfect ballistic missile defenses would magnify considerably the friction that the Soviets would face in attempting to execute a strategic attack against the United States. We should be arguing further that this increased uncertainty, in turn, contributes not to a greater probability of war but to its deterrence. A rudimentary understanding of war, therefore, provides a clear rationale for SDI. Could we say the same for our *Basic Aerospace Doctrinal Manual*? The answer is no, and as a consequence we are fighting our force structure battles by relying on marginal rather than substantive issues. (And, one might add, with individuals and groups who know those types of issues at least as well as we do.)

Another unfortunate aspect of AFM 1-1 is its continuation of the artificial, illogical, and confusing distinctions between strategic and tactical operations. AFM 1-1 tells us that "strategic and tactical actions are not necessarily tied to specific geographic areas, operating environments, or types of vehicles.[61] The basic problem with these types of explanations is that they make little sense when viewed in the context of war. Strategy and tactics are essential elements of war, and they can be defined with a measure of precision. By contrast, the words *strategic* and *tactical* (adjectives, no less!) possess little operational relevance. Consider the World War II example offered to us by Dr. Williamson Murray. In an attempt to determine whether the German breakthrough on the Meuse in May 1940 would be a strategic or tactical victory, he asked the following question:

> What set of missions would have enabled the Luftwaffe to further overall German strategy best in May 1940? Supporting the army's breakthrough efforts along the Meuse or bombing France's industrial base and cities? In the classical definition of strategy and tactics the answer is crystal clear. In terms of Anglo-American air power theories, the question and answer are thoroughly muddled.[62]

Of greater significance, however, is the effect that this artificial distinction has had on the scope of our forces' doctrinal views. We publish what we refer to as basic doctrine, operational doctrine, tactical doctrine (to include, as further examples, strategic and space doctrine), joint doctrine, and combined doctrine. It appears that everybody has a doctrine. But for what purpose? There is only one real issue, and that is war; and the sole purpose of doctrine is to convey our collective and institutional response to it. But these stacks of doctrine manuals, over which we agonize with predictable frequency, are almost devoid of any substantive discussion of war. Indeed, if one examines many of the so-called doctrine manuals, their real purpose becomes clear. They are not about doctrine but about procedures; they are the military variant of the how-to books that proliferate in the commercial market on every conceivable subject. Procedures are important (indeed, one can argue that they are vitally important), but they are not doctrine. For proof, visu-

alize yourself fighting in a war, a real war (as distinct from war on paper) in which various frictions—the play of chance, distortions and uncertainties inherent in the information on which action in combat must be based, imminent risk of death or mutilation, and the enemy's unpredictability—are the dominant factors. Since nothing will go according to plan, intuitive judgment and mental flexibility will be absolutely essential, and improvision and risk-taking will be the only way to contend with the constantly changing conditions of battle. Under these circumstances, what would be the utility of the knowledge found in a procedures manual disguised as doctrine? For those who understand war, the answer is obvious.

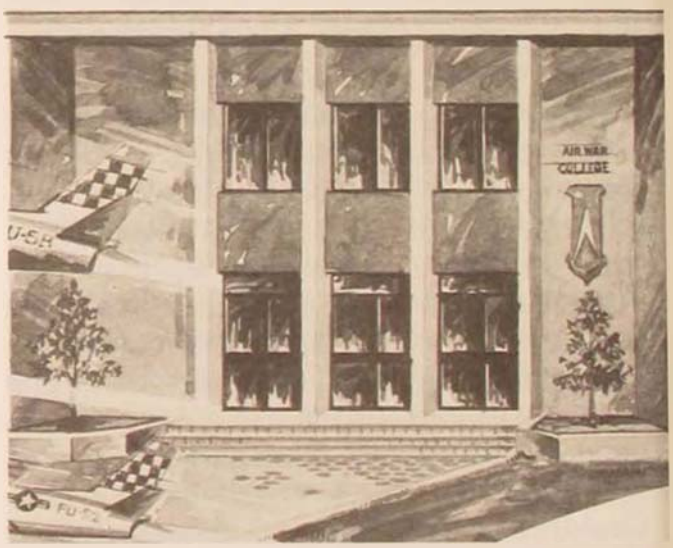
By now it should be reasonably clear that our abstract-Jominian approach to doctrine, from which the current AFM 1-1 is an outgrowth, is totally inappropriate for an institution that claims a responsibility to fly and fight. There is only one, ostensible advantage to the existing approach and that is the value which its abstract nature offers in a competitive institutional setting. It makes bureaucratic agreement relatively easy and thus promotes internal harmony. It also frees us from thinking too hard about war.

Those who write and coordinate doctrine within the Air Force might take exception to this assertion, primarily because considerable staff work is required to produce a doctrine manual. Admittedly, the coordination process necessary in assembling the final product is difficult and sometimes bitter. Nonetheless, even the most vigorous arguments are about how to keep the issues sufficiently abstract to ensure ambiguity.

The greatest failing of the abstract approach is that it tends to view doctrine as a fundamental source when, in fact, the real fountainhead is war. If one understands war, he implicitly understands doctrine; without an understanding of war, doctrine becomes an army of abstract words and phrases searching for a unifying idea.

This lack of central focus in Air Force doctrine extracts a heavy price, and nowhere is it more evident than in the Air Force's efforts to educate its senior officers. The relationship of an Air War College education to the phenomenon of war and the way in which the Air Force intends to fight should be an obvious one. But if, as argued here, the Air Force's concept of war is deterministic and mechanistic (and thus is simply war on paper), and if its doctrinal views advocate an abstract-Jominian approach, then is it not logical to assume that these views will be operative at Air War College (AWC) as well?

Air War College



As the first step, one might begin by examining the AWC mission statement. Although frequently passed off as boilerplate, carefully crafted mission statements usually convey not only an institution's basic purpose for being but also its sense of values and vision for the future. Moreover, the mission statement for a professional school such as Air War College should also reflect the values and vision of the

institution at large, the U.S. Air Force.

The current mission of the AWC is "to prepare select officers for key command and staff assignments where they have responsibility for developing, managing, and employing air power as a component of national security." By design, the statement is sufficiently broad, general, and abstract to ensure collective agreement. Officers are prepared not for war but for assignments, and apparently it is equally important for them to develop and manage air power as it is for them to employ it. This emphasis, of course, defines a broad value system that ultimately manifests itself in the school's curriculum, which, as one might expect, exhibits a lack of clear focus.

For an alternative mission statement, one might consider a more definitive approach, one that clearly identifies a set of values and offers a breadth of vision. Perhaps the mission for the school should be to provide professional officers with a comparative understanding of war, doctrine, and relevant security policies across a spectrum of conflict. Understanding is the minimum desired level of learning; war, doctrine, and security policies are specific focal points that would permit officers and others at the school to express their views on the grammar and logic of war; a comparative methodology would avoid ethnocentrism and demonstrate that the approach to war by others may not be (indeed, almost certainly is not) identical with our own; and study across the spectrum of war should help to ensure comprehension of conflict at various levels.

Fortunately the current AWC curricula is not totally inconsistent with this approach. As it should, Air War College places primary emphasis on the grammar of war as found in the United States, its NATO allies, and the Soviet Union. However, war as practiced in much of the Third World is largely ignored. As one might expect, this pattern of teaching the grammar of war establishes the parameters for teaching its logic; the net result, of course, is little attention to war in the Third World. There exists, however, a commendable effort to teach regional studies, but it suffers primarily because the focus is on the current political, economic, and military situation instead of the more relevant historical and cultural aspects that largely determine why wars occur and how they are conducted.

Despite such shortcomings, the current AWC curriculum clearly can serve as a basis for a significantly modified program. The strength and substance of this program should be based on four pillars of wisdom: the grammar of war, the logic of war, the school's research and writing program, and, finally, the AWC faculty. The first two, the grammar and logic of war, must be addressed on a comparative basis and across the spectrum of conflict. These pillars are vital, for without them no relevant education about war is possible. Fortunately, much of the current program can serve as an excellent foundation. But before these two pillars can be erected, some of the existing superstructure must be removed and discarded or relocated. The task will not be easy, but the choice is clear. Either we focus on the central issue—real war—and develop a program that prepares officers to conduct it, or we accept a war-on-paper approach that will provide us not with understanding and preparation but the illusion of it.[63]

The revised program should address the first pillar of wisdom, the grammar of war, from several vantage points. At the outset there is the nature of war, without which no understanding is possible. Clausewitz must be the guide. *On War* has been used at AWC since 1978 because of the foresight of Lieutenant General Raymond B. Furlong, Commander of Air University at that time, who knew that without Clausewitzian concepts the school's programs would be severely lacking. Since then, however, the potential of Clausewitzian thought has not been fully exploited, despite its obvious value for amplifying our understanding of the nature of war and its purposes. Although Clausewitz says nothing about the develop-

ment and management of air power, he has no peer on the subject of war.[64]

The second vantage point would be military history, studied on a far wider scale than at present. It is history that prevents us from viewing war in a vacuum, alerts us to its nonquantifiable aspects, and provides a breadth of understanding that is essential for any comprehensive critical analysis. As Bernard Brodie reminds us, "the only empirical data we have about how people conduct war and behave under its stresses is our experience with it in the past, however much we have to make adjustments for subsequent changes in conditions."[65] History, moreover, would permit us to contrast theorists from Sun Tzu to Brodie with practitioners from Alexander to LeMay. History would provide a view of war across the spectrum and thus confirm that the grammar of war at one level, for the most part, is not applicable to war at another. In the all-important field of logistics, history would indicate the types of uncertainty that have occurred and how logisticians have dealt with them in the past; more important, it would drive home the point that each war, each campaign, and each battle comes with its own fair share of nasty logistical surprises.[66]

The final vantage point is wargaming, an area in which the AWC has made some improvements over the past several years. Far greater wargaming capability will be available in 1986 when the Command Readiness Exercise System (CRES), operated by the Air Force Wargaming Center, begins operations. CRES will provide a real-world gaming capability that can stimulate wartime decision making and thus provide realistic education and training for officers at all levels.[67] At the outset, however, it should be recognized that an enormous potential for danger exists in wargaming. The first danger surfaces because the easiest but worst thing to do in war games is to make them manageable by focusing on war on paper instead of real war. To be productive, war games must incorporate the general notion of friction, regardless of the frustration it will generate among players. It is the existence of friction in war games that will serve to challenge the courage, character, and determination of those who wish to be commanders. War games should encourage flexibility, innovation, and, above all, risk. Moreover, since we tend to learn more from our failures than from our successes,[68] war games that prevent one from winning might be the most productive.[69]

Explicit in the life cycle of all war games, from their definition to analysis, should be an operational-Clausewitzian framework. Such an approach would de-emphasize the "management of war," while simultaneously teaching combat leadership and the often ignored matter of tactics. On the all-important topic of combat leadership, it should seem obvious that we need to teach commanders at all levels how to make decisions under the worst circumstances of war. Combat decision making is the single most important responsibility of a commander. And as history teaches us, such decisions are made almost by instinct, inasmuch as *"the process by which a decision is reached . . ., in most instances, remains insoluble even to the person who has arrived at the decision. . . . A decision, therefore, is not a problem of simple arithmetic, but a creative act."*[70]

An operational-Clausewitzian view explicit in war games, moreover, would teach combat leaders the need to understand the nature of war as the sine qua non of leadership. Additionally, it would make clear that a decision in combat—any decision—is eminently preferable to no decision. Furthermore, it would inculcate aggressiveness in combat commanders so that, other things being equal, they will always opt for the bolder choice.[71]

The operational-Clausewitzian approach also would require knowledge and use of tactics because of its inherent relationship to combat decision making. In the way we have practiced war, outcomes have depended heavily on tactical results, despite the inordinate emphasis on strategy. As stated by a former editor of *Air*

University Review, a heroic rescue helicopter pilot and noted military historian:

> No matter how much time, effort, and energy we put into strategy, the cutting edge is tactical effectiveness. A military organization incapable of tactical success is strategically irrelevant. . . . Yet compared to strategy, tactics has received remarkably little attention from the theorists—in part because of condescending attitudes among all too many analysts toward the messy details of "mere tactics."[72]

War games with an operational-Clausewitzian orientation, finally, would train officers to distinguish between tactics and the techniques of battle, i.e., routine actions that must be performed in a consistent manner. In essence, tactics are the application of a variety of techniques tailored for a specific battle. Thus, the "difference between techniques and tactics is significant: to instill techniques requires inflexibility and repetition; to develop a sense of tactics requires flexibility, good judgment, and creativity."[73]

Another danger associated with computer-assisted war games is the potential lack of authenticity in adversarial play and the implications of such a lack. Those adversaries whose history, culture, and operational practices differ significantly from our own present especially serious challenges for war game design. For example, the Soviets' combined-arms concept and their attitudes on attrition are fundamentally at odds with U.S. operational views on air power employment, and understanding and incorporating these differences are formidable tasks. All too often, the tendency is to simply cast the Soviets in our own mold. But unless game designers avoid this "mirror-imaging" and instead represent Soviet concepts authentically in gaming software, the outcome will be at best irrelevant and perhaps even counterproductive. The irrelevancy will exist because we will play against an adversary we already know—ourselves. More serious in consequence, the counterproductive aspect will most likely manifest itself when experienced gamers can afford it least—when they engage the Soviets in combat.[74]

The second pillar of wisdom for a senior military school is the logic of war, or the purposes for which war is fought. Currently, AWC conducts for its students an analysis of the logic of war as formulated by the United States and the Soviet Union. Although worthwhile, this analysis is insufficient. We need to understand the purposes for which other potential adversaries resort to war, and such comprehension can occur only if one includes in the analysis their respective cultures, political and economic preferences, and societal characteristics. In particular, the relationship of war and society deserves far greater attention than it has received in the past. British historian Michael Howard noted its significance several years ago:

> Although the technological dimension of strategy has certainly become of predominant importance in armed conflict between advanced societies in the second half of the twentieth century—as predominant as the logistical dimension was during the first half—the growing political self-awareness of those societies and, in the West at least, their insistence on political participation have made the social dimension too significant to be ignored.[75]

The war and society interrelationship in the Third World is especially important for us. We Americans understand those societies least, yet they are the very ones that are most likely to involve us in war. In addition to our experience in Vietnam, the disastrous outcome of the more recent U.S. Marine Corps' stay in Lebanon should teach us a lesson about the need for all professional military officers to recognize the nonuniversality of the grammar and logic of war as *we* military would like to conduct it. The societies and cultures of the Third World, for the most part, are profoundly different from our own; and as a consequence, they approach war with a different set of perceptions and assumptions about means and ends. Viewed in that light, our problems and losses in Lebanon did not result primarily from an inability to

establish clear and attainable objectives. (Indeed, if one stops to consider what constitutes clear and attainable objectives in the context of the world as it exists, it becomes fairly obvious that they will be the exception rather than the rule.) Our failure in Lebanon occurred primarily because we who claim to be professionals at the art of war have yet to learn how to cope with war as others practice it. And in that regard, the shadow of Vietnam looms large. So does the ghost of Clausewitz, who has never ceased to remind us that "war can have all degrees of importance and intensity, ranging from a war of extermination down to simple armed observation."[76] Since motives are less intense in the latter, Clausewitz argued, "the less will the military element's natural tendency to violence coincide with political directives."[77]

Thus Clausewitz's remarkable trinity of the people, the army, and the government is operative across the spectrum of war. The task, therefore is clear: understand, to the extent possible, the values and assumptions inherent in one's own trinity, that of the adversaries, and, lest we forget, our allies. With regard to the last of these, our experience in Vietnam clearly stands as an example of our ignorance and offers us a vital lesson; whether we have learned the lesson, of course, remains to be seen.

This recommended emphasis on the grammar and logic of war as central pillars in the AWC program does carry a price but not a terribly demanding one. It requires only that we take the final step in our long-term and steady effort to reduce the emphasis on the teaching of peacetime management. By now, it should be clear that far too many "senior officers have taken on the mentality of business managers rather than being centrally concerned with the nasty business of sending the enemy to his ancestors."[78] It should be equally clear that our past fascination with management has had serious and adverse consequences for U.S. national security. By relying on management instead of history, the nature of war, and conceptual thinking, we have tended to base our military program decisions mostly on irrelevant but easily measured numbers, rather than on the very relevant but largely unquantifiable demands of war. Instead of decisions being made in a framework based primarily on war and strategy, with management serving as one of several evaluative tools, management has tended to become the driving force, leading to the increasing domination of programs over purpose in the Pentagon, the domination of program managers over strategists.[79]

The third pillar for Air War College is its research and writing program: without such a program, there can be no in-depth understanding of the grammar and logic of war. The primary objective of research and writing is to put war in clearer focus so that efforts to deter or fight can be made consistent with war as it occurs. A constant reexamination of war is essential for the professional officer for several reasons, the most important of which is that "every age [has] its own kind of war, its own limiting conditions, and its own particular preconditions.[80]

However, although there is clearly a need for officers to continually reassess war, the U.S. Air Force officer corps is not known for its contribution to military thought. Colonel Noel F. Parrish commented in 1947, "Air activities have most often attracted men of active rather than literary learnings." Some civilian observers have been less kind, referring to the Air Force as the "Silent Service."[81] But the situation has changed to some extent, and a few bright spots exist. For example, the founding of the Airpower Research Institute, which is committed to in-depth research efforts on a range of issues directly related to the grammar and logic of war, speaks well for the Air Force. (Nevertheless, it must be recognized that it took the personal, active efforts of General Bennie L. Davis and Colonel Haywood S. "Tony" Hansell III, to bring it about.)

At Air War College, research and writing could be far more productive than has been the case. Indeed, when one considers that all but a

few students there are representatives of the U.S. Air Force's best and that they come to the school at a time when the combination of their background, experience, and maturity lends itself to serious thinking, it is quite unfortunate that so little is accomplished. This scarcity of achievement is not surprising, however, because even though they are at the top of their very competitive peer group, they are products of an officer system that does not value professional research, writing, and conceptual thinking. Those attributes simply are not included as essential parts of the career-long socialization process. To expect the majority of AWC students to plunge enthusiastically into research, therefore, is to expect them to modify an inherent behavior that, regrettably, is not challenged seriously by the service leadership.

But there is a more direct reason to explain the paucity of research and writing, and in two words it is unwarranted censorship. No one contests the right, indeed the duty, of the Air Force to conduct rigorous security review of material written by its members or employees. But as is well known by almost everyone involved in research, writing, and publication, far too many efforts are rejected or watered down for alleged "policy" reasons that are not at all obvious. One perceptive officer cautiously wrote recently, "Perhaps we have allowed ourselves to bank slightly in the direction of unwarranted censorship. And if so, why?"[82] The system simply needs reform.[83]

But perhaps this particular failing of the Air Force may be symptomatic of a much deeper difficulty, which is a problem of institutional self-confidence. The Air Force officer corps seems to exhibit a sense of caution that is far in excess of what would be required by professional prudence. For a host of reasons (among them the ghost of the Zero Defect mentality of a decade ago), few Air Force officers appear willing to take risks in the pursuit of their professional responsibilities. And if they are unable or unwilling to do so in peacetime, what is to be expected of them when the klaxon sounds? If risk-taking, which is essential in war, is not an acceptable practice in peacetime, are there many who can expect to conveniently find it in the heat of battle? Again, Vietnam provides too many unwelcome answers.

A thought-provoking statement of this underlying problem appeared in the title of an article by Lieutenant Colonel Timothy E. Kline a few years ago: "Where Have All the Mitchells Gone?" Kline's central thesis bears repeating:

> The Air Force must preserve a way to the top that permits room for its prophetic nobility to take a stand, suffer a shoot down, and rise like a Phoenix toward a vision like Mitchell's. The alternative? No more Mitchells, no more Eakers, no more certain trumpet for air power.[84]

The fourth pillar essential to a high-quality senior service school, like top civilian institutions of higher learning, is the faculty. Air War College currently has fine students, but needed to complement them are more faculty who can ensure that the institution is the best of its kind. Competent military faculty are essential in this process, since only they can provide the necessary military perspective in the grammar and logic of war. To a large extent, adequate resources are available within the officer structure, but the problem is one of assignment motivation. It takes an extremely dedicated professional officer to serve at Air War College if that officer has promotion potential to general officer rank. Officers know all too well that "professional reputations today are not made in the schoolhouse."[85] Unless the Air Force initiates a fundamental change to make faculty assignment a prize of the first order, attracting competent military faculty will remain difficult. When the Air Force *acts* as though lieutenant colonels on the faculty are performing at roughly the equivalent level of a squadron commander while faculty colonels are at the level of a Pentagon division chief, then it will have little difficulty recruiting military faculty for its war college.

By the same token, however, Air War College

must add breadth to the competence of its military faculty by appointing more first-rate civilian scholars. The fact of the matter is that too few officers can attain the required academic credentials for the academic program recommended herein. Consequently, civilian scholars whose competence, reputation, and personalities would contribute to academic superiority should be used to complement the military faculty to a far greater extent than presently is the case.

Air War College has some of the Air Force's finest officers as its students, and the school can develop, if it wishes, a far more substantive academic program. But without a competent faculty, these two elements become insignificant. Until the Air Force recognizes the intrinsic value of Air War College, perceiving the school's direct relationship to future military success or failure, AWC, for the most part, will continue to be just another assignment for many of its students and a source of disappointment for its faculty. Quick fixes and short-term solutions are not the answer. If AWC wishes to be a war college in a meaningful sense, then it must teach the grammar and logic of war, conduct serious research on those issues, and attract a blend of soldiers and scholars who can teach. If it is willing to do these things, then it will produce graduates whom Clausewitz would recognize and with whom he would be satisfied.[86] No greater compliment would be possible for a professional officer.

IF our tasks in the U.S. Air Force are to prepare for war, deter it if possible, and fight it successfully across a spectrum of conflict, then we must understand war, make war the basis for our doctrine, and teach war to our officers. That we have not done so in the past is abundantly clear, prompting us to recall again Bernard Brodie's comment that "Soldiers usually are close students of tactics, but only rarely are they students of strategy and practically never of war!"[87] Brodie is right, of course, but we have an opportunity to prove him wrong.

St. Petersburg, Florida

Notes

1. Dr. Horst Boog, *Air Power and Warfare*, edited by Colonel Alfred F. Hurley and Major Robert C. Ehrhart (Washington: Government Printing Office, 1979), p. 156.

2. One of the more encouraging and instructive aspects of this substantive and prolonged debate is that it is being conducted by officers from across the rank spectrum. In particular, the contributions to this debate by officers in the grade of major should be applauded by Air Force leaders. Some examples of the debate are: Colonel Kenneth J. Alnwick, "Perspectives on Air Power at the Low End of the Conflict Spectrum," *Air University Review*, March-April 1984; Lieutenant Colonel Dennis M. Drew, "Informal Doctrine and the Doctrinal Process: A Response," *Air University Review*, September-October 1984; Lieutenant Colonel Dennis M. Drew, "Of Leaves and Trees: A New View of Doctrine," *Air University Review*, January-February 1982; Major John W. Fal, "Deficiencies in Air Force Doctrine Education," *Air University Review*, January-February 1985; Major General I. B. Holley, Jr., USAFR (Ret), "Concepts, Doctrines, and Principles," *Air University Review*, July-August 1984; Major General I. B. Holley, Jr. USAFR (Ret), "The Doctrinal Process: Some Suggested Steps," *Military Review*, April 1979; Major General I. B. Holley, Jr., USAFR (Ret), "Of Saber Charges, Escort Fighters, and Spacecraft," *Air University Review*, September-October 1983; Colonel Clifford R. Krieger, "USAF Doctrine: An Enduring Challenge," *Air University Review*, September-October 1984; Williamson Murray, "A Tale of Two Doctrines," *Journal of Strategic Studies*, September 1983; Dr. Williamson Murray, "British and German Air Doctrine between the Wars," *Air University Review*, March-April 1980; Lieutenant Colonel David C. Schlachter, "Another Perspective on Air Power at the Low End of the Conflict Spectrum," *Air University Review*, July-August 1984; Lieutenant Colonel Barry D. Watts and Major James O. Hale, "Doctrine: Mere Words, or a Key to War-Fighting Competence," *Air University Review*, September-October 1984.

3. Editorial and Lieutenant Colonel Donald R. Baucom, "The Air Force Officer Corps in the 1980s: Receding Professionalism," *Air University Review*, September-October 1983, inside front cover and pp. 52-53. For further discussion of this lack of combat orientation, see Watts and Hale; Major C. Anne Bonen, "Professionalism from Lieutenant to Colonel," *Air University Review*, January-February 1982; Captain James H. Slagle, "The Junior Officer of the 1980s: The Situational Professional," *Air University Review*, November-December 1981; and Frank R. Wood, "Air Force Junior Officer: Changing Prestige and Civilianization," *Armed Forces and Society*, Spring 1980.

4. Bernard Brodie, *War and Politics* (New York: Macmillan, 1973), p. 11. Although Brodie's statement applies to all officers, one could argue that it is more reflective of the U.S. Air Force than the other services. Intellectual pursuits, which are essential for an understanding of war, do not appear to be valued highly by the Air

Force. See, for example, comments in Robert Frank Futrell, *Ideas, Concepts, Doctrine: A History of Basic Thinking in the United States Air Force, 1907-1964* (Maxwell AFB, Alabama: Air University Press, 1971), pp. 1-2.

5. Carl von Clausewitz, *On War*, edited and translated by Michael Howard and Peter Paret (Princeton, New Jersey: Princeton University Press, 1976), p. 53.

6. Clausewitz, p. 75. Those unfamiliar with *On War* will derive much value and avoid the confusion that generally results from a first encounter with Clausewitz by reading Lieutenant Colonel David MacIsaac, "Master at Arms: Clausewitz in Full View," *Air University Review*, January-February 1979, pp. 88-93. In that article is "One Man's Version of Clausewitz in One Page," probably the shortest and possibly the best précis of *On War* available.

7. Clausewitz, p. 119; for a further discussion of friction and its effect on U.S. strategic bombing in World War II, see Lieutenant Colonel Barry D. Watts, USAF, *The Foundations of U.S. Air Doctrine* (Maxwell AFB, Alabama: Air University Press, 1984), pp. 47-53 and 59-85.

8. For a further discussion of uncertainty, see Colonel Robert R. Lochry et al., "Final Report of the USAF Academy Risk Analysis Study Team," USAF Academy, 1 August 1971. For its implications for war, see Colonel Thomas A. Fabyanic, "The Grammar and Logic of Conflict," *Air University Review*, March-April 1981.

9. Clausewitz, p. 86; cf. p. 134, "Limitation to Material Factors," and p. 149, "Difference."

10. Ibid., p. 102.

11. Ibid., p. 184.

12. Michael Howard, editor, *The Theory and Practice of War* (London: Cassell and Company, 1965), pp. 5-20.

13. "Jomini" by Crane Brinton, Gordon A. Craig, and Felix Gilbert in *Makers of Modern Strategy*, edited by Edward Mead Earle (Princeton, New Jersey: Princeton University Press, 1944), p. 84.

14. Ibid., p. 85.

15. Jay Luvaas, "The Great Military Historians and Philosophers" in *A Guide to the Study and Use of Military History* (Washington: Government Printing Office, 1979), p. 74.

16. For an illuminating discussion of these points, see Clausewitz, pp. 357-59 and 372.

17. Ibid., p. 605. There exists, however, a valid challenge to the analogy by those schooled in the formal languages of modern mathematical logic. They can correctly demonstrate that formal languages, like natural languages, have both grammars and logics but that neither is an end in itself. Sufficient evidence exists, therefore, to reject the analogy. Nevertheless, the thrust of the Clausewitzian argument remains quite valid. In war, there exist military means and political ends; these are distinct but inextricably related, and the former always must be directed to achieve the latter.

18. Ibid., p. 605.

19. Ibid., p. 607.

20. On the issue of ends and means, Clausewitz (especially book eight, chapter 6) remains the essential source. See also Bernard Brodie, *War and Politics* (New York: Macmillan, 1973), chapter 1; Philip A. Crowl, "The Strategist's Short Catechism: Six Questions without Answers," The Harmon Memorial Lectures in Military History, Number Twenty, USAF Academy, Colorado, October 1978; Lieutenant General Raymond B. Furlong, "*On War*, Political Objectives, and Military Strategy," *Parameters*, December 1983, pp. 2-10; and Fabyanic, "The Grammar and Logic of Conflict," op. cit.

21. In World War II, despite some local tactical violations and use of toxic agents against some prisoners, the major powers were deterred from conducting chemical warfare against one another. See John Ellis van Courtland Moon, "Chemical Weapons and Deterrence: The World War II Experience," *International Security*, Spring 1984, pp. 3-35.

22. A rich body of literature exists for limited war, much of it directly related to the possible use of nuclear weapons (either for limited nuclear options or use in limited wars). Some of the more relevant writings are Bernard Brodie, *War and Politics* (New York: Macmillan, 1973); Morton H. Halpern, *Limited War in the Nuclear Age* (New York: John Wiley and Sons, 1963); Henry A. Kissinger, *Nuclear Weapons and Foreign Policy* (New York: Harper and Row, 1954); William V. O'Brien, "Guidelines for Limited War," *Military Review*, February 1979; Robert E. Osgood, *Limited War* (Chicago: University of Chicago, 1957); and Robert E. Osgood, "The Reappraisal of Limited War," *Problems of Modern Strategy*, Adelphi Papers, No. 54 (London: Institute for Strategic Studies, 1969).

23. Serious problems of definition exist in these areas. The term *low-intensity conflict* is too imprecise, but traditional notions even less so. Terrorism presents a particularly serious challenge because it is basically a civil matter. However, one would find it difficult to defend that point by using the example of terror and counterterror activities of the Palestine Liberation Organization and Israeli Defense Forces. All of these types of conflict are different, although overlaps exist. For example, wars of national liberation are generally wars of insurgency, but the former are distinctive because of their anti-Western or anticapitalist flavor and their Communist origins. For further distinctions, see Jack C. Plasso and Roy Olton, *The International Relations Dictionary* (New York: Holt, Rinehart and Winston, 1969).

24. Clausewitz, pp. 81 and 88.

25. For a brilliant and incisive analysis of this point, see Watts, *The Foundations of U.S. Air Doctrine*, particularly chapter 6, "Friction in 20th Century Warfare," and chapter 7, "Toward a Less Mechanistic Image of War."

26. For the vulnerability argument, see General Robert T. Marsh, USAF, "Strategic Missile Debated: Missile Accuracy—We Do Know!" *Strategic Review*, Spring 1982. The opposing view is presented by J. Edward Anderson, "First Strike: Myth or Reality," the *Bulletin of the Atomic Scientists*, November 1981, and J. Edward Anderson, "Strategic Missiles Debated: What You Can't Know!" *Strategic Review*, Spring 1982. A trenchant and incisive argument is found in Arthur G. B. Metcalf, "The Minuteman Vulnerability Myth and the MX," *Strategic Review*, Spring 1983. How real war would affect vulnerability is explored in Thomas A. Fabyanic, "Strategic Analysis and MX Deployment," *Strategic Review*, Fall 1982. In April 1983, the "Report of the President's Commission on Strategic Forces" provided a weak justification for the deployment of MX in Minuteman silos. Moreover, it called for the development of a single-warhead, mobile ICBM (Midgetman); such a missile is about twenty years too late and shows every promise of compounding the Air Force's budgeting, force structure, and strategy problems in the next several years. The mere creation of the commission, moreover, is a prime example of the utter folly that can occur when an institution responsible for the defense of the nation is unable to cope with its central reason for being.

27. Lieutenant Colonel Barry D. Watts, OSD/NA, Memorandum, "Innovative Air Force Thinking on Conventional Air Power," 27 August 1984.

28. Caspar W. Weinberger, *Annual Report to the Congress, Fiscal Year 1986* (Washington: Government Printing Office, 1985), pp. 221-22.

29. "History Teaches 'We Don't Know What We Think We Know' " (a conversation with Daniel Boorstin), *U.S. News and World Report*, 5 March 1984, p. 73.

30. General T. R. Milton, USAF (Ret), "Readiness and the Critics," *Air Force*, October 1984, p. 101.

31. Ibid. The PACAF F-100 pilot training manual for 1961 stated in part that "nuclear training will in every instance take precedence over nonnuclear familiarization and qualification. It is emphasized that conventional training will not be accomplished at the expense of the higher priority nuclear training required by this manual. Non-MSF units will restrict conventional familiarization to the accomplishment of only one event per aircrew per year." Aircrew Training Manual for F-100D/F, PACAFM 51-6, 1 March 1961, quoted in Benjamin S. Lambeth, "Pitfalls in Force Planning:

Structuring America's Tactical Air Arm," *International Security*, Fall 1985, p. 105, note 38.

32. Futrell, p. 7.

33. Major Robert C. Ehrhart, "Some Thoughts on Air Force Doctrine," *Air University Review*, March-April 1980, p. 30.

34. Editorial, *Air University Review*, September-October 1984, pp. 1-3.

35. See note 2.

36. Watts and Hale, p. 10.

37. Ibid., p. 11.

38. Ibid., p. 12.

39. Murray, "A Tale of Two Doctrines," p. 84. Emphasis added.

40. For a scathing critique of the 1979 version, see Murray, "A Tale of Two Doctrines."

41. Air Force Manual 1-1, *Basic Aerospace Doctrine of the United States Air Force* (Washington: Government Printing Office, 1984), p. 2-4.

42. Ibid., p. 2-4.

43. Ibid., p. 2-5.

44. For a superb discussion of existing and emerging challenges concerning C³I and its relationship to combat, see Major George E. Orr, *Combat Operations C³I: Fundamentals and Interactions* (Maxwell AFB, Alabama: Air University Press, 1983). Note especially pp. 85-87.

45. Robert Frank Futrell, "The Influence of the Air Power Concept on Air Force Planning, 1945-1962," paper presented at the Eleventh Military History Symposium, USAF Academy, 12 October 1984, p. 19. This type of thinking continued for the Vietnam War. F-105s, designed to carry up to 8000 pounds of nuclear weapons internally on high-speed nuclear strikes, were almost totally unsuited for conventional operations against targets in North Vietnam. They were used, however, because we had precious little else. After a critical shortage of conventional bombs occurred early in the war, Lieutenant General Albert Clark commented that "all of the emphasis had been on strategic weapons for so long that everybody had forgotten that we might need tactical weapons again." See John Morrocco, *Thunder from Above* (Boston: Boston Publishing Company, 1984), p. 121. For an excellent analysis of tactical air doctrine development problems before Korea, see "Orphan of Unification: The Development of United States Air Force Tactical Air Power Doctrine, 1945-1950," unpublished Ph.D. dissertation by Joseph William Caddell, Duke University, Department of History, 1984.

46. Futrell, "The Influence of the Air Power Concept on Air Force Planning, 1945-1962," p. 19.

47. Ostensibly the Air Force is expected to operate "throughout the spectrum of conflict," to include "special operations." It is clear, however, that the term *special operations* as used in AFM 1-1 is quite limited and does not include, for example, counterinsurgency. And it is in this light that one must interpret the statement that "virtually all aerospace forces have the potential for employment in special operations." See AFM 1-1, p. 3-4.

48. Alnwick, p. 28.

49. Schlachter, pp. 87-88.

50. Increased emphasis on low-intensity conflict is emerging, but it is instructive to note that the impetus is coming from outside the Air Force. Recently the role of air power in low-intensity conflict has undergone significant debate. See the interview of Noel C. Koch, Principal Deputy Assistant Secretary of Defense for International Security Affairs, *Armed Forces Journal International*, March 1985, pp. 36-52; Noel C. Koch, "Is There a Role for Air Power in Low-Intensity Conflict?" *Armed Forces Journal International*, May 1985, pp. 32-42; and Colonel Alan L. Gropman, "Air Power and Low-Intensity Conflict: An Airman's Perspective," *Armed Forces Journal International*, May 1985, pp. 32-42. The ninth Air Power Symposium held at Air War College in March 1985 addressed the topic "The Role of Air Power in Low-Intensity Conflict."

51. AFM 1-1, p. 2-6.

52. "Fundamental Concepts of the Air Service," Air Service Field Officer's School, Langley Field, Virginia, 1923, p. 2.

53. Thomas H. Greer, "The Development of Air Doctrine in the Army Air Arm, 1917-1941" (unpublished manuscript, Air University, Maxwell AFB, Alabama, September 1955), pp. 8-9.

54. Futrell, *Ideas, Concepts, Doctrine*, p. 78.

55. Brigadier General James R. McCarthy and Lieutenant Colonel George B. Allison, *LINEBACKER II: A View from the Rock* (Maxwell AFB, Alabama: Airpower Research Institute, 1979), p. 151.

56. Gordon Nelson and Norm Wood, editors, *The Battle for the Skies over North Vietnam* (Washington: Government Printing Office, 1976), pp. 176-77.

57. McCarthy and Allison, p. 80.

58. AFM 1-1, p. 3-2 and pp. 2-10 through 2-13.

59. Ibid., pp. 2-15 and 2-17.

60. Ibid., p. 2-6.

61. Ibid., p. 2-11.

62. Murray, "A Tale of Two Doctrines," p. 88.

63. Notwithstanding the critique offered in these pages, considerable substance exists in the present curriculum, much of it the result of plain hard work by a succession of commandants, deans, and faculty. Primarily responsible for the current emphasis on the grammar and logic of war is Lieutenant General Raymond B. Furlong, USAF (Ret), who served as Air University commander. In addition to the fundamental improvements that General Furlong brought about at the Air War College, he further enhanced the Air Force's ability to conduct war by establishing the Combined Air Warfare Course within AWC and by taking the initial steps that led to the establishment of the Airpower Research Institute and, two years later, to the incorporation of it into the Center for Aerospace Doctrine, Research, and Education.

64. Any reader as yet unconvinced about that point is referred to Bernard Brodie, "The Continuing Relevance of *On War*," in Carl von Clausewitz, *On War*, edited and translated by Michael Howard and Peter Paret (Princeton, New Jersey: Princeton University Press, 1976), pp. 45-58.

65. Ibid., p. 54.

66. An excellent work is Martin L. van Creveld, *Supplying War: Logistics from Wallenstein to Patton* (Cambridge, England: University Press, 1977). See also Martin L. van Creveld, *Commander in War* (Cambridge, Massachusetts: Harvard University Press, 1985). For a treatment of logistics in Vietnam, see the prize-winning study by Lieutenant Colonel John T. Quirk, "An Analysis of Air Force Logistics Shortfalls of the Vietnam Buildup of 1965-68 as an Indicator of Shortfalls in Future Conflicts," Air War College Research Report, 1980.

67. For a fuller description, see the Air University Catalog, 1984-1985 (Maxwell AFB, Alabama: Air University Press, 1984).

68. A clear exception well worth studying is the German case following its defeat of Poland. See Williamson Murray, "The German Response to Victory in Poland," *Armed Forces and Society*, Winter 1981, pp. 285-89.

69. It is perhaps significant that three senior officers, all of whom are quite familiar with wargaming, have published near simultaneous articles in which they argued for emphasis on the Clausewitzian notion of friction in war games. See Lieutenant General Raymond B. Furlong, USAF (Ret), "Clausewitz and Modern Wargaming," *Air University Review*, July-August 1984, pp. 4-9; General William R. Richardson, USA, "Officer Training and Education," *Military Review*, October 1984, pp. 22-34; and Colonel Huba Wass de Czege, USA, "How to Change an Army," *Military Review*, November 1984, pp. 32-49. General Furlong went so far as to suggest that "it might be worthwhile for all those involved with developing war games, including the programmer, to take a special, intense course on the thoughts of Clausewitz." (p. 5)

70. Translation of *The Command Decision*, Department of the

Army, Office of the Chief of Military History, Washington, D.C., undated (but probably 15 March 1947). This document was most likely written by a German general officer at division commander level who fought on the Russian front. It is available at the U.S. Army Library at the Pentagon.

71. I make this assertion while fully recognizing that boldness is not a prized attribute in today's Air Force. I would add that qualities, such as boldness, not encouraged in peacetime will not be conspicuous when the time comes for combat.

72. See editorial "Toward a Theory of Tactics . . . With an Assist from Clausewitz," *Air University Review*, March-April 1982. For the United States (and probably other Western nations), the argument appears valid. The Soviets, however, appear to be an exception. In World War II, their superior performance at the operational level and their reliance on mass tended to offset tactical incompetence. Consequently, German tactical superiority became largely irrelevant. This approach by the Soviets offers further justification for a comparative approach to the study of war.

73. Timothy T. Lupfer, *The Dynamics of Doctrine: The Changes in German Tactical Doctrine during the First World War* (Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, Combat Studies Institute, 1981), p. 56.

74. For an iconoclastic and instructive view of computer-assisted war games, see Barry D. Watts, "Diagnostic Observations on Theater-Level War Gaming," Thinking Red in War Gaming Conference, National Defense University, 23-25 April 1985.

75. Michael Howard, "The Forgotten Dimension of Strategy," *Foreign Affairs*, Summer 1979, pp. 983-84. For a succinct and provocative essay on the subject of war and society, see Wing Commander Nigel B. Baldwin, RAF, "Strategy and the Social Dimension in the 1980s," *Air University Review*, January-February 1982, pp. 112-15.

76. Clausewitz, p. 81.

77. Ibid., p. 88.

78. Arthur G. B. Metcalf, "Where Have All the Warriors Gone?" *Strategic Review*, Summer 1985, p. 5.

79. Lieutenant General Daniel O. Graham, USA (Ret), "The Decline of Strategic Thought," *Air Force*, August 1977, pp. 24-29.

80. Clausewitz, p. 593.

81. Futrell, *Ideas, Concepts, Doctrine*, p. 1.

82. Major Denny R. Nelson, "Seeking a Forum for the Mitchells," *Air University Review*, July-August 1984, p. 86.

83. For a brief treatment of this problem and the recommendations offered by an officer knowledgeable in this area, see Lieutenant Colonel Dennis M. Drew, "Beware of Simplistic Solutions," *Air University Review*, January-February 1985, pp. 102-04. Drew was responding to William S. Lind, "Reading, Writing, and Policy Review: The Air Force's Unilateral Disarmament in the War of Ideas," *Air University Review*, November-December 1984, pp. 66-70. Not everyone was pleased with Colonel Drew's response to Lind's challenge. Note the ensuing uproar in the July-August 1985 issue of the *Review*, in particular the views expressed by Lieutenant Colonel Lorenzo M. Crowell, Jr., pp. 104-06.

84. Kline, p. 31.

85. The U.S. Army has a similar problem. See General William R. Richardson, USA, "Officer Training and Education," *Military Review*, October 1984, pp. 22-34. The phrase quoted appears on p. 29.

86. This reference to Clausewitz is based on conversations at AWC between faculty members and then Group Captain R. A. Mason, RAF, October 1978.

87. Brodie, p. 11.

Author's note: The nature of this article prompted me to seek a wide review. I am especially indebted to Lieutenant Colonel Barry D. Watts and Dr. David MacIsaac for their extensive and detailed critique. Responsibility for the article, obviously, rests with me.

T.A.F.

BRING ME FAT MEN

Let me have men about me that are fat, sleek-headed men, and such as sleep o'nights. Yond Cassius has a lean and hungry look. He thinks too much, such men are dangerous.

William Shakespeare, *Julius Caesar*
Act I, scene ii

WHAT kind of credibility would a military hero in a modern play have if his script read: "I want my staff packed with fat, bald-headed guys who aren't too bright and like to sleep a lot"? There are specific regulations in today's Air Force that militate against chubbiness, and these proposed staff members would not fit our notions of success-oriented hard-chargers. Moreover, most of us would agree that excessive weight can be unhealthy and may even be symptomatic of some greater physical or psychological problem (although the same might be said of someone with Cassius's "lean and hungry look": such a person might be terminally ill or even anorexic).

In any case, the lean and hungry look is in. Our visually oriented, image-conscious society sanctions it. Civilian clothes, as well as military uniforms, are designed to flatter slender people. If you have doubts, take a look at the next overgrossed and maxed-out officer or NCO you see crammed into one of our tapered shirts or blouses. Notice how the smooth blue fabric rolls and folds over and around the superabundance of flesh. Disgusting?

Doubtless many will remember the main characters in Shakespeare's *Julius Caesar* from having read the play in high school or college. Caesar was a successful general about to crown his career by ascending to the throne. His loyal friend, Marcus Brutus, loved Caesar but hated the tyranny that an imperial ruler might impose. In contrast, Cassius envied and hated Caesar. Like commanders before and since, Caesar had to contend with the milieu of human emotions, aspirations, and contentions that swirled about him. Discerning intentions and fathoming substance behind images was as much a problem for Caesar as it is for today's leaders.

Image can both portray and betray reality. We don't like to think of the grossly overweight Major General William R. Shafter commanding the soldiers that Teddy Roosevelt led up

San Juan Hill. Another American military hero, General William T. Sherman, as great a historical figure as he remains today, looked more at home on the porch of a general store than he did at the head of the grand army of the Republic; Sherman was shallow in image but deep in substance.

Shakespeare's Caesar felt that fat, bald-headed men who slept well were satisfied with their lot dealt by the gods and not susceptible to the destructive ambition that drove Cassius. While Cassius's "type A" personality generated career successes, his penchant for reading and his aversion to popular music and the theater worried Caesar. Certainly, Cassius did not fit the "total man" concept—but, of course, he lived 1400 years before the Renaissance gave us that model. No doubt, if Cassius was our contemporary, however, he would find some kindred souls who are "never at heart's reach while they behold a greater than themselves."

The image we see in a mirror may or may not reflect genuine substance. Perhaps the man or woman staring back at each of us is truly a dedicated military professional, properly accoutered and reflecting the benefits of a rigorous physical fitness program. All to the good, then. But what is reflected *may* be a carefully contrived façade shaped to conform with the neat lines of a tapered shirt and fashioned to fit comfortably into a sanctioned and accepted version of the institutionally promotable image.

Discerning illusory image from substance can be as difficult today as it was in 44 B.C. War, then as now, is the great revealer in the military, slicing through the pretentious to lay bare what is beneath and shattering mere images as surely as a rock breaks glass. The civil war that erupted after Brutus, Cassius, and other conspirators assassinated Caesar revealed the conflicting ambitions of Shakespeare's characters until only Brutus had "the elements so mixed in him that Nature might stand up and say to all the world, 'This was a man.' " We are left to wonder at the measure of his girth.

E.H.T.

IRA C. EAKER
FIRST-PRIZE ESSAY

SYNCHRONIZED SUPPORT: AN IRREPRESSIBLE PRINCIPLE OF WAR

LIEUTENANT COLONEL DAVID C. RÜTENBERG

THE tools of warfare deteriorate in the restful shade of peace. Tightly tarpaulined and unexercised, their finely tuned muzzles slowly oxidize and warp, first sacrificing only a fine measure of precision, then losing to corrosive pitting their edge in range, and finally completing the transformation from first-line protectors to unreliable and dangerous icons of historic battles. Then, when another call to arms suddenly wrests the unoiled weapon from its slumber and packs its chamber with explosive fury, it may just as likely strike at its user as its target.

Like the weapon, the warrior also experiences a kind of rusting of critical functions. Unchallenged by crucial strategic and tactical choices demanded in the swirl and whoosh of combat, his skills and instincts are likely to soften. When tested in battle, they may prove dangerously deficient.

As professionals, we keep our weapons serviced for ready response and continually run our hardware through its paces to the limit of practicality. We try to keep the "gray matter" sharp and oiled, too, by distilling the realities of past wars and projecting experiences onto carefully constructed predictions of tomorrow's battlefields. At the same time, we recognize the danger of misapplying the lessons of military history to combat scenarios and political conditions that may incorrectly describe the future battlefield. To prevent specific lessons from being overblown or misapplied, our entire experiential data base is fed into a giant, mystical leveling machine from which flows the essence of what we believe about how best to achieve victory through warfare. What emerges is called doctrine—a set of fundamental beliefs described by General Curtis E. LeMay as lying "at the very heart of warfare."[1]

But as basic as doctrine is, there are still more fundamental constants of warfare. Doctrine is neither universal nor timeless. Influenced by national goals, technology, geographical realities, and beliefs about the efficacy and morality of war as a policy tool, basic

military doctrine represents the marriage of national character and military objectives to the pure basics of armed conflict, the principles of war.[2] It is upon the foundation of these time-honored principles—truths that vary only minutely from service to service, state to state, and age to age—that doctrines are built. The principles of war are so deeply seated in the warrior's thought processes that they are applied to strategic and tactical planning automatically. The 1921 edition of U.S. Army Training Regulation 10-5, the first U.S. source to codify the principles of war, clearly described the process: "The correct application of principles to circumstances is the outcome of sound military knowledge, built up by study and practice *until it has become an instinct.*"[3]

Such an imperative places a heavy burden on war practitioners to maintain the principles of war in as accurate and complete a form as possible. In fact, there could hardly be a more important responsibility for a peacetime military organization. Ill-conceived principles—useless baggage long ago proved faulty—must be purged from our doctrine. But even more important than culling out unworkable principles is aggressively discovering and refining any new principle that repeatedly surfaces to demand our attention. To fail to embrace and institutionalize such a principle, particularly when failures to recognize it have almost without exception resulted in military disaster, would constitute gross professional negligence.

That is why it is critical for the U.S. military to adopt a principle of synchronized support which holds that strategic and tactical operations must be planned and executed in synchronization with logistical and combat support operations. There is scarcely a ripple in the history of warfare that does not offer compelling evidence of this assertion's inviolability. Nevertheless, failure to codify synchronized support as a bona fide principle has undermined its critical place of importance in military education and training. This educational void, in turn, has resulted in scores of battlefield failures.

Proof of this assertion abounds. General Dwight D. Eisenhower extended the challenge in the aftermath of World War II: "You will not find it hard to prove that battles, even wars, have been won or lost *primarily* because of logistics."[4] General Eisenhower's Chief of Staff, General Walter Bedell Smith, writing on Eisenhower's major decisions, provided a glimpse of the Supreme Commander's respect for support operations: "It is no great matter to change tactical plans in a hurry and to send troops off in new directions. But adjusting supply plans to the altered tactical scheme is far more difficult."[5] In many major campaigns of World War II, providing offensive operations with logistical support proved not only difficult but virtually impossible because the principle of synchronized support was neglected during planning or execution.

For example, while most people are aware of the massive logistical preparations that preceded the Normandy invasion, relatively few appreciate how the subsequent breakout and charge across France was actually carried out. There is a popular notion that General George Patton drove his Third Army so rapidly that it outran fuel supplies and was prevented by a ponderously slow logistics tail from achieving early victory over the German Army. But official postwar accounts suggest instead that support for the Third Army's breakout was superbly orchestrated by invasion planners.[6] Knowing that over-the-shore operations could not simultaneously sustain both the Third Army's advances and those of other vital units, these planners conceived Operation Chastity to capture calm-water ports south of Normandy at Quiberon Bay. After successful accomplishment of this operation, Patton's advance would have been supported easily by Liberty ships' transferring fuel and supplies to an excellent rail and road network leading directly to Paris.

But Chastity was not carried out. Viewed as

merely a logistical operation, it was not appreciated as important by Patton's VIII Corps commander, who was charged with its execution.[7] Because of this violation of the principle of synchronized support, the Third Army predictably ran out of gas (despite heroic efforts to restore synchronization via a fuel truck cavalcade known as the Red Ball Express) because it was forced to share fuel and transport resources with northward-moving Allied forces. Tragically, it was for lack of the same resources that the Allies stalled in the fall of 1944 and allowed the Germans to reconstitute for the Battle of the Bulge.[8] It is not difficult to project that appreciation for the principle of synchronized support could have shaved a year off V-E Day, placing it long before Russian forces were even close to Czechoslovakia or Berlin. The long-term implication of such an adjustment on the subsequent world power balance is obvious.

Many Allied commanders learned the hard way. But an appreciation for the value of synchronized support came more easily for the German leadership, who no doubt learned from their World War I experience with the disastrous Schlieffen Plan. With foot-columns marching at a record-setting forty kilometers per day, the railroads carrying supplies and munitions could not be repaired fast enough to keep pace with troop advances. Similarly, the 6000-truck motor fleet was stretched far beyond its limits, and horse-drawn wagons soon carried more self-sustaining fodder than ammunition and supplies for prosecuting the actual battle.[9]

In contrast, German blitzkrieg tactics in World War II were masterfully synchronized with logistical realities. The lightning-war tactic combined tremendous striking power with the capability to support short, stabbing thrusts within 600 miles or so of the German border. Predictions of a 50 percent vehicle loss rate led to the planned use of captured transports and fuel. Further advantage was gained by incorporating mobile supply and repair teams into the fast columns.[10] The system worked until synchronization was woefully abandoned in the depths of Russia.

The Second World War provides an abundance of lucid illustrations—both positive and negative—of the principle of synchronized support. Consider the tyranny of logistics in North Africa; the dearth of supply at Bataan; and the shiploads of scrambled munitions and supplies clogging French ports while hedgerow fighting units were strapped for ammunition. The unrelenting parade of lessons led Britain's Field Marshal Sir Archibald Wavell to admit: "I have soldiered for 42 years, and the more I see of war, the more I realize how much it all depends on . . . what our American friends call logistics."[11]

Synchronized support, though, has been a determinant of victory or defeat for much longer than Wavell's forty-two years in Her Majesty's service. It was this principle that Phillip and Alexander the Great applied to make the Macedonian army the lightest, fastest, most mobile force of its day, able to make lightning strikes before defenders could react. It was primarily Alexander's ruthless trimming of the army's support element that made the difference; without the burden of massive numbers of pack animals, Alexander could move virtually at will over inhospitable terrain, using speed and mobility to gain tactical advantage. There is further evidence that synchronized support—whatever Alexander may have called it—was a key Macedonian principle. Examples include his exploitation of alliances along the march to provide magazines of provisions in desolate regions, his use of the Macedonian fleet for reprovisioning, his division of the army into smaller units capable of better supporting themselves through plunder, and his careful consideration of harvest seasons in planning marches.[12]

Later, the Roman approach to synchronization would reflect the dual operational needs of maintaining control over a vast empire while sometimes having to travel long distan-

ces in hostile territory. Accordingly, support depots were established along the Roman road network at intervals of one day's march (sixteen miles), but legionnaires also carried enough supplies and engineering expertise to operate autonomously for up to thirty days.[13]

The Macedonian and Roman armies illustrate well-synchronized operational and support concepts that synergistically maximized striking power. It would be a grievous mistake, though, to conclude from these examples that synchronization somehow takes place automatically as leaders deploy their forces and plan campaigns. If that were true, support structures would not have grown so bulbously out of proportion during the seventeenth century. Nor would armies have become transformed into giant locusts with objectives not of victory but of mere survival via plunder and destruction of the land. With the elements of warfighting so desperately out of balance, the stage was set in the early nineteenth century for the entrance of a visionary leader who could resynchronize the support structure to match a new military strategy of destroying enemy field armies through mass, maneuver, and concentration of force.

How did Bonaparte do it? Like Alexander, he slashed baggage allowances to move armies more quickly; he eased the foraging burden by splitting his armies into parallel forces, each feeding to its left and therefore standing in better position to converge quickly on enemy forces; he set up great artillery parks and supply bases through which flowed thousands of rounds of ammunition; he elevated the quartermaster to a chief of staff who issued march orders; and he lessened reliance on the countryside by codifying food requisitioning procedures.[14]

Carl von Clausewitz, who has explained much about Napoleonic warfare, appears to have largely missed the real impact of these actions. To him, Bonaparte's seemingly magical qualities allowed him to employ "an army which did without magazines, lived off the country, paid no attention to considerations of supply and sometimes seemed to grow wings in its marches from one European capital to another."[15]

Clearly, no soldier or historian properly schooled in the principle of synchronized support could propagate such a fantasy. Yet, until we better understood the real nature of war in Southeast Asia, our own U.S. leadership expressed bafflement by attributing near-mystical qualities to an elusive enemy that refused to be interdicted. For nearly four years, Operation Rolling Thunder sought to strangle the insurgency in the South by cutting off the flow of logistical support from North Vietnam. The effort was unsuccessful because it was countered by a Vietcong strategy that embodied the principle of synchronized support—General Thanh's "tactical defensive."[16] Under this concept, the timing and tempo of offensive operations were precisely regulated by the availability of resupply, thus preventing our interruptions of the pipeline from affecting the enemy's ability to control the battlefield.

Interdiction, of course, has always been a major strategy of U.S. forces. It was the lure of being able to reach deep into the enemy's industrial and rear-echelon sources of power that made air power a worthy military option. But where within the current set of war-fighting principles is interdiction justified? A meaningful principle of war not only aids in the formulation of offensive strategies but allows better understanding of the enemy, his strategies, and his absorptive capacities. A complete set of principles would have to demand that the planner evaluate the effect of offensive operations on the enemy's support synchronization. It is instructive to note that, despite the massive role of interdiction in all modern wars, none of the classical principles of war mention, justify, or in any way account for this strategy. With a principle of synchronized support, the objective of interdiction would be clear—preventing enemy forces

from synchronizing their operations and support capabilities.

If persuasive examples of the critical importance of synchronized support emerge from virtually every conflict, from ancient times through the present, why is there no such principle presently on the books? Two basic tendencies appear to have merged to mitigate against recognition. The first involves the maintenance of a certain collegiate mystique about the nature of strategy formulation. The second reflects a deeply ingrained tendency to resist becoming enamored with material aspects of war at the expense of moral factors. Both can be illustrated by examining literature concerning the development of the principles of war.

Historian James A. Huston observed: "Everybody likes to talk about and analyze strategy. Some 'mystic' quality about strategy and strategic decisions seems to arouse spirits of all to a sense of intellectual contest."[17] Too often, we fall prey to the trap of looking at battle as a gigantic board game, with commanders seemingly able to move their forces and resources about at will—feinting, encircling, massing, and thrusting toward their objectives. Problems of supply, transportation, protection, construction, and medical support are viewed as irritations that detract from the lofty exercise of strategic thought. Consider this excerpt from a 1952 Air War College research paper examining whether or not the French principle of administration should be worthy of consideration as a U.S. principle of war:

> If "administration" means good logistical support to the armed forces—food, clothing and weapons of war, along with evacuation and care of the sick and wounded—we are forced to *assume* logistics in this discussion. If this support is impossible, the operation will not (or should not) be undertaken. Lack of logistical support in battle can have serious consequences indeed, but beyond the point of adequate logistic support, logistics in itself is no longer a factor in the outcome of the campaign.[18]

True, the prosecution of war and the exercise of command could be made considerably less perplexing by assuming proper support. Unfortunately, the study of strategy and tactics in isolation from the combat support considerations that energize and/or limit them is irrevocably destined to produce an incomplete, one-dimensional view of warfare. Lieutenant General W. B. Palmer recorded the result as he observed our combat performance in Korea:

> Scrutinize all recent historic examples with a most critical eye and you will find that our training of future commanders has not prepared them to cope with their logistic problems as skillfully as they cope with tactical problems; in fact, many of them have displayed ignorance and inadequacy which, if continued, can only result in an indefensible proportion of waste, extravagance, and paralysis.[19]

Upon what foundation is such training and education built? It is constructed primarily on military doctrine and the principles of war. That is why it is imperative that synchronized support be recognized as the critical principle it has repeatedly proved to be. Once the principle has been acknowledged, meaningful operational doctrine that folds strategic, tactical, and support planning together can be formulated. Significantly, a new AFM 1-1, released in March 1984, introduced a new principle of war called "logistics." Though well meaning and certainly a significant step forward, the term *logistics* is hollow and useless to a commander as a principle of war. It reminds the decision maker to consider logistics but does not indicate what to consider about it. In contrast, the principle of synchronized support expresses the essential characteristic of all successful military operations: the concentration of balanced operational and support power on common objectives. By internalizing this principle into our strategic thinking, we may even find the mystique of successful strategy (and the "fog and friction" of combat) to be considerably less perplexing than we suspect. As Soviet Colonel G. Mok-

rousov wrote in *Voyennyy vestnik* (Military Herald) recently:

> During the Great Patriotic War both senior chiefs and subordinates had great respect for those commanders who fought skillfully, but also organized with inspiration political work, reconnaissance, camouflage, engineer support, technical support, logistical support, and security; that is, they had respect for those commanders who comprehensively supported combat operations. As a rule, such commanders won on the battlefield, and their subordinate units suffered fewer losses.[20]

The second factor militating against recognition of a principle of war involving support is the overextension of a valuable element of esprit referred to today as the "warrior spirit." Misapplication of this concept leads to a self-defeating disdain for support considerations. The problem is not new. In 1918, French General Ferdinand Foch, Commander of the Allied armies, wrote a tract titled *The Principles of War.* In it, he attempted to rally a neo-Napoleonic fighting spirit by emphasizing the moral factors of war (quality of troops and command, energy, passion, etc.) while condemning military schools for teaching the materiel factors. "The worst possible results came from theories of this nature," Foch admonished. "Thus came these exclusive studies of ground, defenses, armament, organization, administration, all more or less scientific but dealing only with the physical side of war!"[21] After such words from the Allied Commander, any prudent soldier would indefinitely suspend any thoughts of expressing appreciation for logistical and support matters.

From this example, we can glean a sense of the mortal competition that still seems to prevail between moral and materiel factors or between warriors ("teeth") and support ("tail"). We must recognize this friction because it is crucial that we eliminate it from our military force. Throughout the study of warfare, the synchronization that fighting forces have been able to maintain between their strategies, tactics, and combat support capabilities has proved to be a reliable, constant, and irrepressible determinant of military success or failure.

WHERE do we stand today? Can we confidently say that our combat support structure is synchronized closely with our strategies? Is our force as mobile and deployable as our strategies call for? Are our weapon systems and support infrastructures designed for the austere, bare-base, and flexible brand of warfare that our doctrine and war plans envision? If not, we could be cultivating a twenty-first century Schlieffen Plan, Maginot Line, or Rolling Thunder. Such can be prevented only if we make certain that strategies and tactics are in phase with the physical capabilities of our force structure. General LeMay described the many pieces that must be counted:

> When I speak of air strength, I am not speaking only of airplanes. I am speaking of airfields, fuel supplies, depots, stockpiles of aircraft parts, weapons and weapon stockpiles, control and communication centers, highly trained and skilled manpower—and airplanes. These constitute airpower.[22]

The U.S. military—because of our geographical separation from likely combat zones, our defensive stance, our limited resources, and our wide range of deployment possibilities—must synchronize its operational plans and support concepts more skillfully than any other military force in history. Our doctrine, and the principles on which it is based, must be written to drive planners and decision makers in this direction. We must begin by adopting synchronized support as our twelfth principle of war.

Gunter AFS, Alabama

Notes

1. Air Force Manual 1-1, *Basic Aerospace Doctrine of the United States Air Force* (Washington: Government Printing Office, 1984), p. i.

2. Ibid. AFM 1-1 currently lists twelve principles: objective, offensive, surprise, security, mass, economy of force, maneuver, timing and tempo, unity of command, simplicity, cohesion, and logistics. The new principle advocated in this essay would replace the principle of logistics, which was added in the 1984 edition.

3. U.S. Army Training Regulation 10-5 contained the principles of war until 1928. They later reappeared in 1939 as part of Field Manual 100-5, *U.S. Army Basic Doctrine.*

4. Hawthorne Daniel, *For Want of a Nail* (New York: McGraw-Hill, 1948), p. xii.

5. General Walter Bedell Smith, *Eisenhower's Six Great Decisions* (New York: Longmans Press, 1956), p. 82.

6. Roland G. Ruppenthal, *US Army in World War II: Logistical Support of the Armies,* Volume I (Washington: Government Printing Office, 1959), pp. 186-89.

7. Harold L. Mack, "The Critical Error of World War II," unpublished monograph.

8. Roland G. Ruppenthal, *US Army in World War II: Logistical Support of the Armies,* Volume II (Washington: Government Printing Office, 1959), pp. 12-21.

9. Colonel Kenneth Macksey, *Guderian: Creator of the Blitzkrieg* (New York: Stein Press, 1976), pp. 31-32.

10. Charles Messenger, *The Blitzkrieg Story* (New York: Scribner, 1976), p. 177.

11. Daniel, p. 239.

12. Donald W. Engels, *Alexander the Great and the Logistics of the Macedonian Army* (Berkeley: University of California Press, 1982).

13. H. M. D. Parker, *The Roman Legions* (New York: Barnes and Noble, 1971).

14. Martin van Creveld, *Supplying War: Logistics from Wallenstein to Patton* (Cambridge: Cambridge University Press, 1977), pp. 40-74.

15. Ibid., p. 71.

16. Editorial, "Air Power and the Art of War," *Air University Review,* January-February 1985, p. 3.

17. James A. Huston, *The Sinews of War: Army Logistics 1775-1953* (Washington: Government Printing Office, 1966), p. 424.

18. Colonel Fred W. Miller, "The Principles of War: A Re-Examination," Air War College research paper (Maxwell AFB, Alabama, 1952), p. 31.

19. Lieutenant General W. B. Palmer, "Commanders Must Know Logistics," *The Quartermaster Review,* July-August 1953.

20. Colonel G. Mokrousov, Air Force Recurring Publication 200-1, "Combat Operations Support," January-February 1985, pp. 234-35.

21. General Ferdinand Foch, *The Principles of War* (New York: AMS Press, 1918), pp. 9-10.

22. General Curtis E. LeMay, quoted in *Air Force 2000: Air Power in the Twenty First Century* (Washington: Hq USAF/XO, 1983).

INNOVATION AND THE MILITARY MIND

AIR VICE-MARSHAL R. A. MASON, ROYAL AIR FORCE

AT a recent seminar in a reputable British university, a young sociology lecturer—fresh from the process of regurgitating other people's hypotheses but already irrecoverably enmeshed in his own—made a disdainful reference to "the military mind." He asserted that the military mind is characterized by conventional thinking, lack of imagination, unwillingness to challenge accepted doctrine, excessive caution, professional pessimism, narrowness of outlook, and subservience to the views of higher authority. In the vigorous debate that followed his remarks, not surprisingly his preconceived ideas were challenged not only by some intelligent members of his faculty but also by several representatives of various armed services. However, just as Descartes observed that "bad ideas can stimulate the good," in this case, the assertions prompted the reflection that even if the military mind was no more tenable a concept than the academic mind, the industrial mind, or the commercial mind, there are nevertheless, in the modern military environment, factors that can induce such characteristics. Indeed, many of these factors and their effects are not only justifiable but essential to the effectiveness of a fighting force. They should be recognized and their implications understood. If mental characteristics among military members should ever coalesce to the extent that the young lecturer's allegation came to be sustainable, the military service concerned would be in serious trouble.

EVEN the most cursory survey of military history illustrates the critical importance of technological and tactical innovation.

The stirrup, the longbow, barbed wire, the tank, blitzkrieg, radar, electronic countermeasures, AWACS, helicopter assault, and the astonishing aggregate of British innovation displayed during the Falklands War are random examples. Sometimes the vision of the innovators has outrun the capability of technology: the early submariners, the early aircraft carrier advocates, the first air power theorists, the proponents of surface-to-air missiles, and, just possibly, those enthusiasts who unreservedly espouse the cause of enhanced technology as the panacea for today's Western strategic dilemmas might be so categorized. Yet without such visionaries and without innovation, a nation's way of war becomes predictable; and predictable means vulnerable.

It is fashionable to criticize the Soviet Armed Forces for the weaknesses listed by the young lecturer, and certainly there is ample tactical evidence to support this contention. But before considering whether the Western superiority implicit in the criticism is justified, one should remember this true scenario:

- A Russian four-star admiral disparaged the value of the aircraft carrier;
- within twelve months, a Russian two-star admiral publicly challenged his commander in chief;
- and the four-star retracted, while the two-star was promoted, as was another junior two-star who equally publicly questioned the judgment of his newly promoted superior.

When did we last see a British or American four-star officer's military judgment being publicly questioned by his subordinates, let alone see these subordinates subsequently being promoted?

One does not have to look to the Soviet Armed Forces to identify the factors militating against military innovation. In organized Western armed services, conformity, reliability, and teamwork have long been essential ingredients of esprit and confidence within the unit. Mutual dependence normally requires coordinated, predictable behavior from colleagues, whether in an infantry platoon or in a four-ship formation. The demands of teamwork tend to inhibit independent action. Above the level of the fighting unit, further restrictions apply. In conventional warfare, it is highly unlikely that the firepower or any other contribution of a single unit will be sufficient to achieve tactical success. The foundations of a commander's assumptions in combat are certain knowledge of the disposition of his forces and confidence that they will react as they have been trained and ordered to do. Modern warfare, and especially air warfare, is fought by an aggregate of interdependent units: a timely matching of men, aircraft, weapons, communications, and logistic support to achieve concentration of appropriate force at the desired point of operational significance. Does innovation threaten such coordination?

Arguably, the time for innovation is at the planning stage, which is shrouded in secrecy to achieve surprise and confound a predictable defense. But there are several complementary factors, particularly relevant to modern air war, which inhibit innovation even then. The gestation period for the entry into service of modern aircraft and weapons considerably exceeds that of previous eras. Progression of such systems from concept, through development, to production, and, finally, operation will usually span several years. These materiel acquisitions may be accompanied by tactical manuals that explain their associated operational procedures. Moreover, there are strong and legitimate influences driving toward standardization of equipment that is increasingly expensive and complex. Yet simultaneously, many of today's military prognosticators predict that conflicts employing sophisticated weapon systems will be short wars, without the extended periods for mobilization and reinforcement that have characterized wars traditionally and offering little opportunity for tactical or technological revision or reequipment once the fighting starts. It would take a very persuasive

innovator to change the direction of a weapon procurement program at the eleventh hour on military grounds alone, in the face of heavily committed commercial, industrial, and political opposition. Indeed, one could argue that corporate commitment to a major weapon procurement program could inhibit innovative responsiveness to changing circumstances. Procurement inertia itself can be buttressed by legitimate military caution in the face of putative advantages from an unproven alternative.

In any event, whether in concepts, procurement, planning, training, or operations, the innovator has many problems to face. To start with, such are the day-to-day pressures on the modern serviceman that he has little time either for reflection—the essential prerequisite for innovation—or even the time to develop the habits of reflection. If an innovation does come to mind and the service member proposes it as a change, the individual is then challenging the accepted wisdom, which, presumably, is either apparently working successfully or has catastrophically failed. In the latter case, the time for innovation may be long gone. The former situation offers greater promise. However, in our military hierarchies, the accumulation of experience and wisdom is associated with increasing seniority. Weight of opinion is usually accredited according to rank. One superior's appreciated innovator can be another superior's pain in the neck. Generally it takes a big man to accept that his subordinate's questioning of the status quo or his earlier decisions is well founded, unless perhaps he can be persuaded that the new ideas are in fact his own. The restless mind can make for an uncomfortable subordinate. Paradoxically, the more powerful, competent, and confident the general, the more difficult it becomes to convince him that he may not be omniscient: it is the general who must be prepared to fight with what he has available and who therefore is the most conscious of the costs in training time, of the possible reduction in readiness or fighting effectiveness, or the gamble involved in changing current proven operational practices under the threat of imminent enemy attack. It is not melodramatic to remember that the general carries the responsibilities of not only the lives of his own men but possibly the fate of nations in his hands. It is scarcely surprising that he tends to approach innovation with caution.

Indeed, when one reflects on all the factors militating against innovation in modern military affairs, it is astonishing that tactical and technical innovations ever take place at all. But they must, for many reasons. "War is the province of uncertainty," observed Clausewitz. How much more so in an age when aircraft are expected to reach across oceans and continents, when command and control is increasingly important in the exercise of coordinated but widely distributed force, and when electronic warfare and other sources of friction can blind, paralyze, disrupt, or delay the plan that has been adopted. When planning, organization, coordination, and communication fail, the leader must rely on his own resourcefulness, ingenuity, flexibility, initiative, and common sense.

"When all else fails," advised Helmuth von Moltke, "march to the sound of the guns." A highly trained serviceman will respond instinctively in those circumstances that demand a swift, instinctive response. But the unexpected may call for more than a precondition or well-rehearsed response; even the use of initiative may be inadequate. Conditioned response contributes to conformity, and conformity certainly strengthens unit dependability, which is essential to the success of any coordinated tactics or strategy. Yet absolute conformity strangles individuality of thought, and the utterly dependable can easily become the readily predictable. A doctrine may have been observed, if not always practiced, for several years with complete confidence. But the onset of doctrinal thrombosis must be prevented by timely diagnosis and treatment, preferably before the patient endures combat conditions. Conformity will not encourage such diagnostic analysis. How-

ever, neither will placing the patient in the hands of a group of doctrinal theorists far removed from the operational theater. Any military innovation is of little value unless it can be made to work.

IF innovation is essential to the successful pursuit of modern air warfare and if by definition it is a risky business with many justifiable and some not so justifiable factors inhibiting it, what can be done to encourage it in a military environment with minimum risk to existing effectiveness?

It is probable (and no doubt could be tested by case histories) that powers of innovation are associated with independence of thought, individuality, imagination, and initiative. However, few, if any, armed services recruit with the slogan "Join our service branch and become an innovator!" Conversely, if young men are naturally inclined toward invention or philosophical reflection, they are unlikely to make military service their first career choice. Nevertheless, Western armed forces, particularly air forces, set out to recruit for their officer cadres young men and women who have strong character, above-average intelligence, and potential for initiative and leadership. The services recognize their need for a reservoir of talent that they can develop and draw on, as needed, in the future. But there is an immediate danger that instead of being encouraged to flow, the springs of creative young people will dry up long before they can contribute to the reservoir.

The first obstacle lies in the nature of traditional basic military training. "Learn to follow before you learn to lead" is a well-proven precept that should not be discarded. Is it sufficient? Good training will produce enlisted personnel and officers who will respond instinctively to anticipated, recognizable cicumstances in a manner circumscribed by their training. How can an officer be trained to recognize and to be prepared for the unexpected? Further, how can he be taught to engineer the unexpected or to innovate? Any suggestion that rookie officers be taught powers of innovation at the expense of military training would be justifiably derided. At the other extreme, it seems unrealistic to expect an officer on achieving senior rank to undertake a postgraduate course at a war college, war-gaming center, or national defense university and make a sudden transition from responder to innovator.

The resolution of the dilemma probably lies in a much maligned word: *education*. It seems to a foreign observer that the great strength of the United States military academies lies in their striving to produce officers who are not only highly trained but who have been taught how to think. If there is a difference between training and education, it is that education should instill the mental flexibility to look beyond today's possibilities, to anticipate and perhaps even to help shape tomorrow's. Inevitably, there are the seeds of tension when conformity and questioning are being taught side by side. It should come as no surprise that military education can occasionally give rise to uneasiness within the military as a whole. There are many apparently incompatible objectives: discipline and individuality, conformity and initiative, responding and innovating, determination and flexibility, imagination and objectivity, fire and dispassion. However, fighting and thinking should not be incompatible, but complementary. A forthright British general observed eighty years ago that "any military service which tries to separate its fighters from its thinkers is likely to finish up with cowards doing the thinking and the fools doing the fighting." Education from the very outset of an officer's career should teach him not only to recognize the apparent incompatibilities but to accept them as the anomalies of his chosen profession. He is then less likely to be confused by the seemingly conflicting demands that he will encounter. Hopefully, we will have selected young men and women with the intellect and strength of character to master the challenges and contradictions confronting

them. No doubt we shall lose those who lack either sufficient strength or flexibility—but better sooner rather than later when their responsibilities, and possibly the conflicting demands placed on them, have grown immeasurably greater.

Thereafter, when young officers go to their first units, they learn that there is a time for thought and a time for action, a time for conformity and a time for independence, a time for consolidation and a time for innovation. Whatever else military education should do, it should instill in them the good judgment to ascertain which time is appropriate for which activity. Even then, these youngsters will not be able to apply that judgment confidently without the tutelage of good leadership. In this context, the good leader is the one who has sufficient self-confidence to encourage his subordinates to think about their own immediate environment and to seek improvements, revisions, or modifications that will enhance unit capability. He will identify those individuals who seem to have the capacity to discharge their regular tasks with the utmost effectiveness and still have the time and inclination to think constructively about what they are doing. He will have the patience to identify and bridle the brashness of youth. He will have the wisdom to instruct his subordinates in the ways of persuasion without provocation. In short, he will be encouraging both activity and habits of thought, and he will be sensible enough to recognize that industrious, innovative officers will reflect the high quality of his leadership, not undermine his authority. And—perhaps most important of all—he will take the necessary steps to ensure that powers of innovation and practical imagination gain the attention of appointers and superiors so that any particular talent can be nurtured and given a wider canvass for its expression.

Subsequently, in this ideal air force or other service branch, such officers who attend staff and war colleges will be surprised by an environment in which there is not just a "recommended staff solution" but also credit given for coming up with an alternative. Some, though probably not all, will be officers who could make the staff solution work in an exemplary fashion if that was called for or, alternatively, harness their formidable powers of leadership and organization to "sell" an innovative solution which they themselves had devised. In every walk of life, such men and women are scarce and very valuable.

In a military service, someone has to become the intellectual master of the ever-expanding, increasingly complex technology; someone has to analyze, synthesize, plan, and recommend; someone has to identify and coolly interpret hostile capabilities; someone has to have the foresight, imagination, and courage to suggest solutions to problems that may be ten years away or more; someone has to address the ambitious bureaucrat, the single-minded politician, and the instant academic strategic analyst from the institution, confronting, discussing, arguing, and holding the corner. Clausewitz was very precise in defining the qualities which he sought in a general officer to meet the uncertainties of war; they are equally applicable for any military leader in peacetime:

> A strong mind which can maintain its serenity under the most powerful excitement . . . strength of character . . . discernment clear and deep . . . energy, firmness, staunchness. . . . Here then, above all a fine and penetrating mind is called for, to search out the truth by the tact of its judgment.

That must be the military mind. Its fostering is not the responsibility of academies and colleges only but of commanders everywhere. Independence of thought, imagination, ingenuity, and initiative are not substitutes for discipline, teamwork, conformity, tenacity of purpose, and loyalty but are military virtues complementary to them. All must be encouraged—from each individual, according to his talents. Therein lies the source of successful military innovation. Should anyone doubt whether the possible outcomes are really worth all the has-

sle, whether the idea is indeed worth the pursuit, perhaps the words of General Henry "Hap" Arnold in November 1945 should be recalled:

> National safety would be endangered by an air force whose doctrines and techniques are tied solely to the equipment and processes of the moment. Present equipment is but a step in progress, and any air force which does not keep its doctrines ahead of its equipment, and its vision far into the future, can only delude the nation into a false sense of security.

Timely and well-considered innovation is the practical manifestation of that vision to ensure the continued harmony of equipment and doctrine without prejudice to today's operational effectiveness.

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SEA POWER AND THE B-52 STRATOFORTRESS

DR. DONALD D. CHIPMAN
MAJOR DAVID LAY

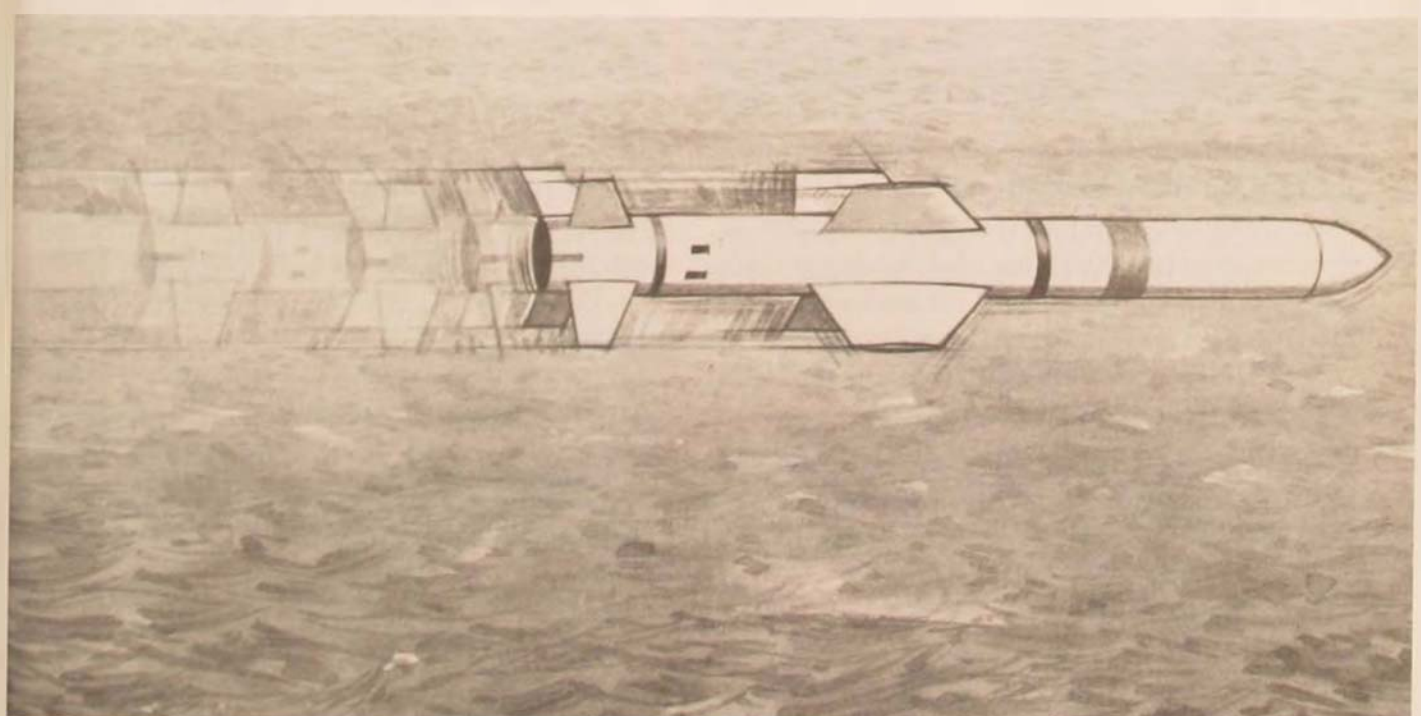
THE mission of the U.S. Navy is to fight at sea and protect our maritime security. Today, as the Soviet naval threat increases, this responsibility is becoming very complex and demanding. If a European war erupts, the U.S. Navy would defend the northern flank by blocking the Soviet Navy in the Norwegian Sea. In addition, they would have to protect the various Atlantic sea lines of communication (SLOCs). *Naval Forces* journal recently estimated the complexity of just this mission:

> In a conflict of even moderate size, it would be necessary to reinforce the Allied Armies by some one half million men, provide some four and a half million tons of ammunition, four million tons of equipment and a hundred million barrels of oil.[1]

A maritime strategy that requires the Navy to defend the SLOCs while at the same time prosecuting a North Atlantic battle would necessarily require joint operations, including U.S. Air Force assets. Consequently, in 1982, after considering these contingencies, United States Chief of Naval Operations, Admiral James D. Watkins, and USAF Chief of Staff, General Charles A. Gabriel, signed a memorandum of agreement for joint maritime operations.[2] Commenting on this, General Gabriel noted: "As the Falklands conflict demonstrated, air power is a critically important part of successful maritime operations. We will be putting more emphasis on such collateral roles as sea-lane protection, aerial minelaying and ship attack."[3]

In 1984, the Air Force changed its maritime role from a collateral responsibility to a major mission. According to basic U.S. Air Force doctrine, the aerospace maritime mission is

> to neutralize or destroy enemy naval forces and to protect friendly naval forces and shipping. Aerospace maritime operations may consist of counter air operations, aerial minelaying, reconnaissance and interdiction of enemy naval surface and subsurface forces, port facilities and shipping.[4]



To accomplish these tasks, the U.S. Air Force has modified the B-52G model to carry the Harpoon missile and has stationed one squadron of twelve planes at Andersen AFB on Guam and another squadron at Loring AFB, Maine.[5] The radar-guided Harpoon missile is thirteen feet long and weighs approximately 1145 pounds with a penetrating high-explosive warhead. The B-52 carries twelve missiles and can launch them about fifty miles from the target.[6] In addition, four E-3A AWACS airborne warning and control aircraft will be modified to support the B-52Gs in this maritime role.[7] The speed, range, and flexibility of the B-52 working with the E-3A in a joint operation with the U.S. Navy should provide tremendous offensive fire power in any maritime battle.

Carrier Battle Group and the B-52

The U.S. Navy's carrier battle group (CVBG) is a formidable striking force, yet the B-52 could enhance the CVBG's capabilities. If assigned to the perimeter defense, B-52s would allow the fleet to concentrate its force to an offensive strategy. Under tactical control of the E-2C Hawkeye, the B-52 could strike the enemy on the CVBG's flanks, leaving the fleet to attack the enemy's principal force.

Once the CVBG's perimeter defense is secured, the B-52 and the E-3A could coordinate attacks on hostile ships at long distances from the carrier. According to one expert, by linking the E-3A AWACS and the E-2C Hawkeye, the battle group could extend its area of operation up to 600 miles.[8] Since Soviet Navy Backfires carry air-to-surface missiles with a range of approximately 200 miles and Soviet surface combatants are equipped with surface-to-surface missiles with ranges of approximately 250 miles, this extended CVBG offensive operation area is a vital tactical requirement.[9]

According to Soviet naval doctrine, when confronted with air attacks, Soviet battle groups will disperse.[10] In this scenario, linked by E-2C and working with carrier aircraft, the long-range B-52 could attack the dispersed enemy fleet. In such a strike, the B-52 would maneuver to the far side of the enemy to destroy their surface combatants. Simultaneous weapons arriving on target within moments of one another and coming from all directions would complicate the enemy's defensive posture.

In certain maritime arenas, the B-52 would work exclusively with the E-3A, allowing the E-2C and the CVBG more flexibility. The E-3A would direct strikes against distant enemy forces, while the E-2C would remain nearer the carrier for defensive purposes. The E-3A could provide distant early warning of approaching enemy forces to the E-2C, which, in turn, would coordinate the defensive tactics.

As the E-3A located distant enemy forces, it would vector both the carrier aircraft and the B-52s into the target range. With an Air Force KC-10 tanker tasked to provide fuel, this air armada could remain aloft for long periods. If Harpoon-equipped B-52s were joined by B-52s carrying mines, the force's versatility would increase considerably. Mine-capable B-52s could establish mine fields in significant enemy approaches, such as harbors and chokepoints. Minefields would force the enemy fleet to disperse, making individual ships more vulnerable to Harpoon attack.

Recently, the Soviets have practiced their own version of aerial ship strikes. In 1982, according to the *Washington Post*, eight Backfires staged two practice attacks against the U.S. carriers *Enterprise* and *Midway* in the North Pacific. Although the Backfires did not come within 120 miles of the American fleet, they were well within the range of its air-to-surface missiles.[11] Without U.S. Air Force B-52s, the U.S. Navy must rely on its slow P-3s to simulate this type of ship strike.

If the CVBG were escorting amphibious ships to secure an island or make a landing, the B-52 would complement this mission. The B-52 could provide a secure barrier in one part of the Navy's and Marine Corp's amphibious op-

A B-52G (above, carrying twelve Harpoon missiles) takes off on a simulated antishipping mission. . . . The Harpoon (right) is a thirteen-foot-long, radar-guided missile with a penetrating warhead. It can be launched some fifty miles from its target.

erations area. The minelaying B-52s and the Harpoon-armed B-52s, coordinated by an E-3A, would work together to seal off any enemy surface threat in one of the sectors. With reduced assets assigned to sector defense, the Navy could then concentrate on the amphibious landings. If this area of operations is near a friendly air base, F-15s could fly combat air patrol with the E-3As providing the defensive counterair.

Thus CVBG joint operations with the Harpoon-armed and mine-capable B-52s, supported by an E-3A and a KC-10, could provide an additional warfare dimension for naval operations. This USAF air armada would defend a maritime sector, strike distant naval threats, provide over-the-horizon reconnaissance, and protect the CVBG. With this Air Force augmentation, the carrier battle group would be more flexible and thus better able to prosecute the main battle objective. As the Soviets have demonstrated with their Backfires, Badgers, and Bears in support of their navy, this mission is no longer an option but is a necessity.

Surface Action Groups and the B-52

Composed primarily of a U.S. battleship and other surface combatants, surface action groups (SAGs) lack organic air power. The Air Force

could partially remedy this liability. If the SAGs journeyed near air bases such as in Iceland, fighters, B-52s, E-3As, and KC-10s could provide continuous air support. These planes would rendezvous with the SAG and position themselves in the direction of the suspected threat, providing both defensive and offensive capabilities. An E-3A could fly a patrol barrier while fighters circled above it in a combat patrol pattern. If enemy surface patrols were sighted, the E-3A could vector the Harpoon-armed B-52 toward the threat. To increase the loitering time, KC-10s would provide fuel.

This maritime aerospace armada would provide the SAG with both over-the-horizon location of enemy activities and a communication relay between various U.S. naval ships. Once an engagement began, the B-52 would attack the enemy with its Harpoons. When the Soviets deployed surface combatants into the Norwegian Sea, their Badgers, Bears, and Backfires would provide fleet air coverage.[12] In a similar manner, B-52s and other USAF aircraft could be used to defend the U.S. Navy's SAGs.

Sea Lines of Communication and the B-52

With its inherent advantages in speed, range, and flexibility, the B-52 could operate independently in support of other primary sea power objectives. Capable of traversing vast distances rapidly, the B-52 could be tasked to accomplish a variety of significant maritime missions where time and distance to the operating area are critical factors. In time of pending war, patrolling the various chokepoints surrounding the Russian littoral would require quick reaction and sustainability. B-52s tanked by KC-10s could respond immediately.

In chokepoint defense, a patrolling B-52 could hinder the Soviet Navy's attempts to sail out of the inland seas into the blue waters of the oceans. Such a chokepoint as the Pacific's Kuril Islands is critical to the Soviet Pacific Fleet operations. In March 1985, a Soviet carrier battle group, composed of the *Novorossiysk*, four cruisers, three destroyers, and two replenishment ships, conducted a major exercise in the Pacific. This Soviet carrier group sailed south through the straits of Tsushima into the Pacific and then back to home port through the Kuril Islands, entering and departing the Pacific through critical chokepoints.[13] In 1905, the Japanese destroyed nearly the entire Russian Baltic Fleet in the Tsushima Strait during the Russo-Japanese War.[14] B-52s, armed with mines and Harpoons, could respond quickly to any U.S. Navy requirement for blocking the Soviet Navy at Tsushima or the Kurils. Mining the Kuril Island chain would force the Soviets to reconsider their strategy and keep them away from critical Pacific SLOCs. In the Atlantic, B-52s could patrol chokepoints such as the Greenland-Iceland-United Kingdom (GIUK) Gap and Baltic entrances.

Defending the sea lines of communication is another appropriate maritime mission for B-52s. In a European conflict, hundreds of thousands of tons of supplies would be shipped through the Atlantic SLOCs. This logistical mission would require large convoys and, in the early battle stages, a massive airlift. As these convoys and USAF aircraft transited the Atlantic, enemy surface ships armed with surface-to-surface missiles and surface-to-air missiles would attack. Assigning U.S. Navy combatants to protect these SLOCs would be costly in terms of time and assets. Overall, assigning Navy ships to this defensive mission would detract from the North Atlantic forward offensive strategy. Instead, B-52s could engage enemy ships threatening these convoys, allowing naval units to concentrate on attacking the enemy's main battle fleet. The B-52 would patrol threatened segments of the sea lanes to ensure passage of the convoy and airlift. On such a patrol, the B-52 would communicate with the convoy commander and the various escort ships, assuming a role similar to the World War II escort carrier that provided protection for convoys crossing the mid-Atlantic Gap.[15]

In addition, the B-52s could attack Soviet merchant ships. The Soviet merchant fleet comprises more than 1700 ships. These vessels are often found sailing on the distant oceans, carrying supplies to Soviet allies. Many of these merchant ships can convert to serve as Soviet Navy supply and replenishment ships.[16] With these vessels scattered throughout the world's oceans, finding and destroying them would divert a tremendous number of U.S. naval assets. For years, B-52 crews have conducted reconnaissance flights identifying various Soviet merchant ships in an Air Force reconnaissance mission called Busy Observer.[17] This experience would be valuable when B-52s seek out and attack Soviet merchant ships.

North Atlantic Scenario and the B-52

In a major European war, the following assumptions concerning the battle of the North Atlantic are likely. As the aggressor, Soviet forces would have the advantage of early mobilization and surprise. The Soviet strategy would include securing the north maritime flank as Soviet southern forces fight across the European plain. The Soviets would move into the North Atlantic by taking parts of Norway and sending their navy into the Norwegian Sea. After securing Norwegian airfields, they would deploy their land-based naval aviation units to these areas and rapidly advance their Northern Fleet into the North Atlantic. These combatants would attempt to prevent Western forces from reinforcing Norway. As the Soviet naval presence increased, the area under their control would extend farther into the North Atlantic to threaten vital Western bases in Scotland, northern England, and Iceland, as well as the North Atlantic SLOCs.

As the Soviets attempted to secure the North Atlantic and the Norwegian Sea theater, U.S. naval forces would deploy into a striking position.[18] However, as the U.S. fleet sailed north to confront the enemy's main force, a second Soviet naval threat could appear from the south. The Soviet Union's surface combatants in the Indian Ocean and South Atlantic would sail north, placing the U.S. Navy between opposing enemy forces.[19]

In this scenario, an air armada of B-52s could assist the U.S. Navy in establishing maritime superiority. Approximately ten B-52s carrying 120 Harpoons could fly south to meet the South Atlantic and Indian Ocean Soviet squadrons. These aircraft would be refueled by KC-10s and vectored by E-3As. As this air armada converged on the Soviet ships, it would disperse in order to launch missiles from several directions. A complete saturation of the enemy with more than 100 Harpoon missiles should suffice.

OVERALL, the B-52, along with the support planes of E-3A and KC-10s, could assist the U.S. Navy in future engagements with a variety of missions, including ship strike, minelaying, reconnaissance, intelligence, and communication links. The acceptance of this new Air Force mission by the U.S. Navy has the blessing of the Secretary of the Navy John F. Lehman. Lehman, a Naval Air Reservist and an advocate of sea power, stated in October 1982 that he welcomed the Air Force to the wartime mission of destroying the Soviet fleet and keeping allied sea lines of communication open.[20]

While joint Navy and Air Force maritime operations are still in the formative stages, the Soviets are very concerned. Recently, a concerned Soviet Navy captain commented on the future of this program:

> U.S. Air Force specialists do not exclude the possibility of employing not only the B-52 bombers, but also the FB-111, SR-71, and B-1 aircraft as well as U.S. Tactical Air Command aircraft in a war at sea. These same specialists also are discussing the joint use of B-52 bombers as a platform for antiship weapon systems and E-3A AWACS long-range radar surveillance and control aircraft, which surpasses the B-52 by at least fivefold in the capability of detecting targets.[21]

The successful war at sea will require new

tactics and new considerations. The B-52, a sea-power ship strike weapon system, is just the beginning.

Maxwell AFB, Alabama
and
Virginia Beach, Virginia

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AIR BASE SURVIVABILITY AND V/STOL AIRCRAFT: A GAP IN AIR FORCE DOCTRINE?

LIEUTENANT COLONEL PRICE T. BINGHAM

THE U.S. Air Force is responsible for developing its doctrine. This responsibility requires thorough evaluation of concepts and technologies so that current and future forces will be able to perform their missions as effectively as possible.[1] To this end, in the development of both air power employment concepts and technology, the Air Force puts great emphasis on an aircraft's airborne performance. Unfortunately, because of this emphasis, the Air Force gives too little attention to those aircraft characteristics most related to air base survivability, support requirements, and operating surface requirements. Apparently, the Air Force considers air base survivability as a problem unrelated to aircraft requirements. The most likely reason for this separate treatment of requirements is that those responsible for doctrine development do not consider the base as an indispensable element in the overall warfighting system, of which any aircraft is but one element. However, because of the rapidly growing threat to air bases, the ability of the Air Force to survive and perform its missions is less than certain.

A more effective approach to doctrine development would make base survivability a key factor in determining what aircraft characteristics are required. In applying this approach, the Air Force would look at how more survivable it could make a base by intelligently exploiting the unique capabilities of vertical/short takeoff and landing (V/STOL) aircraft, such as the Harrier. Unfortunately, there is no evidence that the Air Force is seriously examining this reason for employing V/STOL aircraft. To comprehend some of the reasons why different approaches to air base survivability are not given more attention, one must understand certain characteristics of human behavior associated with organizations. Too often there are important differences between how people in organizations may behave and how they must behave if their organization is to be effective in war.

To appreciate the advantages in basing survivability gained from the inherent flexibility of V/STOL aircraft, particularly compared to either conventional takeoff and landing (CTOL) or short takeoff and landing (STOL) aircraft, one must understand the threat.[2] A major task at the onset of hostilities is gaining control of the air by neutralizing enemy air power. One way to do this quickly, which many perceive to be increasingly effective, is to attack enemy air power on the ground. Temporarily degrading an enemy's sortie generation, rather than destroying his aircraft, may be all that is needed; and doing this may be far more feasible than either destroying aircraft on the ground or in the air.

Air base attacks can involve nuclear, chemi-

The McDonnell Douglas AV-8A/B is a significant advance over the first Hawker Harriers that were such a novelty in the late fifties. Developed from the BAe-8A, a battle-proven and highly capable aircraft, the AV-8B offers new dimensions to the innovative planner.

cal, biological, and conventional munitions, which all have one characteristic in common: their lethality continues to increase. Moreover, simultaneous employment of combinations of munitions produces powerful and often unappreciated synergies.[3]

Advances in the speed, range, and accuracy of various delivery systems are further intensifying the threat. Cruise and ballistic missiles, special operations, and conventional land forces, as well as aircraft, may be increasingly effective means for attacking targets as lucrative and important as most air bases. As with munitions, the employment of combinations of delivery methods creates synergies that make successful defense more difficult.

Just as the threat to air bases is increasing, so are the limitations on air base defensive and recovery measures. Developments in air base attack systems are forcing active defense measures to become more complex and expensive. Simultaneously, the increasing lethality of munitions raises the cost for base defense failures, as increased resources and time are required to return a damaged air base to full effectiveness. Also, these growing requirements for defensive and recovery measures make building a hardened, protected air base, where none now exists, a task that requires more and more time and resources.

Many of the problems involved in defending a base and repairing it quickly are related to the fixed, relatively concentrated nature of most bases. The size, complexity, and density of these bases are the direct result of aircraft maintenance and takeoff and landing requirements. CTOL aircraft require long, relatively smooth, hard surfaces (runways) for takeoff and landing. Both they and most STOL aircraft need similar surfaces or taxiways to travel between the runway and parking areas. Thus CTOL and STOL aircraft usually are located close to runways, where they need hardened shelters to increase their survivability. In addition, most of these aircraft have been designed with the assumption that extensive and complex maintenance will be readily available at the base. Because these requirements are expensive, there are relatively few hardened bases suitable for these aircraft available in Europe, let alone in Southwest Asia. Therefore, the neutralization of only a few bases could have an immense impact on our ability to employ air power.

Because the present approach results in relatively few fixed bases, which present targets that would be both lucrative and vulnerable to an enemy, we must develop an alternative to it. The employment of V/STOL aircraft such as the Harrier makes possible a much different and more survivable approach to basing. The flexible takeoff and landing characteristics unique to V/STOL aircraft make increased basing survivability possible by dramatically increasing one's ability to exploit measures such as dispersion, mobility, concealment, and deception. To understand how this can be done, one need only examine a basing concept for a wing of V/STOL Harrier attack aircraft,

which also possesses a limited air-to-air capability.[4] During combat, the aircraft in such a wing would be dispersed over a wide area, with no more than three or four aircraft based together in a single location or hide. The wing would be composed of three squadrons. Each squadron would control six hides. Hides would be separated by at least a mile. Each hide would include parking for the aircraft, a pad suitable for vertical takeoff and landing, and enough fuel for each aircraft to fly to other locations within 50 nautical miles, three times a day, for three to seven days. To reduce transportation requirements, a hide would have only one reload of air-to-air missiles for each aircraft and only minor maintenance capabilities.

To reduce the hide's signature, increase the number of sorties flown, and take advantage of a pilot's target area familiarity, each aircraft would be scheduled to fly several close air support or battlefield air interdiction sorties in one cycle. A cycle would begin when the aircraft takes off vertically from the hide, carrying only its basic missile load. It would then fly to a predetermined short strip, which might be a field or road, where air-to-surface munitions and fuel are located. This strip and others like it would be used for only short periods of time, perhaps less than a day. Landing at the strip, the aircraft would be loaded with air-to-surface munitions and have its fuel topped off. Using a short takeoff run, the aircraft would fly an attack mission, returning to the strip to be refueled and rearmed until the scheduled sorties in the cycle were flown. At this time, it would recover at the hide for crew change and minor maintenance.

Using strips has several important advantages. It allows hides to be very small and the source of only a fraction of the total sorties, making them more difficult to detect. If strips are located closer to the enemy than hides, time and fuel are saved on turnaround sorties, while the added distance makes the hide even more secure from attack. Finally, a strip enables an aircraft to make a rolling takeoff when loaded with air-to-surface munitions, which avoids range/payload handicaps associated with vertical takeoffs.

If an aircraft needs maintenance that cannot be performed at a hide, it would fly to a specially designated location having more extensive capability. If the aircraft could not fly to the maintenance, either the maintenance could be brought to the aircraft or the aircraft could be retrieved by helicopter. Periodically, possibly every few days, a squadron would relocate its hides. Normally a wing would have only one squadron relocating at a time to reduce the impact of any sorties lost due to the move. The wing headquarters would designate the location of new hides and would assist in the squadron's move.

Both hides and forward strips would be well camouflaged. Besides camouflage, each squadron would use deception. Generally a squadron would build several decoy hides during each move. Aircraft routes to and from hides and strips would be planned specifically to reinforce the deception created by these decoys. Additionally, by concentrating air defenses, a decoy hide could be made into a dangerous trap for the enemy.

The result of this V/STOL basing concept would be greatly improved survivability. One reason is dispersal. Because of the separation between hides, even the explosion of a munition as powerful as a low-yield or "tactical" nuclear weapon would disrupt the operation of only a few aircraft. Another reason is mobility. Since hides and strips would be constantly changing, enemy intelligence on their location would be perishable. Perishable intelligence requires a quick response, limiting time available to concentrate forces, plan, and execute an attack. This circumstance reduces the probability for attack success. Moreover, because a hide could be moved quickly out of a contaminated environment, the effectiveness of area denial munitions, such as mines and persistent chemical and biological agents, would be reduced.

Using camouflage makes it very difficult for

The inherent mobility of the V/STOL Harrier make it a natural candidate for the hide basing concept. From their secluded hides, the Harriers could remain operationally effective while presenting a multifaceted targeting problem to any aggressor.

the enemy to find a location as small as a hide, and deception would make the reliability of any information suspect. Overall, the combination of mobility, concealment, and deception measures operate to make it very difficult for an enemy to find and successfully attack air power based in hides. Due to hide dispersion, even a successful attack would produce little payoff.[5]

An additional factor that we need to consider in examining air power employment is the lack of hardened air bases in areas where national interests may require the deployment of land-based air power. The nature of this V/STOL basing concept not only makes air power more survivable in such a situation but also eliminates the need for long periods of time to build expensive, hardened bases (which later may be abandoned). The use of V/STOL aircraft and hides makes it possible to move land-based air power quickly into an area while reducing indicators that betray our plans.

Despite the numerous advantages of a V/STOL-aircraft-oriented basing concept like this one, many unknowns exist. Dispersion and mobility, which are perceived by many to complicate logistics requirements, may, in fact, be advantageous when compared to the costs in resources and time of trying to operate hardened air bases in wartime. Facing the same firepower trends that threaten air bases, the U.S. Army operates in a way very similar to what is proposed in this concept, using dispersion, mobility, concealment, and deception to increase survivability. Increasingly, the Army also operates equipment with fuel, maintenance, and munitions requirements similar to many Air Force attack aircraft. As a result, with this concept it is very possible that air and land forces could share logistical resources, perhaps reducing overall theater requirements.

Personnel and training requirements would be different under this concept. To make the concept feasible, personnel must be trained to perform a variety of tasks, such as both mainte-

nance and hide defense. As with logistics, the Air Force could examine how the Army approaches this manning/training problem.

Command and control is another potential problem area. Controlling aircraft located in a large number of widely separated hides will require different communications equipment. Again, studying the Army and how it controls artillery might help in the development of solutions.

Obviously, many factors need to be explored before this proposed basing concept can be considered a viable solution for attaining greater air base survivability. Unfortunately, Air Force organizations charged with responsibility for doctrine development do not seem inclined to integrate closely base and aircraft requirements. As a result, there is little effort being made to explore the basing advantages and disadvantages of V/STOL aircraft. To understand better why this is true, it is necessary to examine the nature of both war and organizations.

History provides abundant evidence that innovation and flexibility contribute significantly to success in war. Innovation involves the development and employment of new technology. Even more frequently, successful innovation in war has been due to the employment of old or known technology in new ways. The Germans' employment of tanks in panzer divisions to exploit breakthroughs is one such example. Their innovative use of the tank made the blitzkrieg invasion of France in 1940 a devastating success, despite the fact that German tanks were not superior either in numbers or in quality to French and British tanks.[6]

Often flexibility is closely related to innovation. Flexibility allows a military force to adapt to the changing and unpredictable aspects, or frictions, of war. It also creates uncertainties for the enemy, degrading the effectiveness of his operations. As Clausewitz explained, frictions are an unavoidable reality of war and the successful military commander is the one who does not try to change this reality but, instead, uses his judgment to adapt to it.[7] German innovations combining the use of radios in tanks with a mission-order concept created flexibility. As a result, in blitzkrieg warfare, panzer divisions were able not only to adapt to friction but, more important, to create friction for their foes.[8]

If we believe that effective Air Force doctrine requires objective, rigorous testing of innovative, flexible concepts such as the one proposed here, we need to examine reasons why it is not being done. We find one possible reason when looking at the nature of human behavior. All people are capable of undesirable behavior. Fortunately, when the reasons for this type of behavior are understood, it is often possible to find ways to decrease or even prevent such behavior. A particularly successful example of this is the reduction of undesirable behavior caused by fear through the intelligent development of social bonds within a military unit.

Organizations, like combat, are prone to cause people to behave in undesirable ways. Organizational rules and impersonality developed to produce reliable, predictable behavior may also cause excessive conformity and reduced flexibility.[9] As a result, people in an organization can come to look upon invention as a hostile or destructive act. Such attitudes may result from a realization that change will disturb comfortable routines.[10] Another reason for this negativity toward innovation is the tendency for people to identify too closely with things that give them satisfaction. Whatever the reason, satisfaction with the status quo prevents people from thinking about a practice's original purpose or its defects.[11] If this type of behavior or response becomes prevalent in a military organization, a dangerous situation exists because war-fighting goals become subordinate to organizational rules and procedures.[12] Unfortunately, when we review the history of the development of steamships, aircraft, tanks, and ICBMs, we see that such situations are not rare. According to Michael Howard, aversion to change is prevalent because "a better case can always be made out against innovation than can be made for it."[13]

Realizing the potential dangers, the Air Force needs to take steps to prevent undesirable bureaucratic behavior from affecting doctrine development. We must ask ourselves why we are not integrating closely aircraft and base requirements, particularly as our failure to do so is in contrast to our approach to both the Midgetman and the ground-launched cruise missile. If the Air Force is to develop effective doctrine, its focus must always be on the purpose of air power. We must not allow ourselves to remain fixated on particular basing methods just because they were effective in the past and seem adequate in peace.

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Notes

1. Air Force Manual 1-1, *Basic Aerospace Doctrine of the United States Air Force*, 5 January 1984, p. 4-8.

2. Recognition of the growing vulnerability of current bases resulted in a Rand Corporation proposal to increase basing options for future fighter aircraft. This proposal called for an integrated approach to aircraft design, basing, and support requirements. M. B. Berman and C. L. Batten, *Increasing Future Fighter Weapon Systems Performance by Integrating Basing, Support, and Air Vehicle Requirements* (N-1985-1-AF), Rand Corporation, Santa Monica, California, April 1983. Although this study provides an excellent treatment of methods for minimizing support requirements, it remains incomplete because it focuses only on aircraft with STOL characteristics. Even without considering the basing options available with V/STOL aircraft, it is necessary to recognize that the AV-8B Harrier is very capable of performing missions such as close air support and battlefield air interdiction. For a more detailed treatment of Harrier capabilities, see Lieutenant Colonel Price T. Bingham, "Improving Force Flexibility through V/STOL," *Air University Review*, January-February 1985, pp. 72-87.

3. For example, consider the complexity of attempting to detect and clear mines, perform active defense, make rapid repairs, and generate sorties in a chemically contaminated environment. The complexity results from the different characteristics and effects of each munition, which often cause countermeasures for one munition to be ineffective against another. It is even possible that some countermeasures, like wearing a chemical protection suit, will increase vulnerability to the effects of another munition.

4. Defeating a sudden enemy offensive requires attack aircraft with some air-to-air capability so that they can defend themselves, as well as make enemy offensive air operations more dangerous.

5. The Soviets are known to identify and evaluate uncertainties that threaten the success of an option. Thus, mobility, concealment, and deception measures could have an important deterrent effect on Soviet willingness to attack hide-based air power. Benjamin S. Lambeth, "Uncertainties for the Soviet War Planner," *International Security*, Winter 1982/83, p. 146.

6. B. H. Liddell Hart, *Strategy* (New York: Praeger, 1967), pp. 223-35; Richard M. Ogorkiewicz, *Armor: A History of Mechanized Forces* (New York: Praeger, 1960), pp. 15, 21-22.

7. Carl von Clausewitz, *On War*, edited and translated by Michael Howard and Peter Paret (Princeton, New Jersey: Princeton University Press, 1976), pp. 119-21, 157, 168.

8. Alistair Horne, *To Lose a Battle: France 1940* (New York: Penguin Books, 1979), pp. 79-81, 167, 212-21.

9. Stephen P. Robbins, *Organization Theory: The Structure and Design of Organizations* (New York: Prentice-Hall, 1983), pp. 196-207, 266.

10. Elting E. Morison, *Men, Machines, and Modern Times* (Cambridge, Massachusetts: MIT Press, 1966), pp. 9, 13-14.

11. Morison, pp. 39-40.

12. Gwyn Harries-Jenkins, "Military Sociology," *RUSI*, September 1974, p. 60.

13. Michael Howard, "Military Science in an Age of Peace," *RUSI*, March 1974, p. 6.

POLICY, INTELLIGENCE, AND THE BILLION-DOLLAR PETROGLYPH

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THE relationship between intelligence and policy is complex and frequently difficult to understand. In an ideal world, good intelligence serves power and truth with equal integrity. In practice, this is not always the case. Many political paradigms, especially those with a strong ideological base, are impervious even to the best intelligence.[1] On one hand, good analysis does not guarantee good decisions or policy. On the other, the potential for sound policy is ill-served by the alternative. Nevertheless, the relationship between intelligence and policy is essentially symbiotic. Policy looks to intelligence for a logic of evidence, and significant analysis looks for policy to serve.[2]

Intelligence and policy, their institutions and systems, are often viewed as separate activities. At their worst, they probably are. At their best, institutional and systemic boundaries are blurred. The twilight zone that separates intelligence and policy is infinitely more difficult to describe than the institutions themselves. This "no man's land" seldom becomes the object of scrutiny except after an intelligence failure. Yet most intelligence failures are political failures waiting for the jury to come in.[3] Institutionally, policy is the ultimate power broker, and realistically, it is in the position to be lion to the intelligence ram. The danger is one of proximity. As P. T. Barnum once observed: "If you put a ram in a cage with a lion, you need plenty of rams in reserve."[4]

Institutions and definitions of their activities

are both plagued by oversimplification. For the sake of convenience, we often speak of "the" policymaker or "the" intelligence analyst, but policy and intelligence seldom have single authors. Each is fashioned in separate institutions (for reasons prudent and convenient), and the players who influence output are numerous.

Within the intelligence community, the need for multiple views is often cited as the rationale for multiple institutions. However, the output of the corporate intelligence "system" is more often characterized by consensus than institutional originality. The pressure for corporate intelligence consensus is as great as the pressure for corporate policy consensus.

The policy and intelligence processes are different but not separate. Intelligence is defined through analysis, and policy is defined through implementation.[5] New policy can focus intelligence analysis, and new intelligence may influence policy changes. The relationship is dynamic, and exchanges are not necessarily sequential but invariably interactive. This interaction is not always harmonious; indeed, often it is a troubled road characterized by the need for reduction, the intrusion of bias, and the vagaries of a vast collection and processing subculture.

Too often the policy/intelligence relationship, particularly in the defense establishment, is viewed idealistically, and this romantic view undermines the very process of effective interaction. Ideally, policy and intelligence are collegial partners in pursuit of larger national security goals. In practice, intelligence is somewhat of a junior partner with, what may be, a self-imposed image problem.

Traditional suggestions for improving the quality of military intelligence support to the national security debate have focused on resource augmentation. Improved outcomes are inexorably, and often inexplicably, tied to more dollars and more sophisticated collection technology. However, what would improve intelligence most in the defense arena are three shifts in emphasis that require little or no new resources: a better understanding of the corporate personality of policymakers; a recognition of the role that bias plays in policy formulation and intelligence analysis; and a change in the image of the intelligence process, coupled to an upgrade in the stature of intelligence managers.

The Corporate Personality of Policymakers

If the intelligence ram is to lie down with the policy lion and survive, he should, at the outset, understand the nature of the beast. There are a number of attributes that are common to most successful policy players. Primary is the possession and use of power. Power is the fuel that fires the political furnace. Intelligence can only influence the decision process, while the power to drive policy lies in other hands. Bad intelligence can be embarrassing or inconvenient; bad policy can be fatal.

Power brokers do not suffer fools gladly. They are decisive, confident, sure of their ideology, and, not uncommonly, convinced that they are their own best analyst. The policy lion also has a vested interest in his policy.[6] He thrives on optimists and boosters—and often finds it difficult to quarrel with their good judgment. If he makes policy, he has been successful. More often than not, he views his success as a confirmation of his way of doing things. In short, the policy lion is a formidable beast.

the definitive policymaker

The casual political science artist paints the typical policymaker as a member of the executive branch.[7] The usual stereotypes are cabinet officers, department heads, or military commanders. Even select members of the intelligence community occasionally enter this elite group.[8] Such formulations would give the framers of the Constitution collective gout.

The stated intent of our founding fathers was not to vest such sweeping authority in a single

elected or, worse still, appointed official. The original design of the (republican) government vested the authority to *make* policy (or law) with Congress—the representatives of the people. The executive branch was chartered only to *enforce* policy. Nonetheless, over time, Congress has delegated much of its authority to the executive branch. which, in turn, has passed much of its policy charter down to appointed officials. Today, the popular myth sees the policymaker as anyone but a member of Congress.

Modern policy, and even intelligence, apparatchiks commonly remonstrate against the "meddling" or "intrusions" of Congress in the policy process. Their protests are mostly heat and smoke. The fire in the political furnace may smolder occasionally, but the policy oven is still up on Capitol Hill.

the predispositions of policymakers

The task of influencing policy is, like lion-baiting, often uncertain and always dangerous. There are a number of policy predispositions that will invariably give the intelligence analyst fits.

Fearing the unknown and uncertain. Decision makers don't like to see untidy intelligence, even if it does accurately reflect a complex and ambiguous world.

Forecasts or estimates are especially bothersome because they illuminate variables and expand uncertainties and also tend to be windy and wordy. Who has time to read in the midst of a policy brawl where time is short, the stakes are high, and the relevant intelligence is buried in a 500-page tome? If the decision maker has not seen and understood the estimate long before the crisis, the estimate will have no influence during or after the key events and decision making. Even with the best of estimates, a smug "I told you so" from the intelligence corps will do little save hasten the transition of ram to sacrificial lamb.

Policymakers understand the difference between a forecast and a prophecy, yet, given a choice, most would still prefer a prophecy. Unfortunately, intelligence, unlike religion, seldom provides elegant solutions.

Wanting viable options. Power brokers seldom care for uncertainty, but they do like options. Unfortunately, intelligence often reminds them of their limited influence on events. Intelligence that limits choices corners the beast.

Recent events in Lebanon illuminate a policy environment where choices were limited severely. In such narrow confines, policy often becomes an ally of the problem. In such cases, even the most objective assessments may serve only to remind power brokers that things can get worse.

Disliking that which undercuts established policy. The political world is awash with pet paradigms, conventional wisdom, and vested interests. All of these at times find their way into policy. Intelligence that questions policy, often in the form of protracted divergent views or new insights, is seldom welcomed. Policymakers frown on continuous disagreements and absolutely abhor surprises, especially those that challenge policy. Worst of all, disagreements and surprises provide ammunition to opponents. Bad news can be correct but seldom will yield good effects—especially for the messenger.

The infamous *Pentagon Papers* revealed that there were a number of protracted, divergent views on Vietnam policy within the intelligence community—for more than a decade. Later, during the Carter administration, the sudden discovery of a significant increase in the North Korean order of battle was a good illustration of new intelligence that undercut a plan to withdraw the U.S. Second Infantry Division from South Korea. The more recent discovery of a Russian brigade in Cuba is another example. In the Korea instance, it is still not clear whether or not Eighth Army Chief of Staff, Major General John K. Singlaub, was speaking for command intelligence when he publicly disagreed with the Korean withdrawal policy. In any case, his message was bad news,

and he was the first casualty.

Avoiding public controversy. The policy lion purrs with constancy and cringes from controversy. Controversy is another form of bad news. When intelligence analysts cannot agree on the range of a bomber, the value of civil defense, or the level of Ivan's defense spending, these issues are likely to be settled by fiat. Controversy and uncertainty often provide the mulch for the garden of asserted conclusions and worst-case scenarios.

Persuading the public. Policymakers are vested with uncommon authority. There is an element of mystery or magic about what they do. Yet they still look to intelligence for the logic of evidence that occasionally argues for public confidence.

In the early 1960s, President Kennedy disclosed sensitive intelligence to argue his Cuban policy. Unfortunately, the long-term impact of such a dramatic public gesture was not well appreciated. If intelligence could be used to argue for "good" policy, then policy opponents reasoned that it also should be used to argue against "bad" policy. Thus "leaks" for and against all manner of national security issues became the order of the day.

Public disclosure now has all the charm of Pandora's box. The Cuba-related performance, for which the intelligence community is still oddly taking bows, may have done more to encourage security breaches than the KGB.[9] The policymaker's conflict is between expedience and prudence. Usually, putting the intelligence system at risk for transient political gains is a costly practice in the long haul.

The Intrusions of Bias

Policy thrives on certainty and sureness of purpose. Intelligence seeks to extract certainty from the uncertain.[10] In the process, intelligence must oversimplify reality to some degree. Unfortunately, analysis based on too few variables is certain but can be erroneous. On the other hand, too much ambiguity in intelligence analysis opens the door for the nabobs of bias to play their role in policy formulation.[11]

Intelligence analysts and their policy clients are alike in their uniform tendency to see bias as a disease that infects someone else. Actually, bias is the common cold of all intellectual processes. None is immune.

I recall a roadside lunch in Vietnam where a lieutenant, a naive seeker of truth, inquired about the ingredients in a tasty stew—after he had consumed it. When told that the meat used in the recipe came from a small dog, the young officer became acutely ill immediately. His perceptions about the edibility of dogs were more important than the reality of a good lunch.

Biases have a tendency to overpower reality. Therefore, they need to be illuminated and controlled. A bias properly recognized can be used as an assumption. Such assumptions are more significant than methodology. Once stated, assumptions are often regarded as reality. The difference between an analyst and an advocate is not strength of logic but how each deals with assumptions and probabilities.

Bias in the policy community is likely to be personality-dependent. Bias in the intelligence community has institutional roots. Policy chefs also tend to overpower their ingredients,[12] while intelligence ingredients tend to overwhelm their cooks.

The institutional roots of bias in the intelligence community are varied and can be attributed to the following: the *focus of collection*, the sheer *volume of data*, *security paranoia*, and *analytical inertia*.

Intelligence collection systems, especially sophisticated sensors, are focused on things quantifiable—or only on that which can be heard or seen. Technical means of collection can discriminate, count, measure, and catalog, but they don't qualify very well. The empirical strength of technical collection—an unprecedented ability to quantify accurately and rapidly—overshadows the systems' limited capabilities in qualifying or in retaining context.

Technical collection tends to extract the measurable (e.g., weapon capabilities) from context and simply illuminate it in isolation. Although some might argue that analysis reimposes context, in practice, it is very difficult to reconstruct the context from which an elect piece of evidence has been drawn. (Genuine contextual analysis is an art lost by technology.) The very focus of collection has a great influence on analytical outcomes.[13]

Further, the sheer volume of raw data reported by collection systems often saturates, and frequently overwhelms, the analytical process. The wealth of unevaluated data encourages selectivity, not all of which is wholesome. It often forces analysts to ignore that which is difficult to process, and it encourages analysts to choose only evidence that supports their arguments. The volume problem also tends to obscure the distinction between reporting and analysis. A hard-pressed analyst frequently finds it expedient, and safer, to regurgitate data rather than to divine its significance. The system is further constipated as each intelligence headquarters feels compelled to publish "summaries" of the same summary reports published by other headquarters.

Similarly, security paranoia often excludes nonintelligence data and eliminates competing evidence. A premier Air Force intelligence facility, for example, prohibits analysts from bringing unclassified periodicals to their offices.[14] Security is the stated purpose of the policy. How security is improved by banning incoming literature escapes most observers. Nevertheless, the net effect sends a clear message to analysts: Don't mix open sources with classified sources. Such practices reinforce the common, often erroneous belief that classified data are inherently more credible than that which are not. Misguided security is not much of a tradeoff for isolated analysis.

And finally, even blessed classified evidence is often abused by common inertia. Intelligence, like other disciplines, tends to do most often what it does best: quantify a few formulae with a few criteria. This type of analysis is safe, unambiguous, and, in many cases, useful, if not valid. Threat analysis, based on military capabilities alone, is an example of the mischief that this bias leads to most often. Analytical inertia tends to favor oversimplification.

One of the common outcomes of bias (and of ensuring longevity in the analysis business) is the production of worst-case scenarios. Although it may have something of an undeserved reputation as the exclusive distributor for worst-case scenarios, intelligence is seldom accused of wishful thinking. Pessimism has always been a safe course for analysis. If you predict the worst and nothing happens, your clients might raise a brow or two, but privately they breathe a sigh of relief. If events confirm gloomy forecasts, no one is happy, but your credibility and theirs are still intact. However, if your predictions are optimistic and things take a turn for the worse, stand by for a witch hunt. Columnist William Safire has pointed out, pessimism is a kind of no-lose hedge for all sorts of analyses.[15]

Traditional Images of Intelligence

A significant number of the problems of the intelligence community and the policy/intelligence relationship stem from traditional images that have failed to keep pace with and reflect both the intelligence clients' desires and their needs for sound, relevant current information that may be useful.

the category problem

Traditionally, intelligence that comes to the policymaker is categorized as one of three types: term, current, or estimative.[16] (See Figure 1.) A term intelligence product contains historical and encyclopedic information. As a rule, it looks to the past. Current intelligence primarily deals with that which is new or changing. It, for the most part, focuses on the present. Es-

	domain	visibility	confidence	focus
term	historic and encyclopedic data	moderate	high	past
current	that which is new or changing	high	moderate	present
estimative	futures and forecasts	low	moderate	future

Figure 1. Traditional Categories of Intelligence

timative intelligence tackles the toughest questions: forecasts and futures.

These categories have remained unchanged since they were originally defined, but they have been bypassed by new requirements. Today's needs argue that the basic list of three should be revised or expanded to reflect a world that is both more complex and more rapidly changing than in the past. These new categories should include deception, warning, and military threat intelligence. (See Figure 2.)

deception

By any measure, deception analysis is the most obscure and most unsavory intelligence task. It alone raises uncertainty to a threshold of pain. The mere possibility of deception assaults the policymaker and intelligence manager with equal vigor. Intelligence doesn't want to be reminded that it can be led to bad judgment, and policy doesn't want to hear that it can be fooled—especially in retrospect. Unless it stands alone, deception analysis tends to be suppressed.

Figure 2. New Intelligence Categories

	domain	visibility	confidence	focus
deception	denial, deception, and null sets	low	low	present and past
warning	attack indicators	high	high	immediate
military threat	force posture through intentions	moderate	moderate	present and future

The policy lion and the intelligence ram both have a subjective tendency to dismiss evidence that doesn't fit their pet paradigms as "disinformation." Neither have expressed much interest in establishing a separate analytical discipline or criteria that might umpire the balls and strikes.

warning

In the past decade, the complexity of weapon systems has expanded, while warning times have been compressed. Simultaneously, the spectrum of potential conflict has grown in ways that allow little time for the more deliberative, or traditional, intelligence methods to operate effectively. These changes have spawned the need for the new collection analytical specialization of indications and warning intelligence. Traditionalists might argue that indications and warning intelligence is merely another facet of current intelligence. However, current intelligence often only addresses information needs, whereas tactical and strategic warning are matters of survival. The importance of timely warning coupled with specialized analytical and reporting needs suggests that this category of intelligence is unique.

threat

Military threat intelligence is another modern category that could also stand alone for reasons of significance. It is difficult to overstate the complexity and ambiguity of threat intelligence. (See Figure 3.) The components of threat analysis not only are varied but require very different methodologies. The concerns of military threat are characterized by a rank order of understanding and analytical difficulty, compounded by an inversion of significance.

Traditionally, military threat has been treated as a subset of estimative intelligence. The military dimension of threat now contains such unique lethality, however, that it is a curiosity *not* to see it in a class by itself. Further, the art of threat analysis has long been a victim of oversimplification. Collection and analysis for the

Figure 3. Components of Military Threat

object domain	first questions	concerns	level of certainty	methods of inquiry
force posture*	What/where?	strength	high	empiric and analytic
vulnerabilities	What not?	weakness	moderate	
doctrines	How?	employment	moderate	rational and hermeneutic
risks	What cost?	disadvantages	low	
benefits	What gain?	advantages	low	
circumstances	Which?	conditions	low	
motivations	Why?	purposes	low	
intentions	When?	execution	nil	

* Includes structure, readiness, sustainability, and modernization

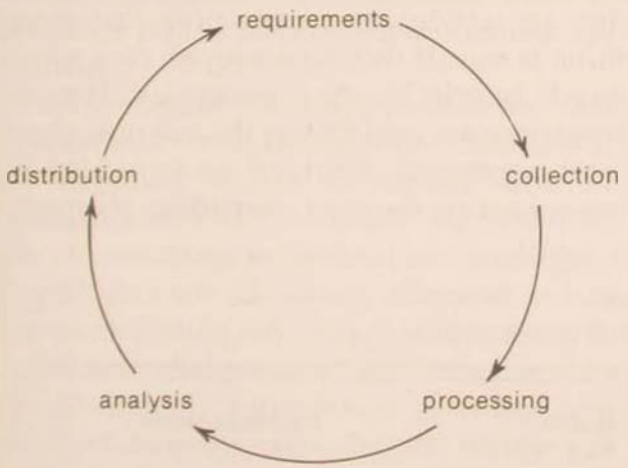
more uncertain components of military threat could surely benefit from special illumination.

the process problem

The "category" inadequacies are further aggravated by the rather bizarre image of the intelligence process. The traditional symbol for this process is a circle,[17] or cycle, which begins with *requirements* that generate *collection* that provides grist for *processing* and *analysis*, which produce outputs that are then *disseminated* to clients who finally close the loop by generating more requirements.

This cycle metaphor, depicted in Figure 4, is among other things an oversimplification. Surely there are different weights of effort and investment of treasure in the various slices of the pie. But the sense of the metaphor is accurate. Intelligence is portrayed as a closed system which, some critics uncharitably suggest, feeds on itself.

Figure 4. Intelligence Processing Cycle



A circular matrix that appeals to intelligence engineers may not be a view that charms senior managers and policy analysts. The policy lion does not jump through hoops gladly, nor does he like to think about occasions where he might chase his tail. An intelligence system with a circular image may be an unfortunate choice to serve a policy system with a sense of purpose. Policymakers thrive on linear images that lead them toward goals—preferably their policy. They are not fond of circular logic that appears self-serving and directionless.

The circular image of intelligence also perpetuates some unfortunate mythology about the role of requirements. It suggests that the policymaker, after viewing the intelligence product, closes the intelligence loop with some definitive statement of satisfaction—or identifies new requirements. This loop-closing simply does not occur in most cases. For the most part, intelligence managers alone play the requirements "game." In practice, they are often unaware of needs of policy, yet the requirements flow continuously. More frequently than they would care to admit, intelligence personnel are kept in the dark by hidden agendas, security considerations, or the more understandable discontinuities of changing administrations.

There are times when intelligence is simply not informed of a policy action until after the fact. Worse still, as Hans Heymann reminds us, the stated objectives of policy, when known, are often not the real objectives.[18] Further, the security walls around policy are often more impenetrable than those of the intelligence community. Policy cliques are purposely kept small and exclusive. Even edicts of record are highly classified and/or sparsely circulated. The problem is regularly aggravated between administrations, when classified and unclassified policy papers are uprooted, dispersed, or buried in presidential libraries.[19]

As a system, intelligence usually has more continuity than policy, Yet, that intelligence anticipates the needs of policy at all is probably due more to intelligence archives and good guesswork than formal feedback. Still, the intelligence ram traditionally plays the goat in disputes over requirements. In 1973, for example, one of the stated reasons for disbanding the Board of National Estimates was that it was unresponsive to policy requirements.

Needed: A New Image of Intelligence

The circular image of intelligence is no doubt an insider's perspective, the result of a fascination with mechanics and the sophisticated gadgetry of collection and processing. Unfortunately, this image fails to distinguish between the necessary components for production and the desirable components of outcomes. A focused image of the system more compatible with client concerns and current needs might be an open-ended linear matrix, of inputs and outputs, which conveys a sense of direction. Such a new image could reflect the needs of clients *and* the substance of useful intelligence: relevant *expertise*, sound *analysis* (coupled with *integrity*), and effective *communication*. (See Figure 5.)

expertise

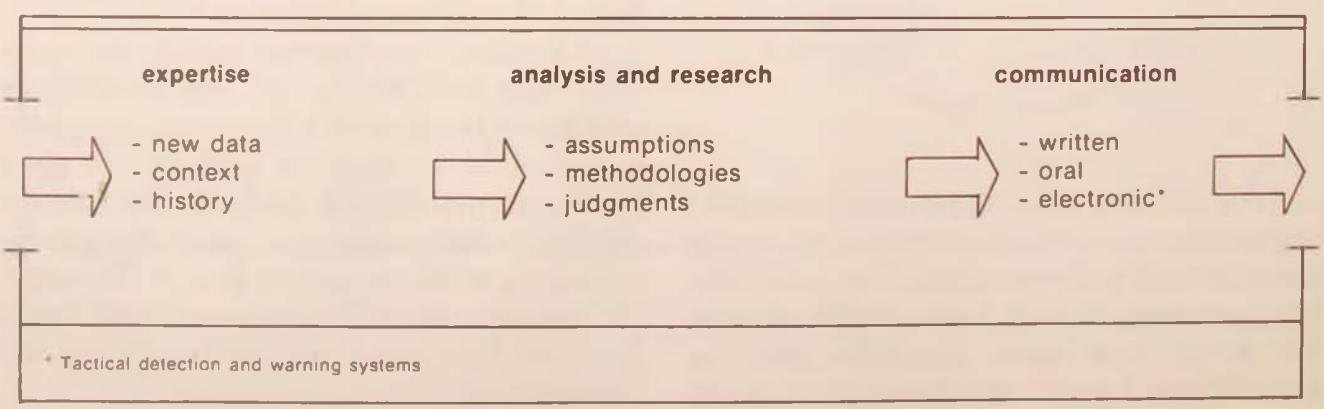
On the input end of the intelligence process, the only truly relevant substance (for analysts and clients) is new information, the context in which it is set, and any background that history might provide. Intelligence purists might argue that the powerful roles of collection and data bases are slighted in such a reduction.[20] Not really. The esoterics of collection are to the analyst and policymaker what logistics are to the battlefield commander. Neither worry much about the minutiae of acquisition as long as the material is sound, enough is available, and it gets where it needs to be on time. The question here is not one of significance but emphasis. Collection and data bases support the adequacy of expertise. Expertise is the first major threshold that intelligence must cross for the client. How one gets there is more a question of mechanics than substance.

analysis

Assumptions and methodologies are the substance of analysis. Both must be explicit and defensible. Analysis is, in turn, the head and the heart of the intelligence process. The head addresses the rational needs of inductive or deductive logic, and the heart speaks for intuition and integrity. Many rationalist methodologies ignore the nonrational and moral elements of analysis, but they do so at the risk of excluding precipitous insights and inviting suggestions of duplicity.

Intuition and integrity play their strongest role in any statement of assumptions. Clearly, assumptions fall into the intuitive realm, as they are notions, or suppositions that something is true. If they were proved, they would merely be grist for the rational mill. How assumptions are used defines the real integrity of most arguments. Unstated or imbedded assumptions are the most worrisome. No induc-

Figure 5. The Intelligence System: A Client's View



tive or deductive logic can overcome the mischief of unwarranted intelligence assumptions.

What an analyst or policymaker does not know will never cause as much trouble as that which he thinks he knows but which isn't so. This dilemma is standard issue when bias weds unwarranted assumption.

On the rational side of analysis, there is a striking similarity in the relationships between intelligence and induction and between policy and deduction. Intelligence is concerned with inducing evidence, or reasoning from parts to a whole. Policy is concerned with generalities, or reasoning from a whole to its parts. If the assumptions are used with integrity, intelligence fairly looks for policy to serve, while policy fairly looks to intelligence for evidence.

integrity

The tough part of intelligence analysis is trying to do the task with integrity on policy that the policymakers regard as clearly their turf. Most intelligence functions come under the explicit control of powerful policy lions. The situation is acute in the military. Here the intelligence ram is outgunned, outflanked, and outranked.

Service headquarters are illustrative. Most support staff elements under the Chief of Staff are "deputies," but the intelligence element is invariably only an "assistant." Rank disparities also reinforce subordination. Intelligence flag officers are commonly allocated at least one star less than other support counterparts.

At lower echelons, intelligence functions are understandably subordinate to troop commanders. In many cases, they are further subordinated to other staff elements, such as operations. Here the stature and rank disparity is likely to be even greater. Intelligence is often a junior officer, while other staff sections are led by field-grade ranks. Intelligence managers often compound the problem by manning their higher headquarters at full strength with the best analysts and letting operational units fend for themselves. Traditionally, combat units have the greatest number of junior and inexperienced intelligence officers.

Policymakers frequently admonish intelligence to be independent.[21] However, they do little to underwrite integrity in bureaucratic hierarchy, eminence of position, grade structures, or manning equity. In a hypothetical conflict between policy advocacy and intelligence objectivity, the military intelligence officer not only is outgunned, outflanked, and outranked but also faces a spectrum of choice that runs from bad to awful. When evidence and argument fail, he has four choices: resignation, public confrontation, capitulation, or bureaucratic subversion. Resignation and public confrontation are similar for their probable outcome, career suicide. Neither is very likely or realistic, as each represents a choice between integrity and livelihood. In a real impasse, capitulation and bureaucratic subversion become more attractive and less wholesome. The purity of analysis, under fire, may rely more on policy temperance than intelligence integrity.

Testimony during the Westmoreland versus CBS trial provided some insights on this problem. In late 1967, General William C. Westmoreland's Chief of Intelligence in Saigon tried to surface evidence that would have increased enemy strength figures above those generally accepted in Washington. Westmoreland apparently rejected the new figures at the time as "politically unacceptable." Order-of-battle bookkeepers, in turn, were told to trim their figures. Commanders, like Westmoreland, often see assessments from intelligence in the same vein as reports from other staff elements—i.e., simply papers to be accepted, rejected, or revised. Unfortunately, intelligence judgments that are changed at the whim of commanders are often accomplished at the expense of truth. For General Westmoreland, the truth became apparent on 30 January 1968 when the Communists launched an unprecedented countrywide offensive that was to change the course of the Vietnam War.[22]

The lion also intimidates the ram in less subtle ways with an occasional direct assault on analytical institutions or analytical criteria themselves. As cited earlier, in 1973, the Board of National Estimates and its staff was disbanded by William Colby, presumably on orders from the Nixon/Kissinger White House.

communication

If analysis is the head and heart of the intelligence process, then communication is the voice and also the cutting edge of intelligence. Here policy is served well or not at all. The best intelligence, poorly communicated, is worthless. Communication, in the best sense, is a verb (action), not a noun (medium). The methods of intelligence communication are *writing* or *speaking*. The purpose of communication is impact—always a noun. Writing and speaking are the actions of intelligence communication; impact is the desired accomplishment.

The written word. As the intelligence officer seeks to influence the policymaker with the written word, there are probably only three axioms worth remembering. First, all that will *ever* be known about any report's routing is what office received it, not who read it. Second, the readership of any report is probably inversely proportionate to its length. Finally, if the report is written the way most government reports are, it hasn't got a prayer of having impact. Easy reading demands painstaking care in writing (wordsmithing for precision, conciseness, and clarity), but few intelligence authors take the trouble.

A National Security Council staffer once observed that there were only two, possibly three, types of reports that are read on a regular basis in Washington: point papers, the editorial pages of select dailies, and cartoons. It would be difficult to confirm the observations on the first two categories of reports, but the third is a cinch. The walls of the offices of most bureaucracies are papered with cartoons. Staffers not only read cartoons but cut them out and hang them in a place of honor to be savored indefinitely. No one has ever been observed nailing a 500-page national estimate to the wall of any office.

It is no accident that intelligence reports are "distributed" and "disseminated," while intelligence briefings are "presented." The difference is all the difference.

Policy lions are always on the move and have little time for sedentary pursuits, least of all lengthy reading. Nevertheless, their offices are awash in paper. The sheer volume of reporting represents a problem for analyst and decision maker alike.[23] As the volume of available paper goes up, so does the likelihood that briefings will play a larger part in the decision process.

The spoken word. The pile of written analyses and options gets reduced prudently or arbitrarily. This reduction most often comes in the form of a briefing, which is red meat to the real policy lion. Here he and the intelligence ram will be face to face in the same cage. In this arena they will be at their symbiotic best or fratricidal worst. It is possible to move the policy broker with a phone call, a shout in the hall, or even with a quiet chat over lunch. But when all those are done, he will probably still need or request a briefing. In the briefing room, rams are separated from lambs and, as Barnum observed, some of the lambs are lost.

For intelligence, briefings may be ubiquitous, but they are also inevitable. Briefings, like no other form of communication, have captive audiences. Here the interaction of policy and intelligence is assured, for good or ill; and intelligence never gets off this treadmill. Even when there is nothing to say, the briefings go on. If no other reason for them exists, they will demonstrate and justify continued funding of collection technology.

The Intelligence Phalanx

The personalities that inhabit the intelligence world often mirror the system itself. The

principals, especially those on the cutting edge, usually fall into one of four categories: managers, experts, analysts, or communicators. In the policy corridors of the Pentagon, it is common to see such a group advancing as a unit toward the den of some policy lion.

The intelligence phalanx is an impressive sight. The wedge is usually led by some bemedalled panjandrum who confidently strides in the point position.[24] The manager is usually flanked by a somewhat junior (but always impeccably groomed) briefer. The communicator, irreverently known to peers as "talking dog," invariably carries a chrome divining rod strikingly like an antenna off a 1959 Buick. It is, in fact, a collapsible pointer—the omnipresent baton that binds formal arguments.

This trio is followed by one or two nervous experts. Experts are those intelligence specialists who command a high degree of knowledge in some specific discipline. Through long years of experience or study, they either know much about a specific topic that has little breadth, or, equally important, know what data base to tap. These data specialists are often mistaken for analysts and seldom volunteer to correct the confusion. Experts are known in the trade as "backup." They are trained to respond to nothing save direct questions.

Analysts seldom travel with the phalanx. It is too dangerous, and they are too valuable to put at risk. Analysts usually know both sides of the impending argument. Worse still, the best among them are inclined to volunteer relevant but ambiguous judgments at just the wrong moment.

The rear of march is usually brought up by a couple of acolyte briefers who are affectionately known as "flippers." They are burdened with heavy satchels, not unlike ammunition boxes of old. The function of flippers is to force-feed their precious cargo of visual aids into projectors on command from the briefer.

As the lights dim in some cool and windowless Pentagon inner sanctum, an eerie chill of collective déjà vu sometimes sifts through the silence. The colors that dance across one wall in the dark are reminiscent of what? Plato's cave shadows? Ancient rock drawings etched by flickering candlelight? The sketches and pictures are the final reduction of the best and most complex technology known to man. The output, the cutting edge, the billion-dollar petroglyph of unprecedented collection and analytical empires, is an eight-by-ten-inch acetate cartoon! Upon such, the fate of nations rests.

Such observations do not trivialize or demean the wealth of energy and treasure invested in the intelligence system. They merely recognize the primitive reality in that final and crucial step in the process: after thousands of years of socialization and technological achievements, mankind's modus operandi remains unchanged. Power and persuasion still retreat to darkened caves to put the handwriting on the wall.

Perhaps thousands of years hence, archaeologists will sift through the debris of our civilization. Certainly they will recognize the bones of the policy lion and the intelligence ram, and they are likely to view the computer as the definitive artifact of our generation. But when they come upon some faded vu-graph in the pile, will they recognize it as the billion-dollar petroglyph?

OVER time, policy and policymakers will change. However, the characteristics of a successful policymaker will probably remain fairly constant. Intelligence officers cannot afford to be unable to distinguish between the flux of policy and those bedrock predispositions that always characterize the corporate policy environment. Solid evidence and strong argument alone will not win the day. Effective intelligence must also understand and overcome those fixed obstacles to persuasion that exist independent of specific policy and intelligence support.

Intelligence must also recognize and explicitly deal with a thicket of biases, many of them

generated by the structure of the intelligence system itself. Today the system is front-loaded with a complex and prolific collection technology that warps focus and frequently overwhelms the very clients it is designed to serve. This volume and complexity problem is compounded by a dangerous tendency to view unclassified data and analyses as inherently inferior and, hence, to ignore them.

The great irony of the national security decision process is that intelligence will always have the potential to make *itself* irrelevant. Nonetheless, with or without sound intelligence, the policymaking process is likely to march on. Thus, the initiative for improving the impact of analysis lies with intelligence. Unfortunately, in recent years intelligence managers have emphasized inputs, the gadgetry of collection, and technical processing at the expense of outputs.

As a consequence, the output of intelligence may not be as effective as it could or should be. The categories of intelligence products are outdated—a factor that may also skew the focus of collection and analysis. In the warning arena alone, the continued categorization, functionally and institutionally, of indications and warning intelligence as a subset of current intelligence misplaces the emphasis. Placing "warning" under "current" is like classifying nuclear war as another form of friction.

The image of the intelligence process is sorely in need of repair also. The self-serving cyclical metaphor needs to be replaced with a more dynamic image that conveys a sense of direction. Beyond image, the communication phase of the intelligence process needs to be streamlined and revitalized. Written products are both too numerous and too voluminous, creating logjams within the intelligence system and encouraging indifference without.[25] Simplistic briefings may be inevitable, but the billion-dollar petroglyph need not be the only currency between the lion and the ram.

Finally, the stature of intelligence functions and managers needs to be elevated. For intelligence, the war is now! If warning and threat analysis is effective, the actual shooting may never start. If the voice of the intelligence warrior is to be heard, the speakers must enjoy some stature beyond that of supply officer.

Washington, D.C.

Notes

1. Yehoshafat Harkabi, "The Intelligence-Policymaker Tangle," *Jerusalem Quarterly*, Winter 1984.
2. Thomas L. Hughes, "The Fate of Facts in a World of Men," Foreign Policy Association, Headline Series No. 233, December 1976.
3. Richard K. Betts, "Analysis War and Decision: Why Intelligence Failures Are Inevitable," *World Politics*, October 1978.
4. Apologies to Barnum. His original homily spoke of lambs.
5. Hans Heymann, Jr., "The Intelligence-Policy Relationships: From Arms Length to Love Hate," an address at the U.S. Air Force Academy, Colorado Springs, Colorado, 6-7 June 1984. Many of the observations in this article on the nature of the policymaker were extrapolated from this address and a series of lectures presented by Heymann at the Defense Intelligence College during the summer of 1984.
6. The masculine pronoun is used here and elsewhere in recognition, however unfortunate, that most government policymakers are men. Were they not, their characteristics might, hopefully, be different.
7. Lincoln P. Bloomfield, *The Foreign Policy Process* (Englewood Cliffs, New Jersey: Prentice-Hall, 1982), p. XIV.
8. The director of CIA, while not a member of the cabinet per se, has been elevated to cabinet rank recently.
9. Committee for State Security (KGB) of the Soviet Union.
10. Betts, op. cit.
11. Ibid.
12. Former national security advisors Henry Kissinger and Zbigniew Brezezinski are two of the most prominent in recent memory.
13. Collection, in a sense, randomly manufactures puzzle pieces that analysis is charged to assemble. Unfortunately, there are always more pieces than pictures. Intelligence analysis labors inductively, reasoning from many parts to too few elusive wholes.
14. Newspapers are generally forbidden at the Foreign Technology Division of the Air Force Systems Command. Other unclassified periodicals need to be specifically deemed (by supervisors) as "work-related."
15. William Safire, "On Wishful Thinking," *New York Times*, 30 August 1984.
16. Sherman Kent, scion of the old Board of National Estimates, defined original categories of "modern" intelligence.
17. Amos A. Jordan and William J. Taylor, Jr., *American National Security Policy and Process* (Baltimore, Maryland: Johns Hopkins University Press, 1981), p. 131.
18. Heymann, op. cit.
19. National Security Council staffers must frequently trek to the presidential libraries to search for documentation that provides the

threads of policy continuity.

20. Today, it would be very difficult to slight the role of collection. The collection cart has been pulling the analytical horse for at least two decades. Clearly, there is more reputation and treasure to be made in buying and selling collection gadgets than there is in improving the outputs of analysis.

21. Senator Daniel Patrick Moynihan, "Only the Brave Risk Intelligence," Commencement Address at the Defense Intelligence College, Washington, D.C., 15 June 1984.

22. Connie Bruck, "The General v. CBS: Rush to Settlement," *Washington Post*, 7 April 1985, p. F1.

23. In the defense intelligence system, there is some control over production through the Delegated Production Program but no similar program controls reporting.

24. Moynihan, op. cit.

25. Roberta Wohlstetter of the Rand Corporation identified the intelligence need to separate the "relevant" from the "noise" more than two decades ago in her analysis of the Pearl Harbor surprise attack. Thus far, intelligence has managed only to increase the volume of its own noise.

It would be absurd to claim that technological development by itself could rid the world of nuclear weapons. The two primary agents for abolishing nuclear weapons must be international negotiation and the aroused conscience of mankind. But the success of negotiation and moral indignation in bringing about nuclear disarmament will also depend upon technical factors. We will have a far better chance of achieving nuclear disarmament if the weapons to be discarded are generally perceived to be not only immoral and dangerous but also obsolescent. An intelligently conducted arms race, leaving nuclear technology further and further behind, could help mightily to sweep nuclear weapons into the dustbin of history.

Freeman Dyson
Weapons and Hope, p. 41

EXPERIMENTAL AIRCRAFT

WALTER J. BOYNE

OVER the years, the style and character of experimental aircraft, and particularly their use, have changed fundamentally, to the great advantage of science and to the loss of romance. To understand the status of experimental aircraft today and anticipate possible outcomes in future efforts, it might be worthwhile to retrace the development of a few experimental aircraft of the past.

In the beginning, all aircraft were experimental in one sense or the other; however, of the beginners, only the Wright brothers' aircraft were experimental in a scientific sense. In terms of aeronautics, the Wrights were in advance of all others by a minimum of six years; in procedural experimental terms, they were in advance of all others by a decade.

The Wrights, without a formal education, but self-educated with wonderful discrimination, plunged into an arduous, often disheartening three years of planning and testing that led from their experiments with kites to the flawless execution of four flights on 17 December 1903. Not surprisingly, these successful first flights were not widely known and, where known, were often discounted. The Wrights continued with their experimentation for the next two years, "perfecting" their design by 1905 and then retiring from flying for two years to sell their invention while protecting their patents.

In Europe, there was nothing to correspond to the Wrights' insightful and rapid development program. The news that man had flown was not believed, and the pioneers—from Santos Dumont through Voisin and Ferber—sought flight through intuition rather than

genuine scientific experimentation. They would not have agreed to a statement like this at the time, and many would not agree with it today. But the facts are clear: no systematic, step-by-step approach, allied to a fateful insight, was achieved on the continent. Not until the demonstrations at Reims and elsewhere in Europe established the fundamental Wright baseline did the method of development by intuition achieve success. The European effort, spurred by military expenditures, soon eclipsed all American efforts, but it did so on the foundation of the original Wright experimentation and success.

Since the Wrights, more than a million aircraft have been produced in countries all over the world. Thousands of individual types have come and gone, many not remembered or even recorded by drawing or photograph. In this process, the U.S. Air Force and its predecessor organizations have contributed a host of remarkable experimental aircraft, which reflect not

The Verville-Sperry R-3 (right) was a victim of politically motivated procurement policies. If properly developed, it would have provided the Air Service in 1926 with a monoplane fighter seven years before the Russians introduced their famous I-16. . . . The Boeing XP-9 (below), although advanced in design, possessed dangerous handling characteristics.

only the technology of the times but the spirit and rigor with which experiments were conducted.

The United States, after having invented the airplane, promptly forgot about it, although the U.S. Armed Forces had observers at the front long before America's involvement in World War I, and the airplane had become headline news in the newspapers of the world. The warring nations had initiated conflict with a few aircraft relegated to ancillary duties, all of which were basically derivatives of the ad hoc intuitive development of aircraft for prewar sportsman pilots. The tempering experience of war created an enormous industry (England produced more than 55,000 airplanes in the First World War, Germany, more than 40,000) together with a series of disciplines that remain with us to this day. It is not generally recognized, but within the first nine months of combat in World War I, almost every aspect of modern aerial warfare had been demonstrated, including strategic bombardment (the Avro 504 raids on the Zeppelin sheds), psychological warfare (the Taube's bombardment of Paris), strategic reconnaissance (the monitoring of General Alexander von Kluck's curving arc above Paris), ground attack, aerial photography, and even air-to-air combat. By March 1915, things had progressed to the state that an entire battle, Neuve-Chapelle, had been fought on the basis of maps prepared from aerial photography and in conjunction with raids to interdict rail lines.

Every air service established an experimental station: the British at Farnborough, the French at Meudon, the Germans at Johannisthal, and the United States at McCook Field (Dayton, Ohio).

The Americans were at an initial disadvantage, beginning the war with some fifty-five obsolete training planes and making the logical but costly decision to commence production of established Allied types, including the English de Havilland DH-4, the Handley Page 0/400 bomber, and the Italian Caproni.

In a manner that became characteristic of U.S. air endeavors, McCook Field became a focal point, a collecting agency, for some of the brightest young flyers in the business, as well as the most talented engineers. They took from their foreign colleagues and applied to it a work discipline that resulted in the creation of engineering logistic and test entities which led directly to today's Air Force Systems Command and Air Force Logistics Command.

The "grandpappy" of the B-17, the YB-9, represented a new trend in monoplane bomber design that influenced later developments.

The experimental process took time to mature, however, and much was vested in the pilot's almost intuitive analysis. It is interesting to read McCook Field test reports today: some are as much as eight pages long, filled with succinct comments such as "good ship," "controls need work," or "please condemn." There were extensive tests underlying the pilot's analysis, many of which would be familiar today, but in the main, a pilot could make or break the development of an aircraft with his comments.

Among the literally thousands of aircraft that have followed the experimental path, I shall discuss a number of those that might not be the most famous of their kind but which illustrate aspects of the experimental process that might not otherwise be considered.

the Verville Sperry R-3

The Verville Sperry R-3 is an almost perfect example of the opportunity cost of an inadequate development program. Designed by Alfred Verville, a kindly genius who had a penchant for just missing the brass ring of commercial success, the R-3 was years ahead of its time when it first appeared in 1922 as a certain winner for the Pulitzer Trophy Race.

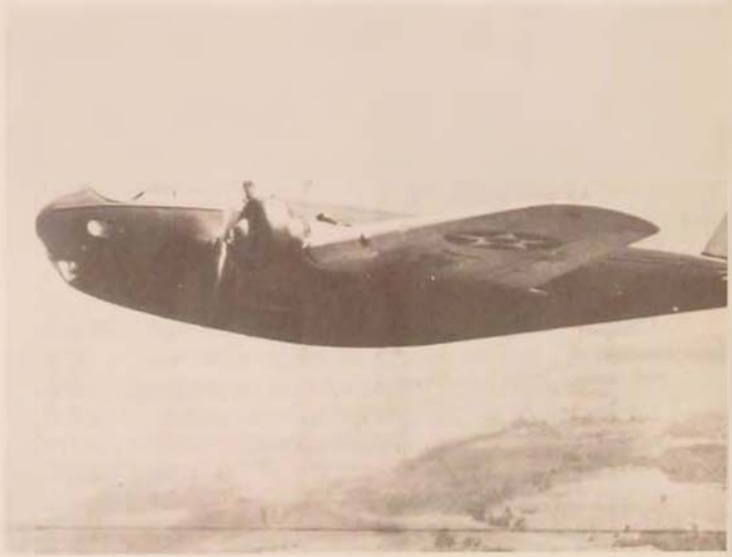
Here was a racer, contemporary with the Thomas-Morse biplane pursuit, which featured a cantilever wing, streamlined fuselage, and fully retractable landing gear, clearly presaging the mid-1930s formula of the Messerschmitt, Hurricane, and Spitfire. However, it also evoked some political problems that might be analogous to the current F-16/F-20 controversy. The Verville was developed by the McCook Field Engineering Division and manufactured by the Lawrence Sperry Aircraft Company of Farmingdale, New York. Three aircraft were purchased, and on them, the aircraft builders intended to use the silky-smooth 450-horsepower Curtiss D-12 engine and the all-metal Curtiss Reed propeller. Fundamental to the design was the use of the patented Curtiss wing radiators, thin brass sheets that conformed to the airfoil.

It happened that the foremost aircraft manufacturer of the time was the Curtiss Aeroplane and Motor Company, which was also building the sleek series of racing biplanes. As a political result, the R-3 was fitted with the 300-horsepower Wright H-3 engine, notorious for its vibration. A stock wooden propeller and "lobster pot" Lamblin radiators were installed. With

these totally undesirable modifications, the airplanes were no longer competitive, and first and second places were won by the sleek Curtiss biplanes using the preferred engine/propeller/radiator combination.

All three R-3s started the race, but only two finished. Lieutenant Eugene Barksdale finished fifth at a little better than 181 mph. Lieutenant Fonda B. Johnson finished seventh, his engine freezing solid immediately after landing. The legendary Lieutenant Saint Clair Street broke an oil line and had a forced landing, damaging the airplane.

Development of the aircraft ceased for all practical purposes, despite the large investment. There were several problems with it—incipient flutter, the drag induced by the open wells of the retracted wheels, a general lack of harmony in the controls—that would have been eliminated by a series of tweaking test flights or in the wind tunnel. For political and eco-



The Fokker XB-8 (above) looked sleek but was "yesterday's technology" with its steel-tube fuselage and wooden wings, despite its retractable landing gear . . . When Glenn L. Curtiss accepted the Collier Trophy for design excellence in the B-10/B-12 series (right, top and bottom), he said, "I owe it all to mother." Actually, he "owed it" to the Army, which forced him to make essential design changes and modifications.

The XA-14 (top), though fast and well armed, was too expensive for Depression-era defense budgets. . . . The Stearman XA-21 (immediately above) represented a quantum leap for its company, which specialized in biplanes, but offered little in the way of optimum performance. . . . After Hitler's armies began marching, defense dollars started flowing and advanced designs like the XP-50 (center) proliferated. This plane, though hot, was not developed due to technical problems. However, it did provide valuable data for the development of the XF7-F Tigercat late in the war.

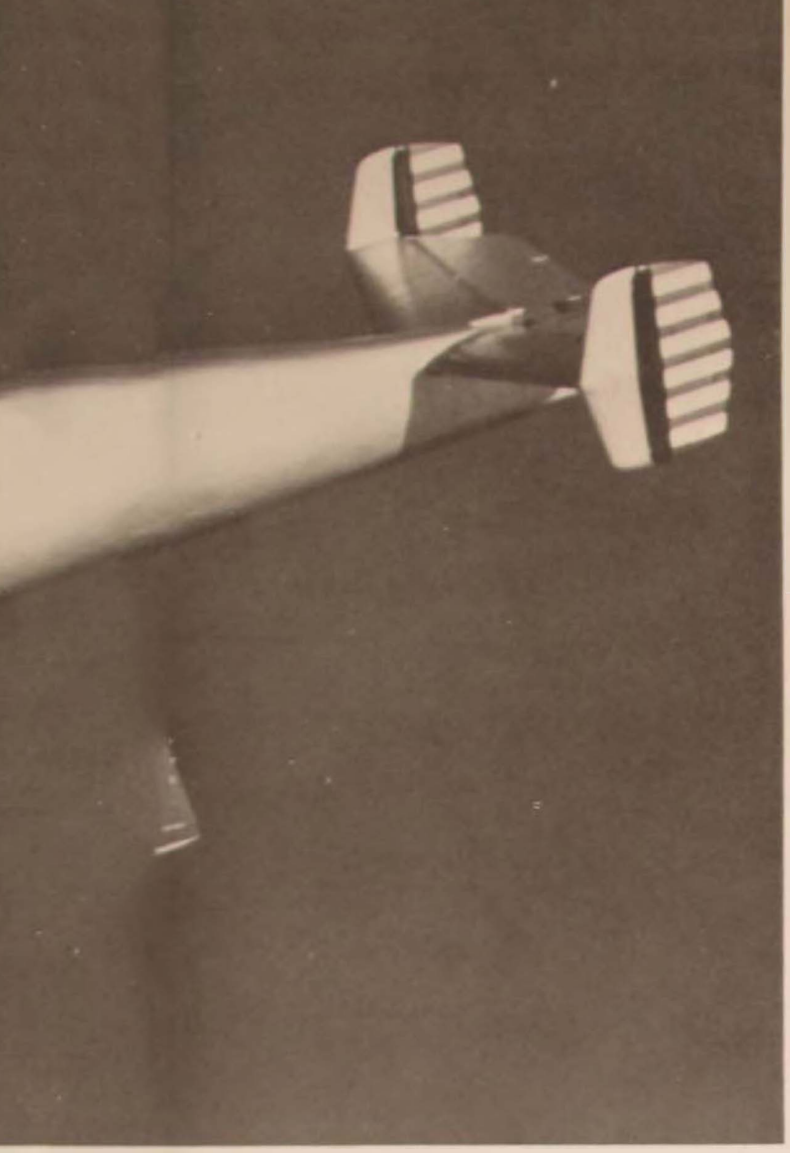
nomic reasons, these remedial procedures were denied.

A Curtiss D-12 engine was installed in the plane for the 1923 Pulitzer, and while vibration was no longer a problem, there were still handling difficulties, especially at top speed, now reaching 233 mph. The airplane had to withdraw from the race. Once again, a Curtiss biplane was the winner.

Again, no substantial development work was invested in the design, and it was with some misgivings resurrected for the 1924 Pulitzer, when the preferred entry—a Curtiss biplane—crashed. Ironically, the R-3, piloted by Lieutenant Harry H. Mills, won the race at a slow speed of 215 mph. The racer was almost immediately relegated to the McCook Field Museum, where it was ultimately burned. The R-3 remained merely another exciting, unfulfilled concept.

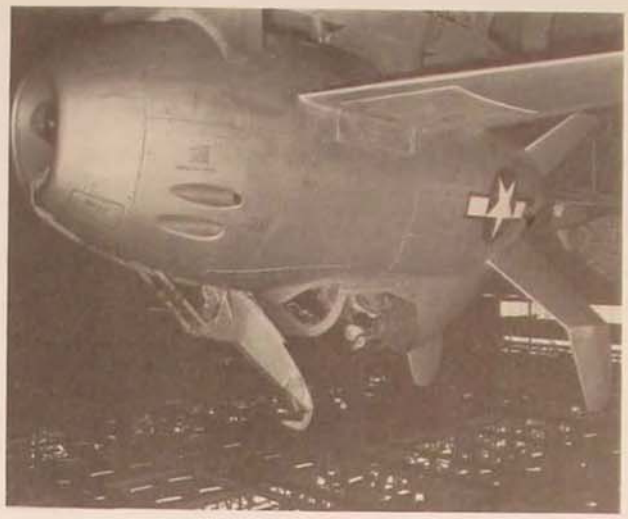
Huff Daland LB-1

Sometimes the experimenters almost got things right, only to be frustrated by an outside event. In the case of the Huff Daland LB-1, the intended replacement for the series of Martin Bomber-inspired MB-2, which formed the bulk of the bomber fleet, engine reliability was of such a low order in the early 1920s—and for a considerable period there-



The XA-38 Grizzly (top) sported four 50-caliber machine guns and a 75-mm cannon, but its potential as a ground-attack fighter was never realized. Because the B-29 program needed the R-3350 engines that would have powered it, the Grizzly never went into production. Classic in its looks, the XF-12 (immediately above) was not procured for the strategic reconnaissance role because the B-29 and the B-50 were already on hand.

A clunker, the Brewster XA-32 (left) performed as badly as it looked.



after—that a twin-engine aircraft was far more susceptible to crashing from engine failure than a single-engine type. The reason, of course, was that no twin-engine aircraft of the period could maintain flight on a single engine, so by running two engines you doubled the probability of an in-flight emergency.

Huff Daland built a giant—well, sixty-six foot wingspan—single-engine bomber to avoid the redundant emergency problem, using the Packard 2A-2540 engine of 750 horsepower. The Packard, like all of the Packard aviation engines of the time, was a monument to unreliability; and it did not take long to determine that one Packard would fail more often than two Liberties. In this instance, however, Huff Daland retrieved the situation by falling back on the twin Liberty engine formula for the LB-5, which led, in turn, to the whole series of Keystone bombers that served as the background of the fleet until the early 1930s. Here, failure led to success on an unpremeditated scale.

Boeing XP-9

The Air Corps was increasingly interested in monoplanes in the late 1920s, and the first Boeing effort in this regard was their Model 96, the XP-9. This aircraft actually proved to be more important for structural than configuration reasons, for it was also the first metal semi-monocoque fuselage by Boeing, and it was to have great influence on a number of later designs.

The XP-9 was powered by the standard liquid-cooled Curtiss SV 1570 engine of 600 horsepower, and some sources indicate that it had a top speed of 213 mph. Its biplane counterparts, the Boeing P-12D and Curtiss P-6E, had top speeds of 188 and 193 mph, respectively.

The XP-9's handling characteristics and landing speeds left much to be desired, however, and no production order ensued. Yet the airplane's influence was far greater than commonly realized, for it inspired the Boeing Monomail, a single-engine, all-metal, retractable-gear mail plane, and the YB-9 Death Angel. The Death Angel, in turn, pioneered the construction that resulted in the precedent-shattering Boeing 247D transport and led directly to the Model 299 Flying Fortress. Despite the test pilot's report, which called the aircraft "a menace" because of its poor visibility and bad flying qualities, the XP-9 had an influence well beyond the manufacturer's expectations.

The tiny XP-85 Goblin (inset, adjacent page) was designed to fit into the bomb bay of a B-36. After release from a trapeze device extended from the larger plane (adjacent page), it was supposed to shoot down enemy interceptors and then be recovered and placed back in the bomb bay for refueling and rearmament. Launching and recovery from the dirigible-style trapeze system proved to be exceedingly difficult, and the program was scrapped.

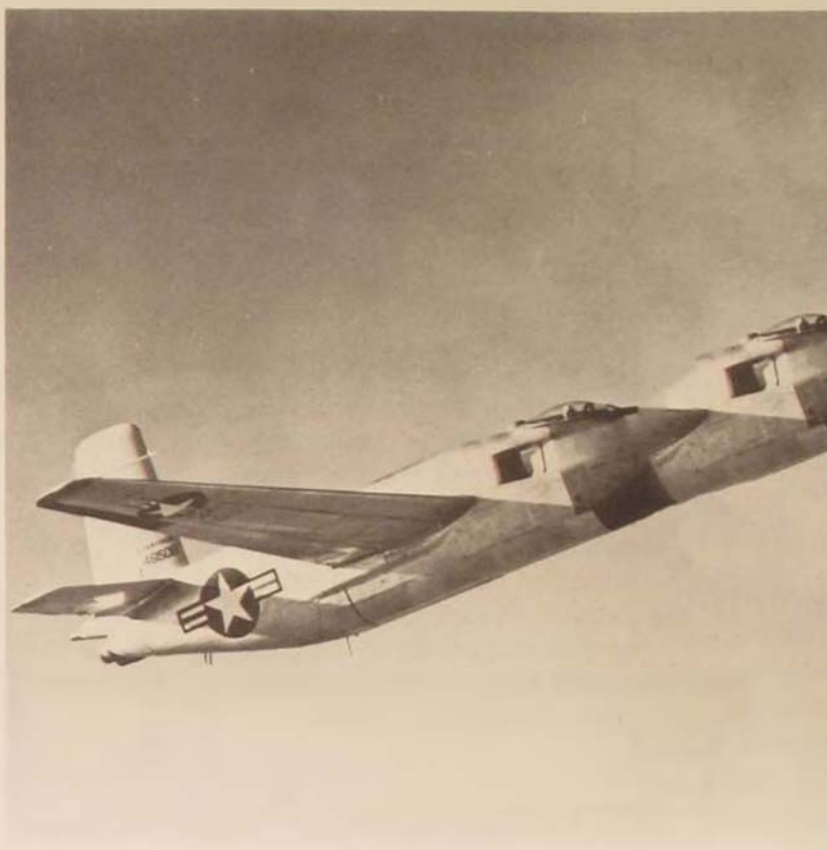
Fokker YO-27/XB-8

Often manufacturers have experimented in a most economical way, stretching existing technology to cover new configurations. The result has rarely been satisfactory. The American Fokker company had inherited the design philosophy and manufacturing techniques of the parent Dutch Fokker company; and these, in turn, extended back to the wartime work of A. H. G. Fokker and Reinhold Platz. Fokkers were built with steel-tube fuselages and wooden wings, and they would be so until after Fokker's death at the age of forty-nine in 1939. The Air Corps issued a call for a monoplane light bomber and/or observation plane, and the Fokker firm responded to the new configuration with their familiar construction techniques, adding only a retractable landing gear as a token to modernization. The XB-8 was, in fact, the first retractable-gear bomber to reach Wright Field.

The airplane was in direct competition with two versions of a basic Douglas design, the XO-35 and the XB-7. On balance, the Fokker was a cleaner aircraft but otherwise very similar in terms of weight, wing area, and engines. The Douglas airplanes, however, were all metal, had a more modern airfoil, and generally performed much better than their Fokker competitor. At least ten miles per hour faster, the Douglas airplanes were also much more pleasant to fly.

Fokker had erred in pursuing the same formula: the wooden wing, with its standard Fokker airfoil and layout, simply was not suitable any longer. The traditional thick section created too much drag, and the Fokkers were as much as twenty miles per hour slower than the Douglas YB-7, which topped out at 182 mph. Both companies received token orders, but the stage had been set for the first truly

The XB-43 (right), America's first jet bomber, did not get the green light for production because the B-45, a more capable airplane, was waiting in the wings.

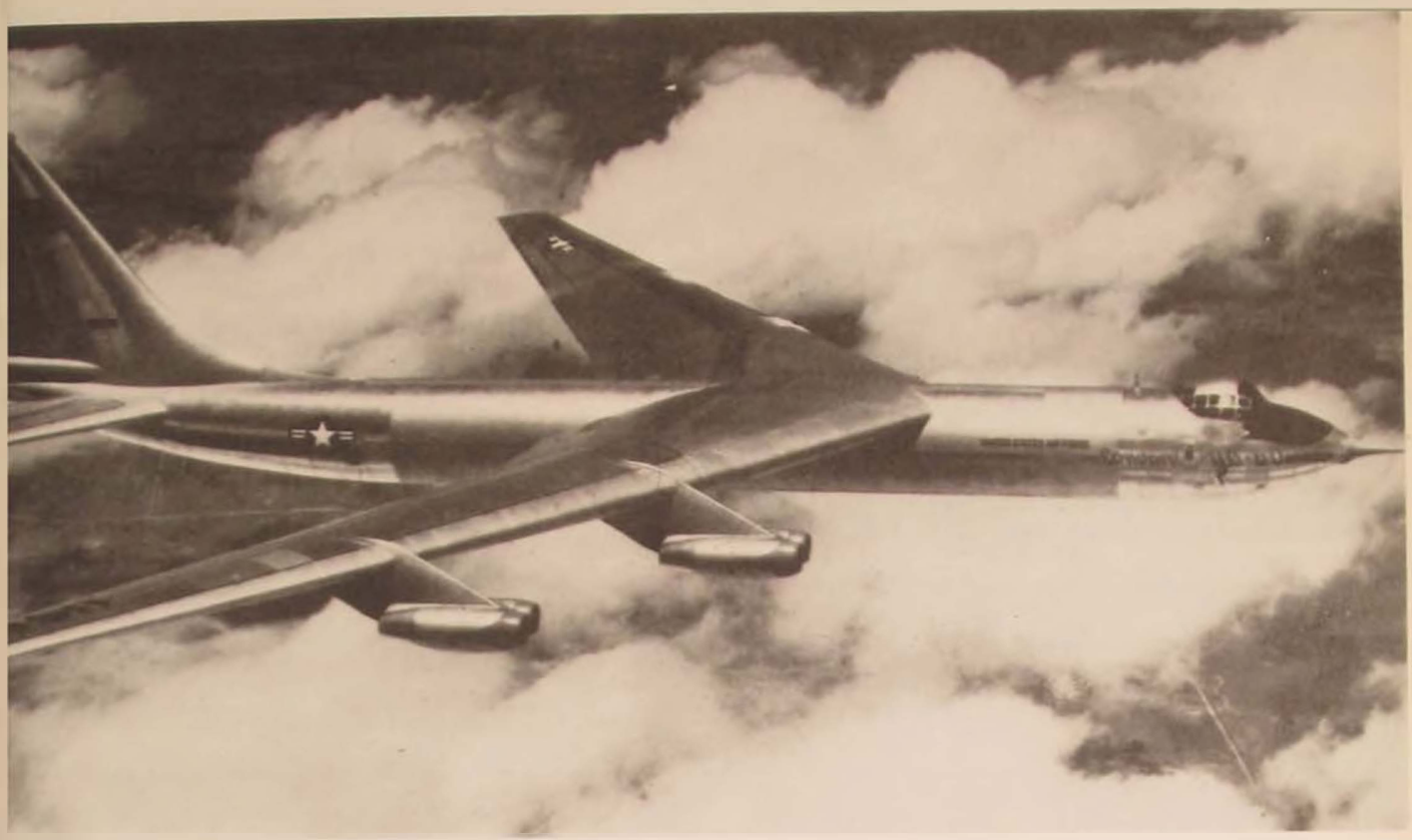


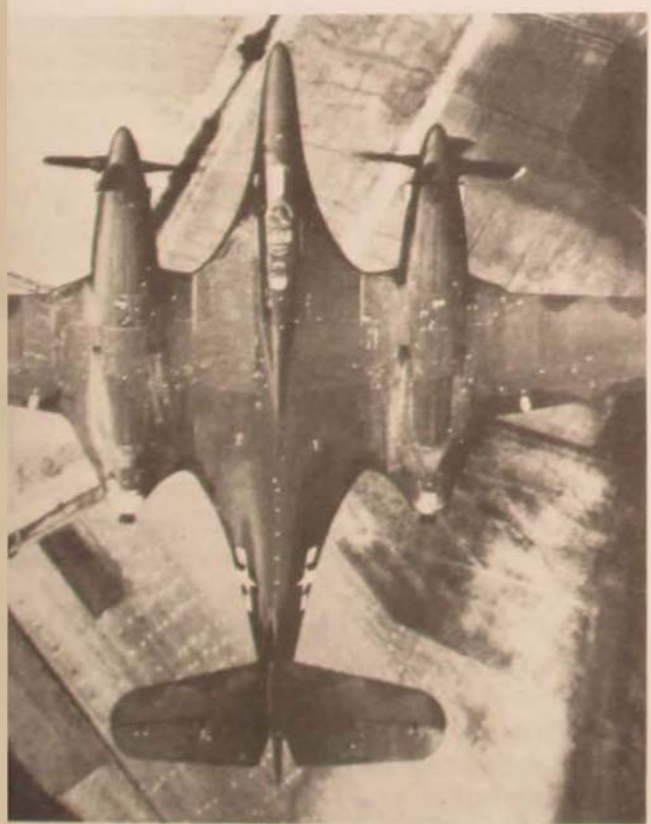
modern bomber, the descendant of the XP-9, the Boeing YB-9.

the Boeing YB-9

The YB-9 bomber was in the direct development line that led to the B-17, and it was revolutionary. It combined a cantilever wing and retractable landing gear with a blistering 173-mph top speed, more than 50 percent faster than the Keystones in fleet service. It was a private venture by Boeing and

The XP-75 (below, left) was a fighter with counterrotating propellers. This plane and the XP-81 (below, right), which featured a jet in its tail and a turboprop in its nose, were hybrids—examples of transitional technology that could not measure up to early jets such as the F-80 and F-84. The XP-81 airframe was seen for years derelict on the test range at Edwards AFB; is it still there?



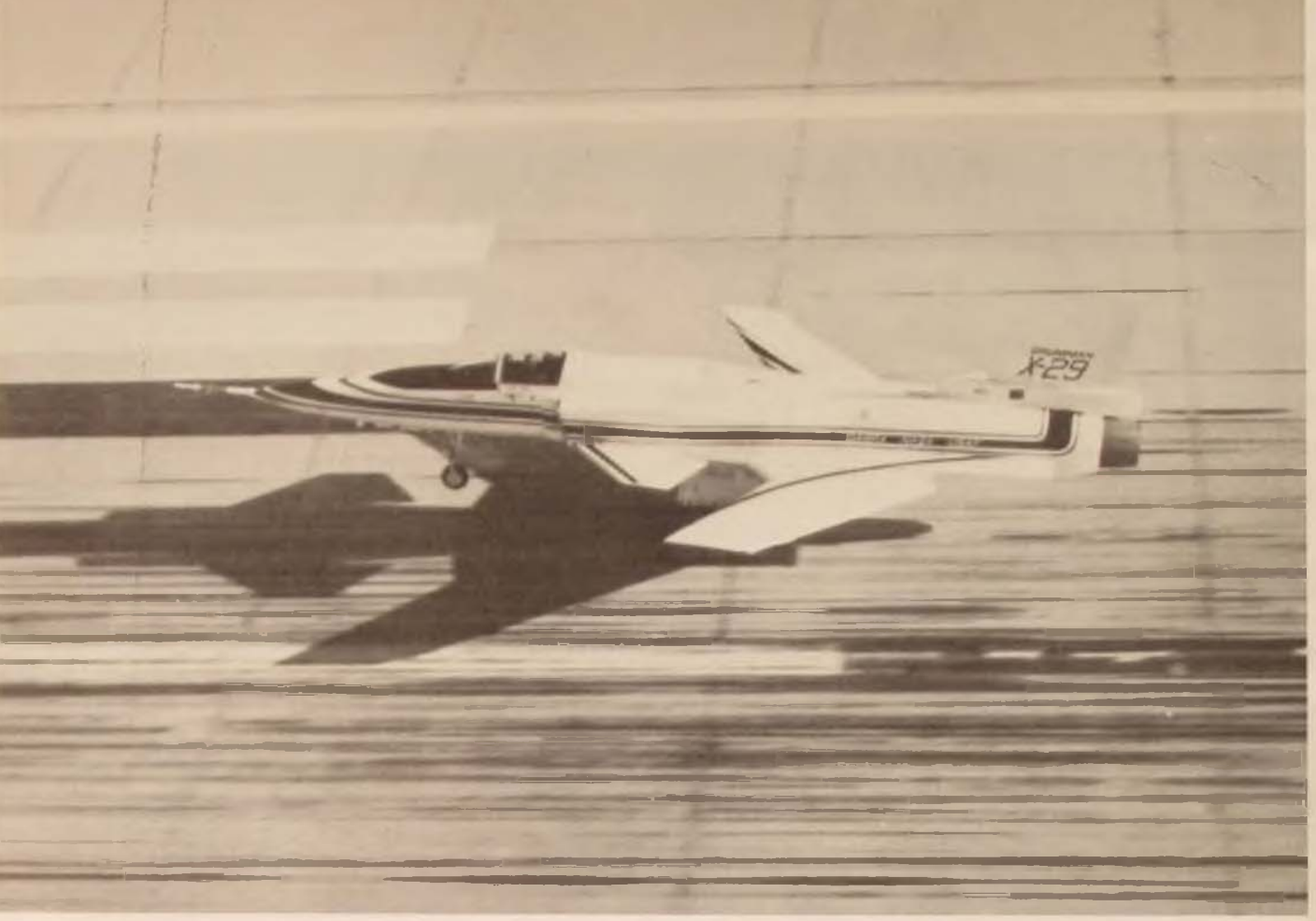


The Convair XB-60 (above), the Air Force's hedge against failure in the B-52 program, had considerable commonality in parts with the B-36. When the B-52, which was vastly superior to the XB-60, proved a resounding success, Convair's entry in the long-range bomber category was eclipsed. . . . McDonnell's XP-67 (left) looked menacing but suffered from relatively poor powerplant performance.

looked like a world beater. Unfortunately, Wright Field had been working for an extended period with Martin and developed in concert the XB-907, which gained the only production orders. Only seven models of the YB-9 type were built, but they led directly to the world-beating 247D transport, which, in turn, laid the foundation for the B-17 and Boeing's forty-year dominance of the bomber industry.

Martin XB-907 (B-10/B-12)

In these days when castigating the Department of Defense is so popular, one can look back to the



The innovative tradition continues with the Grumman X-29. Given the excitement in aviation's first eighty-two years, the next century promises to be a real lollapalooza.

1930s with some nostalgia. Then the Army and Navy were revered institutions, but they didn't always get their proper share of credit. The McArthur-Pratt agreement was formalized on 9 January 1931, assigning to the Air Corps the air defense of coastal regions. The Air Corps put out a request for proposal on an aircraft that would replace the traditional coastal defense weapons, asking for an advanced all-metal monoplane. The Martin Company responded with proposals for a biplane and a monoplane with fixed gear, traditional biplanes. There ensued an agonizing two-year process in which Wright Field asked for an all-metal monoplane, retractable landing gear, enclosed cockpits, and cantilever wing; Martin resisted each of these efforts but finally succumbed to pressure to create the XB-907, which incorporated the retractable gear and wing structure developed at Wright Field. The prototype had some problems but, with further help from Wright Field, developed into the XB-907 (later the XB-10), with a turret and a 207-mph top speed, faster than any service fighter.

The B-10/B-12 series taught the pilots, bombardiers, and mechanics both what a modern airplane could do and what it required in terms of maintenance and support, laying the foundation for the great fleets of B-17s that would follow.

Curtiss A-14

Sometimes nothing happens even when everything goes well. Curtiss was notorious for stretching designs long past the point of no return—the basic PW-8 design had appeared in 1924 and been tweaked for the next ten years before ending life as the export Hawk III and IV. Similar life extension had been provided the Falcon series of observation planes.

With 1934's XA-14, however, Curtiss broke entirely new ground. The XA-14 was a strikingly handsome all-metal, twin-engine attack plane, fitted at one time with a 37-mm cannon. Top speed was a sizzling 254 mph, and it was reportedly de-

lightful to fly. However, it was three times as expensive as the Northrop A-17A just coming into service; and Congress, as Hitler was reputed to be, was more concerned about numbers than performance. The XA-14 was developed into the attractive A-18, but only thirteen of these were ordered.

In this instance, the experimental aircraft did not come into service, nor did it have much effect on the Curtiss firm's thinking. However, it did spur the Air Corps planners to raise the requirements for attack planes to a European level and to promote a competition that resulted in the Douglas DB-7—progenitor of the A-20 series.

Stearman XA-21

The prospect of war inflamed the imagination of designers, and companies recklessly abandoned their traditional fortes to try new and more radical designs. The Stearman Aircraft Company had created an impressive record with rather conventional biplanes, but the attack competition induced them to submit the almost radical (in terms of engineering features) X-100, a 269-mph bomber. Begun before the Boeing Company acquired Stearman, the X-100 was the first all-metal, twin-engine, retractable-gear airplane, powered by two experimental Pratt and Whitney R-2180 engines. Few firms were able to make such a severe transition, and the X-100 was an example. Subsequently, the new bomber was modified to the XA-21 and found to have very little better performance than the rejected XA-14. No other aircraft used the R-2180 engines, making the Stearman effort a true aerial dead end.

Grumman XP-50

As the money began to flow from Congress in 1939, there was an explosion of experimentation. Grumman had developed the squatty-nosed XF5F-1 for the Navy and a rather more handsome derivative, the XP-50, for Air Force use. The XP-50 was a hot airplane for the time, with a projected 424-mph top speed developed from two turbosupercharged Wright R-1820 engines. The aircraft was ill-starred, suffering first from a landing accident and then having the turbosupercharger blow up. The airplane augured in, and Air Force interest waned. The basic design, however, was developed into the XP-65—canceled by the Air Force—and the XF7-F Tigercat, which went on to a great career with the Navy. Thus the effort of development was worthwhile, even though it didn't lead to an Air Force purchase.

Beech XA-38 Grizzly

Some airplanes just look right, and the Beech Grizzly was one of these. Far more than a C-45 with a pituitary problem, the big XA-38 was powered by two R-3350 engines, giving it a 376-mph top speed, packing a 75-mm cannon plus two pairs of .50-caliber guns. The airplane had excellent flying qualities and almost certainly would have been ordered into production except for one problem: the R-3350 engines were required for the B-29 program, which, of course, had priority.

Brewster XA-32

The problems in experimental aircraft were sometimes the result of problems inherent in the manufacturing company. Brewster had startled the world when its pudgy Buffalo beat out Grumman's entry in the first Navy monoplane fighter competition. After that, it scarcely did anything right; and the XA-32, despite a sound layout, became a compendium of management-induced faults. A husky brute of an attack plane, the XA-32 was terribly overweight at almost 20,000 pounds. The drag induced by its rotund shape was amplified by careless detail design, which left it festooned with bumps and lumps. It was underpowered by the Pratt and Whitney R-2800. The real problem, however, was that the XA-32 suffered from the terminally bad Brewster management system. First flight was not until 22 May 1943, two years after the design was proposed; and almost every aspect of performance fell short of the specifications. The firm was in such management shambles that it drew the wrath of Congress and actually went out of the aircraft manufacturing business.

McDonnell XP-85

Perhaps the best excuse for the XP-85 was the fact that it was ordered in October 1945 to be carried in

the bomb bay of a B-36. The idea was that the XP-85 would be launched when an enemy fighter attack was imminent. It would engage, shoot down the opposing fighters, and then be picked up for storage inside the bomb bay again. McDonnell came up with a tiny, ugly airplane; its 21'1" wings folded to a diminutive 5'5" and, despite all the obstacles, it flew fairly well. Its launch and recovery problems brought about its demise. Its basic idea was picked up later with the RF-84 Fighter Conveyor program, but Air Force planners were driven to the conclusion that a long-range penetration fighter was needed—a concept that persists to this day.

Republic XF-12 Rainbow

Alexander Kartveli qualified as a Cellini-class artist with the design of the beautifully streamlined XF-12. Originally envisioned as a transatlantic passenger plane for Pan American World Airways, it lost out in the commercial market because of its small forty-four-passenger capacity. It was converted into a flying photographic laboratory.

Kartveli had addressed the problem of streamlining with consumate skill, and the Rainbow had aesthetically appealing lines. It suffered the ordinary development problems, including an engine fire and subsequent crash, but the real reason for its demise was the availability of both B-29 and B-50 types for interim duty as reconnaissance planes until the far more capable RB-47 was brought into service. The Rainbow is a perfect example of the importance of timing; had it been available in 1944, it almost inevitably would have been ordered in quantity, and the whole postwar structure of aircraft markets might have been altered, with Republic building follow-on airliners. As it was, the Rainbow disappeared into oblivion, despite its graceful lines and high performance.

Convair XP-81

An almost certain recipe for failure in aviation is the bet-hedger; anytime compromise is built into concept, success is almost impossible. Such was the case with the Convair XP-81, designed to have a GE J33 jet engine in the tail and a GE XT-31 turboprop in the nose. The idea, of course, was to combine the range of the turboprop with the dash speeds of a jet. In this case, doubling up the power plants didn't double the pleasure but instead doubled the mechanical difficulties; and the outstanding promise of the P-80 and other pure jets relegated it to the drawing boards.

Convair XB-60

As development costs go up, so do the manufacturer's fears—a combination that sometimes results in wistfully hopeful compromises like the XB-60. Ordered by the Air Force as a precaution against some unforeseen catastrophic failure in the B-52, the XB-60 had a 72 percent commonality with the veteran B-36. Essentially, a swept wing and tail were substituted, and eight J57 jet engines were added, resulting in a 508-mph bomber that was totally outclassed by the B-52. Convair bounced back, however, and proceeded with the beautiful supersonic B-58 Hustler, which carried bomber performance into a realm still not surpassed.

Douglas XB-43

The first American jet bomber was a straightforward derivative of the radical XB-42 Mixmaster, a twin-piston engine pusher aircraft of Learfan configuration that was supposed to do the job of the B-29 at about half the cost by achieving a 30 percent improvement in aerodynamic cleanliness. The jet age caught up with the XB-42, and Douglas responded by working the static test article into the XB-43 by substituting two GE J35 engines for the piston Allison V-1710s. The airplane was satisfactory, with a 515-mph top speed, not bad for a static article, but the B-45 was in the wings. The XB-43 subsequently became an engine test bed at Edwards, earning the nickname Versatile.

McDonnell XP-67

World War II changed American aviation from virtually a cottage industry to the greatest industrial effort ever seen, and a prime beneficiary of this process was the McDonnell Aircraft Corporation. Founded in 1939 with a total capitalization of $195,000, McDonnell built subassemblies for other

manufacturers for most of the war. Its first military design, the XP-67, was a radical concept of blending wing and fuselage in a constant airfoil design. The airplane was perhaps the most beautiful—or sinister-looking—piston-engine aircraft of the Second World War. McDonnell was forced to use the brand new and unreliable Continental X1-1430 engines, and these ultimately destroyed the aircraft and the program.

McDonnell had aimed high, with a pressurized cabin and armament provisions for either six 37-mm cannons or a single 75-mm installation. Top speed was guaranteed to be 472 mph, but the prototype achieved only 405 mph. The aircraft needed far more development time than the war allowed. Another critical factor was the rapid development of the P-51 Mustang, which was in mass production and seemingly able to handle any task assigned to it. As a result, the XP-67 was dropped and thus could be regarded a failure.

Nothing could be further from the truth, for the rapport McDonnell had established with both the Air Force and the Navy permitted the company to win a contract for a Navy jet fighter, the XFD-1 Phantom, starting a series that led ultimately to the giant McDonnell Douglas Company, with its enormous stable of civil and military aircraft.

THE costs of unsuccessful experimental aircraft are often cited as an example of waste or poor planning. In fact, the true value of an experimental aircraft may not be in the airplane itself, but in the team that it brings together for further efforts, for the concepts it proves incorrect, or in the spur that it gives to competition. Today the cost of experimentation has become perilously high, and there are fewer and fewer opportunities for companies to explore new but not yet proven lines. The truth of this situation is perhaps validated in a way that has never been seen in history before: one giant power, the Soviet Union, is apparently allowing its research to lag far enough behind the United States to permit certain developmental lines to prove themselves. It then steps in and builds, in large quantities, very similar aircraft types. In effect, our research and development is subsidizing Soviet R&D in a considerable way, and our experimental aircraft are, indirectly, also theirs.

National Air and Space Museum
Washington, D.C.

air force review

LIEUTENANT JOHN O. DONALDSON: WORLD WAR I AIR ACE AND ESCAPE ARTIST

DR. JAMES J. HUDSON

Scattered cumulus clouds seemed to fill an otherwise bright sunny sky as six SE-5A single-seat fighters of Royal Air Force Number 32 Squadron circled at 11,000 feet over the small French town of Mont Notre Dame late in the afternoon of 22 July 1918. Second Lieutenant John Owen Donaldson, a twenty-year-old American, who had been assigned to that crack British fighter squadron less than three weeks earlier, found himself quite busy trying to maintain his position as a wingman in the formation. Suddenly the patrol leader rocked the wings of his SE-5 and slanted down to the left. The sharp-eyed Donaldson, keeping one eye on the patrol leader, quickly spotted the reason for the maneuver. Approximately 2000 feet below and a little to the east, he saw some twenty blue-and-white-colored Fokker D-7 biplanes. Apparently the Fokker patrol had not yet seen the SE-5s diving out of the sun and from the fringe of a nearby cloud. Donaldson, flying as number two in his formation, picked out the second enemy machine, "firing a burst of 75 rounds into it from close range." The Fokker "sideslipped to the right and then to the left, finally bursting into flames." Young Donaldson circled around "watching the enemy machine fall, and saw it crash near Mont Notre Dame." The destruction of the enemy fighter was witnessed by Lieutenants Alvin Andrew Callender and P. Macfarlane, and Lieutenant Donaldson had his first confirmed "kill" of the war.[1] There would be seven other victories before he was shot down and captured by the Germans on 1 September 1918.

SON of Thomas Quinton and Mary Elizabeth (Willson) Donaldson, John Owen Donaldson was born at Fort Yates, North Dakota, on 14 May 1898. His father was a distinguished U.S. Army officer who, like most military people, served at many different army posts throughout the United States and the Philippines.[2] Consequently, young John was to have a varied background. His education was completed at Furman University in South Carolina and at Cornell University in New York. He was at Cornell when the United States entered the First World War. Volunteering for aviation duty, he was trained initially in the United States and then in England, where he completed his preparation for combat flying at the School for Air Fighting.[3]

Donaldson was posted to Number 32 Squadron, then commanded by Major J. C. Russell and stationed at Planques Airdrome, some thirty-five miles north of Amiens, on 3 July 1918.[4] Because the squadron was heavily engaged in offensive patrols at the time, he was forced to get his familiarization flights in actual combat patrols. Lieutenant Donaldson survived this early learning period (the highest rate of casualties normally occurred in the first few weeks of combat experience) and soon be-

came a highly skilled fighter pilot.

Three days after his first victory, Lieutenant Donaldson's patrol, which was then based at Touquin in the Marne area, bounced a formation of fifteen Fokker biplanes over the town of Fismes on the Vesle River. Donaldson fired approximately 150 rounds at two of the enemy aircraft without results. As his engine began to malfunction, he broke off contact and started to glide to a possible forced landing. In doing so, he found himself practically on top of six enemy machines. Ignoring his faltering engine, he dived on one of the Fokkers and fired "200 rounds at point blank range into it." The German fighter "turned on its back, went into a spin, came out of the spin, and went down in a flat spin, and was observed to fall out of control for two or three thousand feet." While struggling with his own sputtering engine, Donaldson was unable to observe whether the enemy plane actually crashed. Nonetheless, he was credited with driving the Fokker "down out of control."[5] Three other enemy aircraft were knocked down in the same air battle—one by Lieutenant Alvin Andrew Callender, an American from New Orleans.[6]

After the Allied counteroffensive in the Aisne-

No doubt General Thomas Quinton Donaldson (above) passed along a spirit of innovation to Lieutenant John O. Donaldson. General Donaldson fought the Sioux Indians in South Dakota—a difficult challenge that demanded all of one's resources. When his son went to war, combat was different but no less demanding. . . Most of the flyers in the Royal Air Force Number 32 Squadron (below, pilots in front of several SE-5s) did not survive the war. Those who made it had to depend on their skill and their wits.

Marne sector ended on 3 August, Number 32 Squadron was shifted back to the Somme area on the British front and stationed at Bellevue, some fifteen miles southwest of Arras. It was from this base that the squadron was to participate in the British-French Amiens offensive to drive the Germans out of the Somme sector. The drive opened on 8 August 1918 with ten British and eight French divisions engaged. From the air forces' point of view, according to one source, the Amiens offensive "was the most complete surprise of the war." Behind the front, from Courcelles to Albert, the Allies had concentrated more than 1900 planes.

> The German fighters were outnumbered more than six to one and when the thick mist lifted around 9:00 A.M. the greatest armada ever assembled in the war took to the sky. Tremendous confusion within the German lines produced exceptional targets. Transports were blown off the road, and horses stampeded. Time and again, parties of infantry were scattered in panic by low-flying singleseaters. Bomb after bomb was showered on demoralized enemy troops in full retreat toward the Somme.[7]

However, the initial Allied air advantage was soon to vanish. Late in the afternoon on the first day of the offensive, the Germans were able to shift vast aerial reinforcements, including the Richthofen *Jagdgeschwader*, then commanded by Captain Hermann Goering, into the Amiens-Somme battle area.[8]

The result of the German air reinforcement was to increase the intensity of the air fighting. During the next several days, Number 32 Squadron pilots were to score several aerial victories, and Lieutenant Donaldson added more kills to his own score. At 1810 on 8 August, Donaldson, accompanied by two Sopwith Camels and one French Spad, engaged five Fokker D-7s at 1500 feet over the town of Licourt. He attacked the first enemy aircraft head on, "firing about fifty rounds without result, then made a climbing turn and dived on a second enemy machine, firing 100 rounds at him, at very close range." This machine immediately "went into a straight dive and crashed to earth, midway between Licourt and Morcham where it remained with its tail vertical."[9]

On the following morning, John Donaldson fired a 200-round burst into a Fokker biplane and watched it go down in flames for victory number four. His own SE-5 fighter was damaged in the dogfight, and he was forced to land at a nearby airfield occupied by an Australian fighter squadron.[10]

On the morning of 10 August, a patrol from Number 32 Squadron became hotly engaged in a battle with nine Fokker biplanes in the vicinity of the French city of Peronne. In the swirling dogfight, Donaldson sent one of the German fighters down out of control for his fifth kill—making him an ace after approximately one month with the squadron.[11]

Although involved in several air battles during the next few days, Lieutenant Donaldson did not score again until the late afternoon of 25 August, when he attacked four "blue-gray" Fokkers in the vicinity of Hancourt, a village some ten miles northwest of Saint-Quentin. After firing approximately 150 rounds at long range, he singled out one enemy aircraft and, diving on it, fired 100 rounds at very close range (approximately fifty yards). The Fokker "went into a sideslip-dive, and after falling about 2000 feet, the left wing of the enemy aircraft broke off." The pilot of the doomed Fokker jumped out of his machine with a parachute, "which opened after falling about 1000 feet, and apparently went down safely."[12]

Victory number seven for the eagle-eyed ace came at 0730 on 29 August, when Donaldson "observed a Fokker biplane edging close to DH-9s (British observation planes), and diving on it fired 100 rounds at medium range." His quick action saved the two-seater observation aircraft, and observers saw the enemy machine "do a vertical dive for some thousand of feet, out of control." Because of the presence of other enemy fighters in the area, Donaldson was not able to witness the actual crash of his victim.[13]

On 1 September over Valenciennes, some

eighteen miles northeast of Cambrai, Donaldson scored his eighth and last "kill" when he shot down a Fokker D-7 in flames. During the combat, his own plane was riddled with bullets. With his engine out of commission, he was forced to land his SE-5 behind enemy lines, where he was captured by the Germans.[14]

Lieutenant Donaldson was taken as a prisoner to the town of Douai and kept for one night. Due to the heavy shelling by the British forces, he was transferred the next day to a temporary prison camp in the village of Conde. During Donaldson's first evening at Conde, he was joined by another recently captured American pilot—Lieutenant Oscar Mandel.[15] The two escaped a few hours later by jumping out of a second-story window and strolling casually through the village street. The pair walked all night and just before dawn discovered a newly established German aerodrome. Making sure that there were no guards patrolling the field, Donaldson and Mandel then attempted to steal a German two-seater observation plane. After approximately two hours of work, they managed to get the plane "almost entirely out of its hangar, but finally had to take the whole hangar down to get the machine clear." Just as the two American pilots were about to start the plane's engine for an escape by air, a German guard appeared on the scene. In the ensuing struggle, Donaldson was stabbed in the back and Mandel had his clothes slashed by the bayonet-wielding guard. However, the Americans were able to hit the German on the head with a large electric lamp, and they fled across the airdrome.[16]

The two pilots were not pursued, and a few minutes later they stopped at the home of a French peasant, where Donaldson's wounds were treated and found not to be very serious. Due to the fact that Lieutenant Mandel spoke German fluently, the American pair were able to talk their way past numerous enemy guard posts during the next several days. However, on 9 September, while trying to swim across a stream between the German and Allied lines, they were apprehended and once again imprisoned—this time in the city of Valenciennes. The ingenious pilots continued their escape try and after three days managed to cut a hole in the prison roof with a piece of broken saw that they had discovered in the room. Donaldson and Mandel, along with an English noncommissioned officer and two other American pilots, Lieutenants T. E. Tillinghast and R. A. Anderson, then crawled through the opening in the roof, slid down into the courtyard, climbed over the wall, swam the canal bordering the prison, and set out on a cross-country trek toward Holland.[17]

For several days the escapees traveled at night and slept during the daylight hours. On the eighth day after the Valenciennes breakout, the little party arrived in Brussels, where they met several wealthy Belgians who could speak English. Here Donaldson and his friends were supplied with civilian clothes, maps, and other items and information that would help them on their journey to freedom. Mandel and the Englishman separated from the group at Brussels. A few days later, Lieutenant Donaldson and two of his companions, Lieutenants Tillinghast and Anderson, cut their way through an electrified and closely guarded wire fence and entered the neutral state of Holland. From the Dutch border, the three proceeded to Rotterdam, to Le Havre, and finally to England, arriving only a few days before the end of the war.[18]

Shortly after his arrival in England, Donaldson and several other flyers were received by King George V at Windsor Castle. Although Donaldson had never actually flown with the U.S. Air Service while in combat, he was promoted to captain in the U.S. Army and was decorated with the British Distinguished Flying Cross, the U.S. Distinguished Service Cross, and the Belgian Croix de Guerre.[19]

Captain Donaldson remained in the U.S. Air Service for several months after the war and won the Mackay Gold Medal for taking first place in the Army's transcontinental air race in October 1919. He resigned his commission in 1920 to enter the business world but continued

to be involved in flying activities. During the 1926 to 1930 period, he was president of Newark (New Jersey) Air Service, Incorporated. After winning two races at an American Legion air meet in Philadelphia, he was killed when his plane crashed during a stunt-flying performance on 7 September 1930.[20]

University of Arkansas

Notes

1. Combat Report, 22 July 1918, in Air 1, Box 122, housed in the Public Record's Office, London, England. Other combat reports cited in this article can be found in this collection.

2. Thomas Quinton Donaldson was born in Greenville, South Carolina, and educated at Patrick Military Academy and the U.S. Military Academy at West Point. He served as a lieutenant in the Seventh U.S. Cavalry and participated in two engagements with hostile Sioux Indians near the Pine Ridge Agency in South Dakota in 1890. He received a slight wound at the Battle of Wounded Knee. Later he served as professor of military science at Patrick Military Academy and at Clemson University. Subsequently, he served in the Army at various posts in the United States, Cuba, and the Philippines. He held the rank of brigadier general during World War I and was awarded the Distinguished Service Medal for his work in France. Through most of the 1920s, he commanded the 23rd Brigade at Fort Howard, Maryland. In 1928, he was appointed Commander of the Second Division and promoted to major general. He retired in June 1928 due to ill health.

3. *The National Cyclopedia of Biography* (New York: James T. White and Company, 1935), vol. XXIV, p. 226.

4. Number 32 Squadron was formed on 12 January 1916 as a fighter outfit at Netheravon from surplus personnel of Number 21 Squadron. Originally equipped with DH-2 singleseater pusher biplanes, the squadron proceeded to France on 28 May 1916. The squadron was based for short periods at airdromes at Saint-Omer, Auchel, and Treizennes before transferring to Vert Galand, where the unit remained until late October 1916. It then moved to Lealvilliers, where it remained until the summer of 1917. Throughout the Battle of Somme, the battles of the winter and spring of 1917, and the Battle of Arras, the squadron continued to fly offensive patrols. In May 1917, it was reequipped with DH-5s, with which it intensified operations, including ground strafing sorties, especially during the Third Battle of Ypers. In January 1918, the unit was given SE-5 machines. The squadron was moved to Fouquerolles-Ruisseauville on the French front in June 1918 and transferred to Touqin Airdrome in late July.

5. Combat Report, 25 July 1918.

6. In addition to Donaldson, three other Americans were to become aces with Number 32 Squadron during the summer and autumn of 1918. They were Lieutenants Alvin A. Callender (ten victories), Bogert Rogers (five victories), and Frank Hale (eight victories). Lieutenants W. Amory and M. A. Tancock, both New England boys, were also members of the squadron.

7. Gordon W. Callender, Jr., and Gordon W. Callender, Sr., editors, *War in an Open Cockpit: The Wartime Letters of Captain Alvin Andrew Callender, RAF* (West Roxbury, Massachusetts: World War I Aero Publishers, 1978), p. 17.

8. S. F. Wise, *Canadian Airmen and the First World War: The Official History of the Royal Canadian Air Force* (Toronto: Toronto University Press, 1980, p. 531. Goering was away at the time, leaving the *Jagdgeschwader* in command of Lothar von Richthofen, the younger brother of Manfred.

9. Combat Report, 8 August 1918.

10. Combat Report, 9 August 1918.

11. Combat Report, 10 August 1918.

12. Combat Report, 25 August 1918. Many German pilots had begun to use parachutes during the last several months of the war. Unfortunately, Allied pilots were not so equipped. Many Americans, British, and French flyers were very disgruntled with the Allied high command for its reluctance to provide parachutes. See James J. Hudson, *Hostile Skies: The Combat History of the American Air Service in World War I* (Syracuse, New York: Syracuse University Press, 1968), p. 299.

13. Combat Report, 29 August 1918.

14. "American Air Service Units with the British Expeditionary Forces" (Gorrell History, Air Service, American Expeditionary Force, series B, volume XII), p. 37. This document is housed in the National Archives, Washington, D.C. Also see Callender, *War in an Open Cockpit*, p. 87.

15. Lieutenant Oscar Mandel was a member of the 148th American Squadron, which was then flying Sopwith Camels on the British end of the Western Front. He had been shot down on 2 September 1918.

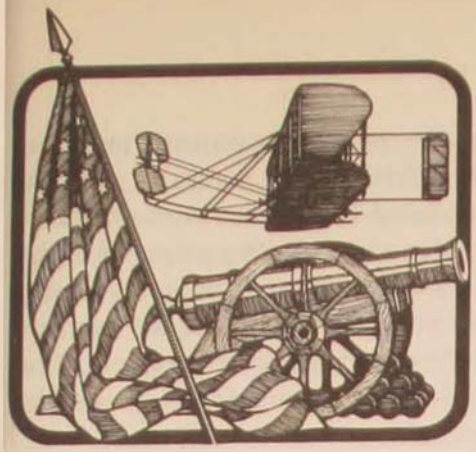
16. These details on the escape of Lieutenant John O. Donaldson are derived from a report in "American Air Service Units with the British Expeditionary Forces."

17. Lieutenant Theose E. Tillinghast from West Hartford, Connecticut, was a member of the 17th American Squadron, then flying Camels. He had been shot down behind enemy lines on 22 September 1918. Lieutenant R. A. Anderson was an American attached to Number 40 Squadron, RAF, and had been captured on 27 August 1918.

18. "American Air Service Units with the British Expeditionary Forces."

19. *The National Cyclopedia of American Biography*, vol. XXIV, p. 226.

20. Ibid.



the classic approach

REFLECTIONS ON DOUHET

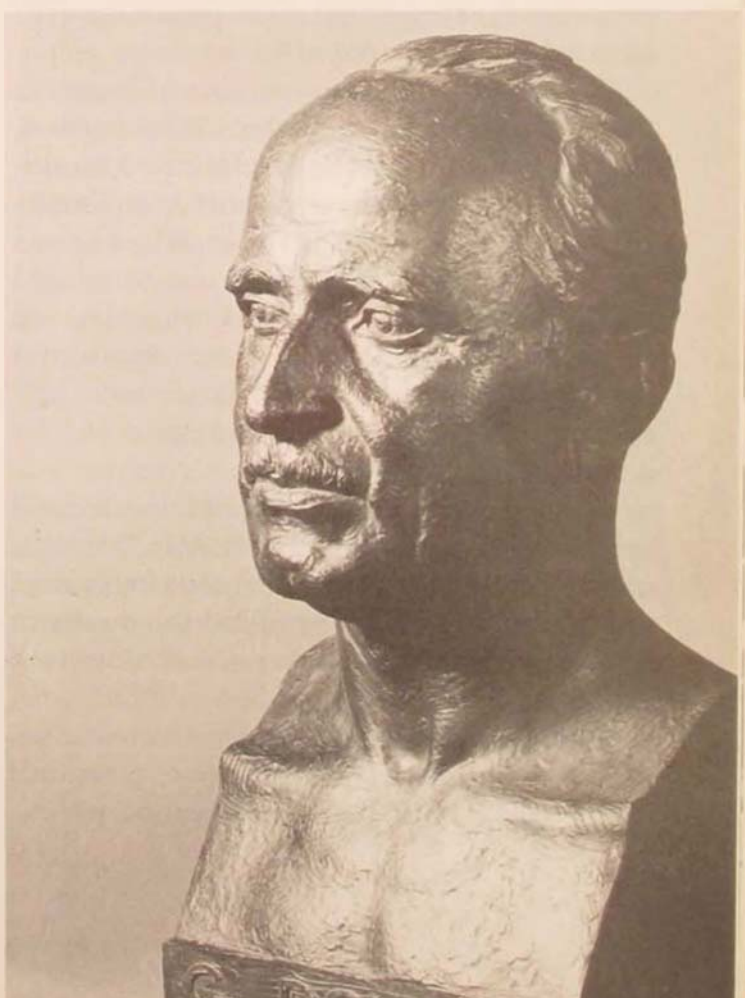
COLONEL JOHN F. SHINER

AS military professionals responsible for protecting the nation and its vital interests, we know that the conduct of war is our business. Should an adversary seek to harm the United States, we must carry out effective combat operations and defeat his forces. Our fellow Americans rely on us to do this; they have placed their trust in our capabilities and professional competence.

Professional Air Force officers and enlisted personnel have dedicated themselves to preserving American security but have not spent nearly enough time learning all they can about war—knowledge that is crucial to serving the nation with optimum effectiveness. To remedy this deficiency, Air Force leaders have instituted Project Warrior, an ongoing program that seeks to instill in all service members a deeper understanding of the theory and conduct of war. Study of the military classics can help provide this understanding, for it enables us to benefit from the thinking and experiences of others. This allows us to build on their ideas and alerts us to past mistakes.

Giulio Douhet's *The Command of the Air* is such a classic. It was the first detailed analysis of the offensive and defensive employment of the air weapon. Published in 1921, *The Command of the Air* asserted the decisiveness of strategic bombardment before Billy Mitchell and other air leaders had given that subject any detailed thought. The 1927 edition, which is still in print, contains Douhet's fully developed thesis on how to use the air weapon to achieve victory. Subsequently translated into English, French, German, and Russian, it stimulated the thinking of aviators in various countries prior to World War II.

Giulio Douhet was born in 1869 and served for many years as a career officer in the Italian Army before the onset of World War I. He was



first assigned to aviation duty in 1911 and, by the time Italy entered the war in 1915, had already done considerable thinking about how air power should be used. A tireless, blunt, impatient, and very self-confident individual, Douhet openly criticized the military leaders who were directing the Italian war effort, asserting that they lacked innovative ideas and approaches. As a result, he was court-martialed and spent a year in prison. He was vindicated by the military disasters that soon beset the Italian Army and was recalled to active duty during the last year of the war.

Douhet was promoted to brigadier general in 1921, the same year that the Ministry of War published the early version of *The Command of the Air*. He served as Commissioner of Aviation after Mussolini came to power in 1922, but soon resigned from that position and the Army, devoting full time until his death in 1930 to spreading his message about air power. He firmly believed that the only effective way for Italy to defend itself in future conflicts was to establish an independent air force and use it properly. He spelled out all of this in the 1927 edition of *The Command of the Air*.

This classic contains a number of Douhet's "basic truths" about military aviation. First, Douhet believed that the airplane had revolutionized warfare. Basing his conclusions on the experience of World War I, which had been a long war of attrition, Douhet was convinced that land warfare now overwhelmingly favored the defensive. A clear decision over an enemy's field forces would take years to achieve. Only after a prolonged and costly struggle could the attacking army hope to penetrate into the interior of a hostile country, dominate the land area, and bring the war to an end. In Douhet's mind, the airplane, with "complete freedom of action and direction," provided the means to attain quick victory without first defeating enemy surface forces.

Second, Douhet believed, aircraft are instruments of incomparable offensive potential. The airplane is "the offensive weapon par excellence." It can make devastating, mass attacks virtually anywhere.

Third, command of the air is essential to attaining victory in war. With command of the air, one's own air force is free to operate whenever and wherever it desires, while the enemy's air arm is rendered permanently helpless. The enemy then has no effective defense against the ensuing air attacks.

Fourth, all future conflicts would be unrestrained, total wars. No longer should there be a distinction between belligerents and nonbelligerents: when a nation is at war, everyone takes part. Wars are won by crushing the resistance of the enemy—an action that can be accomplished more easily, faster, more economically, and with less bloodshed by attacking the weakest points in that resistance, namely, the vital centers (cities) and civilian morale.

In accordance with these "basic tenets," Douhet explains what he views as the proper conduct of aerial warfare. The first priority in air operations is to gain command of the air, for this makes all else possible. This objective is achieved by destroying the enemy air force on the ground through attacks on airfields and aircraft factories. The only type of airplane needed for this and other aerial missions is the battle plane, an armed and armored bomber that can fight its way to and from the target. The attacking force will take some losses, but by using surprise and flying in formation, these losses will not be excessive. The air force must be a standing force ready to fight at the onset of hostilities. It should take the initiative and strike first. It must hit hard and often, until command of the air is achieved.

No effective air defense is possible, for only the attacking force knows its objective. To stop an adversary, defenders will need as many fighters covering every possible target as the attacker has battle planes, even if the entire attacking force is going after only one target. If there are 100 battle planes involved in an attack and 100 potential targets that may be hit, defenders will need 10,000 fighter-interceptors—

a purely defensive force that is far too costly. Antiaircraft guns, which had proved generally ineffective in the First World War, also will have to be dispersed to cover the multitude of potential targets, further weakening their usefulness. Since no effective air defense is possible, no resources should be wasted on fighters and antiaircraft artillery (AAA). Likewise, since land forces had proved incapable of carrying out truly decisive action during the Great War even when aided by tactical aviation, all money earmarked for military aircraft and AAA should be used to build the largest possible force of battle planes.

Writing at a time when radar did not exist, Douhet asserts:

> There is no practical way to prevent the enemy from attacking us with his air force except to destroy his air power before he has a chance to strike us. . . . We must therefore resign ourselves to the offensives the enemy inflicts upon us, while striving to use all our resources to inflict even heavier ones upon him.

Through effective attacks on enemy airfields and aircraft factories, command of the air will be achieved quickly.

Having achieved command of the air, the aviators then will use their battle plane fleet to destroy the enemy's will and capacity to resist by bombing his cities.

> A complete breakdown of the social structure cannot but take place in a country subjected to this kind of merciless pounding from the air. The time will soon come when, to put an end to the horror and suffering, the people themselves, driven by the instinct of self-preservation, would rise up and demand an end to the war—this before their Army and Navy had time to mobilize.

One's own army and navy, lacking the ability to sustain effective offensive operations in modern war, need only be small defensive forces, thereby making additional resources available to build a more powerful air force for mass employment.

Douhet firmly believed that strategic air power was an instrument capable of delivering quick victory. *The Command of the Air* convinced other aviators of this idea, and in the United States the book served to reinforce the views of Air Corps officers who had come independently to the same conclusion.

THIS first systematic examination of aerial warfare is still of value to us today. However, for this classic to be of greatest worth, we must use it in conjunction with the study of combat air operations that have taken place since Douhet's death. World War II, Korea, Vietnam, the Arab-Israeli wars, and other conflicts reinforce Douhet's assertion about the value of centralized control and massed employment of an air force. Those wars also indicate the importance of destroying the enemy air force while it is still on the ground, along with its bases and supporting industries. However, Douhet was far too optimistic about how quickly and easily this destruction could be accomplished. The Italian thinker's war-winning mission for the air arm, strategic bombardment, remains a very effective way to undercut an enemy's combat capability, even in a conventional conflict, although he greatly overstated the ease with which morale can be undermined and victory achieved. Further, he was wrong in his belief that land and naval warfare would be of little value in future conflicts and that TACAIR and joint operations were a waste of resources.

The Command of the Air contains additional errors, as well as additional grains of truth about effective air employment, which can be of benefit to us as we work to improve our professional expertise through the study of military aviation history. Air Force base libraries and unit Project Warrior coordinators have copies of *The Command of the Air* and other valuable books. As guardians of American security, we should read these works, for if we learn the lessons of the past—what worked, what did not, and why—we will be better prepared to meet the challenges of the future.

Office of Air Force History
Washington, D.C.

You've got the stic

THE ELEVENTH MISTAKE

LIEUTENANT GENERAL THOMAS C. RICHARDS

THE great Tatar leader Temuchin, better known as Genghis Khan, reportedly allowed his chieftains a total of ten forgivable mistakes. The eleventh mistake cost the subordinate his head. That policy sounds harsh, but in practice it worked fairly well.

The headsman did not, in fact, work overtime. Incompetent and brash warrior leaders made their fatal mistakes in battle. Competent young leaders, on the other hand, could afford to take the kind of innovative risks that often worked, bringing victory and its benefits. If, every now and then, such a chieftain miscalculated, there were still a number of mistakes between him and eternity. The occasional misstep served to reinforce wisdom, giving one increasingly better reasons to profit from past mistakes and avoid similar ones in the future. Mongol warriors did not have the option of retiring after twenty or thirty years of service, so they had an indeterminate time in which to become more proficient so as to avoid that eleventh mistake late in their careers. Even so, we assume that most of Genghis Khan's chieftains were either killed in battle at some point or passed away of natural causes. The Khan did not have the reputation of being a bad leader, which excessive executions would have certainly conveyed.

The spirit of innovation and imagination that helped to make Mongol armies successful are just as important in today's military. The United States Air Force was built by leaders who took calculated risks. Today, however, there is a fear that one mistake can lead to a kind of career decapitation. The fear that a single error can so blemish a record as to end one's chances for promotion and advancement as certainly as a headman's axe ended the lives of the Khan's incompetents, while an unfortunate misperception, can be an overwhelming concern that inhibits the risk-taking spirit. Given the nature of the challenges we face, anything that stifles innovation and imagination is counterproductive and potentially disastrous.

The "threat" cannot be defined in simple terms. It is much more than a catalog of weapons, divisions, wings, and fleets. The larger forces fielded by the Soviets are a constant in our defense equation. But size alone does not always translate into effectiveness. The armies of Nicholas II numbered in the millions. At the turn of the century, every intelligence service in Europe held the Russian military in high esteem, despite its poor performance and the general incompetence of its leadership in the

Russo-Turkish War in 1877. However, in 1905, Japanese forces, with imaginative and innovative leadership, defeated the Russians handily. The Soviet forces of today do not resemble those gray masses of Nicholas's day: they are far better trained. Moreover, modern-day Soviet soldiers, sailors, and airmen are motivated and committed, ably led, and equipped with useful weaponry. The challenge for us is to develop the kind of innovation and imagination that gives our forces the edge so that we can continue to deter war or, if deterrence should fail, fight to win.

Given the mutual balance of nuclear power, it is unlikely that American and Soviet forces will be fighting one another in the immediate future. Limited and unconventional wars, as well as the increasingly ugly struggle against terrorism, present a more immediate and, in some ways, greater challenge. In arenas where violence and warfare take many forms, we must be prepared to encounter and deal successfully with the unexpected. If we are to prevail, it will be through strategies and tactics that must emerge from our imaginations. Any preoccupation with doing the safe things to build a blemish-free personnel file can lead to stagnation throughout the force. We need our risk-takers—not brash and foolish gamblers, but men and women who are not afraid to let their imaginations help them foster the kinds of ideas that will keep ours the best air force in the world. To do less may mean that we all suffer the consequences of the eleventh mistake.

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Letters

on battlefield air interdiction versus Soviet forces

With some interest, I have read "TACAIR Missions and the Fire Support Coordination Line," by Lieutenant General Merrill A. McPeak, which appeared in your September-October issue. However, I am not as optimistic as General McPeak regarding our chances of achieving good results with battlefield air interdiction (BAI). There are two, closely related reasons for my concern. One results from how the Air Force perceives the threat and the other from the Air Force method for controlling BAI.

The Air Force seriously misunderstands the future of the threat and, therefore, the role of BAI. Richard Simpkin in his book *Red Armour* identifies the problem when he compares the "Anglo-Saxon approach" to war with that of the Soviets (and also those of the Germans and Israelis). The Anglo-Saxon approach, he says, is one of position and destruction, while the Soviet's is one of movement and disruption.

A key aspect of the Soviet approach is an emphasis on the operational level of war, a level only recently discovered by the U.S. Army and still unknown to the majority of the Air Force. According to Simpkin, the operational level in Soviet doctrine involves three components: Soviet main and mobile forces and our land forces. Therefore, the key to understanding this threat is to realize that Soviet success depends on the interaction between Soviet main and mobile forces and of both with our own land forces.

Defeating such a threat does not necessarily depend on the current geographic location of Soviet forces, a conceptual focus seen in the Air Force emphasis on lines, specifically the forward line of own troops and the fire support coordination line. Rather,

the key is the movement of these Soviet forces, particularly the mobile forces, relative to our own maneuver forces. If one compares land maneuver to the dynamics of air combat, it is easy to see why the relative motion and energy of Soviet and friendly land forces can be far more important than their current physical location.

If the Air Force recognized this aspect of the Soviet maneuver threat, there would be less BAI emphasis on destruction of an enemy target set. Instead, our focus would be on destruction of the enemy's strategy through the disruption and delay of the movement of his maneuver forces *relative* to our own.

Therefore, our BAI goal would be to help Army maneuver forces gain and maintain a higher energy state than the enemy. With this goal, the Air Force would recognize the serious limitations of using attrition models to assess BAI effectiveness. Instead, appreciating the vital importance of time, the Air Force BAI effort would emphasize mobility skills and area denial munitions that could delay and disrupt the movement and cohesion of the Soviet maneuver forces.

My second concern—the Air Force intention to control BAI from a centralized facility, the tactical air control center—evolves in large part from our misperception of the threat. The ponderous planning cycle shows that the Air Force does not now recognize the critical importance of time in maneuver warfare. Nor does the Air Force appreciate how the important role of the human element in maneuver warfare greatly increases uncertainty, despite advances in technology. As a result of these failures, the Air Force is satisfied that our sophisticated reconnaissance, communications, and information processing technology will enable centrally controlled BAI to be effectively coordinated with friendly land force maneuver.

However, as Martin van Creveld shows in his excellent book *Command in War*, certainty in war is the product of time, as well as information. Further, organization design plays a greater role in battlefield performance than does communications technology. From historical analysis, van Creveld concludes that decision thresholds should be fixed as far down in a hierarchy as possible. There is a danger, he cautions, that allowing communications and information processing technology "to dictate the structure and function of command systems . . . is not merely to become the slave of technology but also to lose sight of what command is all about."

I am confident that as the Air Force studies the nature of the threat and the essence of command in war there will be questions regarding the effectiveness of the present approach to BAI. At this point, perhaps, Air Force BAI doctrine will begin to evolve to the point where we can be confident of achieving General McPeak's goal of good results in joint operations.

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managers: the source of all our woes?

Having just finished reading "The Cockpit Warning Light Reads 'Reform' " in the September-October issue of the *Review* by Colonel Thomas A. Fabyanic, USAF (Ret), I am moved to pen this rejoinder.

I disagree not with Colonel Fabyanic's call for "reform" but with his attack on management studies. In an unsupported, but strongly worded manner, he has managed to lay the blame at management's door for every "failing" of the system, from OSD micromanagement to shabby procurement. I am sure that but for fortuitous timing we holders of the dreaded advanced degree in business would also be blamed for the delay in the October pay raise, the rise in medical malpractice, and the return of Halley's Comet!

I am tempted to ask why every call for an increase in war-fighting focus, motivation, and leadership is accompanied by an attack on management. Sadly, the very cases cited are often all the more reason for increasing support for the study of management. Would Colonel Fabyanic shut down medical schools to stamp out malpractice? Of course not! Yet he has no reluctance to suggest an intellectual "black out" as a cure for the "ills" of management. Those of us who second Fabyanic's call for a return to military competence do not necessarily consider attainment of military and management competence to be mutually exclusive goals.

Regarding the implied criticism of some "bureaucrats who, for the most part, have no professional responsibility for the defense of the nation," I find Colonel Fabyanic's conclusion to be again unsupported. In a series of jobs, from MAJCOM to the White House, I have had the pleasure to serve with some of those "bureaucrats." They were in many cases dedicated, tireless *professionals* in every sense. I spent many a late hour and weekend working side by side with a former Marine officer, long-time defense policymaker, and holder of an advanced degree whose every decision was made in the pursuit of advancements in war-fighting skill and capability. To be honest, I also observed some poor OSD staff

members; but I have also seen some mediocre blue-suiters during my career. To Colonel Fabyanic, I say, "Don't stereotype your targets." Some of those people (most, in my view) are as dedicated as we are.

In summary, don't build a "*straw manager*" to destroy, expecting that his removal will solve our problems. Focus instead on the real problems we face, and before ejecting, check to see whether the indication on the reform warning light is a valid indication. Also, don't shut down your good engine (management) when the problem is in the other engine (competence?). As my rated friends tell me, a good rule of thumb in any emergency is "hold what you got!"

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bureaucracy and militarism

Senator Gary Hart's "The Need for Military Reform" and William Lind's "JCS Reform: Can Congress Take on a Tough One?" in the September-October 1985 issue both advocate changing what they feel is a somewhat sterile, unimaginative, and rigidly bureaucratic U.S. military system. With great sound and fury, the two actually propose fairly standard recommendations for reform, ideas that have had some press in the past few years. Particularly, Senator Hart argues that we should replace "firepower-attrition" with "maneuver warfare," select large numbers of tactical-quality systems rather than small numbers of technological-quality weapons, and nurture military theorists instead of managers; Lind, on the other hand, focuses his attention on the military's chief advisory body, the Joint Chiefs of Staff, suggesting that a "purple suit" JCS based on the model of the Prussian general staff would be a viable alternative.

These arguments are not new, but both men articulate their positions quite persuasively, reminding us that the need for military reform deserves our continuing attention. Although the strategies for reform in the articles are worthy of debate, I prefer concentrating here on two side issues that the authors rhetorically toy with: *bureaucratism* and *militarism*, concepts that are much more interesting to me because of the way they are used or skirted.

Both articles are, of course, linked thematically in their advocacy of military reform. That is self-evident. But what might not at first be so obvious is that the two authors see *bureaucracy* as the nightmarish *bête noire* we need to subdue—or the whipping boy we need to excoriate. Using *bureaucracy* as the scapegoat for the military's alleged inefficiencies, both men suggest the same solution to the bureaucratic dilemma. That solution prefers *socialized* to *bureaucratic* behavior within organizations. The two men even use the same terms, although Senator Hart probes the dichotomy much more extensively than does Lind. In fact, Senator Hart uses the distinction as the consummating contrast in the discussion, shortly before sounding his clarion call: "The time for reform has come." Lind does not explore the two terms as fully but uses them primarily as a point of departure, a starting point for his subsequent analysis of an alternative to our congressionally mandated JCS: "The Prussian general staff was what is called a 'socialized,' rather than a bureaucratic, organization."

To attack the nameless, apparently inhuman bureaucracy is, has been, and will be a fairly standard ploy for writers, thinkers, literary artists, and even aspiring politicians. Doing so is convenient because most of us already agree that the negative aspects of bureaucracy need to be remedied. It is repulsive to us, for example, when a bureaucracy becomes a stifling system of administration marked by constant striving for increased functions and power, by lack of initiative and flexibility, by indifference to human needs or public opinion, and by a tendency to defer decisions to superiors or to impede action with red tape. Since 1818, when *bureaucracy* came into the language (and 1842, when *bureaucrat* first appeared), writers have castigated what these terms negatively suggest, yet bureaucracies have persisted, their negative elements continually needing our attention. And both Lind and Hart have picked up that sword. Lind bemoans the "bureaucratic behavior" of the JCS as he argues for a different way to restructure that advisory body. And in rhetorical anticipation of 1988, I'm sure that Senator Hart and his "military reform movement" will battle "bureaucratic resistance" even more vocally.

In addition to their standard attack on the bureaucracy, I find the authors' use of militarism quite intriguing. Senator Hart takes a fairly aggressive stance in terms of conventional warfare, arguing for a large number of high-quality tactical weapons, apparently suggesting that we should match the Soviets system for system. But he totally avoids the specter of nuclear war: "Because the notion of winning is meaningless in a nuclear war, the military reform movement concerns itself only with conventional forces." The Soviets, however, with their massive civil-defense efforts and training programs,

seem to feel that a nuclear war is winnable. So why is the "military reform movement" selectively militaristic, conveniently shunting aside the difficult discussion of nuclear warfare?

William Lind also curiously approaches militarism, but from an entirely different perspective. Arguing that Congress should revamp the JCS to be more in line with the model provided by the Prussian general staff, Lind, in the same breath, implies that this restructuring will in no way make the JCS (or our country) more militaristic. Lind's position is that the essence of the Prussian general staff was to provide the best military advice, not a command structure, to those who directed the armed forces. The analogy at first sounds convincing, and we might even want to believe that the Prussian-model general staff would never become dictatorial—until Lind reminds us of General Erich von Ludendorff and the authority he exerted from 1916 to 1918. No matter how Lind tries to rewrite military history, *Prussianism* equates with *militarism*. Strategic thinkers should analyze Lind's ideas about JCS reform carefully, but not in the context of Prussianism.

Militarism seems to be on the rise in the United States at this time—a trend that is, in many ways, encouraging, yet which, if not controlled, could prove devastating. Rampant militarism, on our part, might provoke a military confrontation or antagonize a significant number of American citizens. So let's make the "military bureaucracy" our servant, not our master, reforming our own excesses and restructuring our advisory staffs as necessary, so that we don't become the center of public attention in 1988.

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officer effectiveness and the military reformers

Major Forrest E. Waller, Jr., unfairly phrased the title of his September-October 1985 *Air University Review* article ("Are Officers Incompetent?"), which tries to discredit the current movement to improve the effectiveness of the officers of our armed forces. The basic competency of officers is not at issue. No one has called into question their job knowledge and job skills—but whether their professional effectiveness has become diluted and frustrated by managerial attitudes and standards that are not compatible with the best functioning of organizations whose purpose is to apply force to implement national policies and which may require a high degree of cohesion and sacrifice from their members.

I found not only the title but, more significantly, the context of Major Waller's article unsatisfactory. His article is a morass of inaccuracy and misstatement. He presents the movement to reform the officer corps as the effort of civilians, many of whom he claims are misguided by journalistic analyses that are distorted and based on inaccurate and inadequate evidence. In fact, a large part of the impetus to improve the attitudes and standards of officers comes from the officers of the armed forces themselves, as can be seen by the frequent articles on this matter by officers themselves which appear in military publications.

Major Waller claims that "military reformers forget that the founders of American military professionalism . . . preferred wars of attrition to wars of maneuver." I find this statement downright absurd. Who are these founders of American military professionalism? Major Waller doesn't name them. On the contrary, America's outstanding military leaders have been practitioners of maneuver instead of attrition warfare. Consider, for example, Winfield Scott, Stonewall Jackson, Robert E. Lee, Richard Eichelberger, George Patton, and Douglas MacArthur. And let's not forget Ulysses Grant, whose campaigns before his final struggle with Lee in Virginia were characterized by the fine employment of maneuver and who in his Virginia campaign continually tried to flank and envelope Lee's forces and force a decisive battle by maneuvering federal forces between Lee and Richmond. Willingness to endure attrition was only one aspect of Grant's campaign against Lee.

Major Waller claims that the greatest influence on those who want to reform the officer corps is the book *Crises in Command* by Richard A. Gabriel and Paul L. Savage. Waller says that the reformers are deeply "beholden" to this book, but he says that he can't explain why the reformers don't cite this book in their writings. His own admission demonstrates that *Crises in Command* isn't the pervading influence he claims. In his article Major Waller frequently faults the reformers for their lack of evidence, but he himself has presented no evidence for his claim regarding the tremendous importance of *Crises in Command* to the reformers.

Waller claims that social scientists have "rejected Gabriel and Savage's evidence and their explanation of disintegration in American combat units" in Vietnam. In his footnote to this assertion, Waller cites two articles from the Spring 1977 issue of *Armed Forces and Society*, a social science journal. However, I have examined these two articles by

Stanford W. Gregory, Jr., and John H. Faris, and I have found that they do not say what Major Waller claims they do.

Neither Faris nor Gregory were commenting on *Crises in Command* as Waller implies they were. Instead, they were commenting on an article by Gabriel and Savage that appeared in the Spring 1976 issue of *Armed Forces and Society*—an article that contained only a small fraction of the material found in *Crises in Command*. If one looks at the beginning of Faris s article, the second line, in fact, one finds that Faris states he considered the article by Gabriel and Savage a "worthwhile study of military disintegration in the U.S. Army in Vietnam." Faris did not, as Waller claims, reject the evidence and explanation of military disintegration in Vietnam that Gabriel and Savage presented. Faris's criticism was that the article oversimplified primary group dynamics and focused too narrowly on institutional factors alone. Faris still considered the article a "worthwhile study."

Similarly, Gregory's article did not reject the evidence and explanation of Gabriel and Savage's article. What Gregory actually said was that in his opinion their article "does not contribute any more advanced or innovative analytical knowledge to the social sciences that updates the original seminal work of Shils and Janowitz written shortly after . . . World War II." (The work alluded to is a 1946 article in *Public Opinion Quarterly* on cohesion and disintegration in the German Wehrmacht.)

Major Waller says that Gabriel and Savage have asserted only that "aggressive careerism . . . led to the disintegration of primary group social bonds in combat units." However, in their Spring 1976 *Armed Forces and Society* article, Gabriel and Savage never used the term *aggressive careerism*. What they did assert was that in the Vietnam War there was a radical increase in the percentage of Army officers, while the officers did not bear a comparable share of the dangers of combat. The article compared the French Vietnam experience, in which officers made up 4.9 percent of the French troops in Vietnam and bore 11.8 percent of the combat deaths, against the American one, where officers made up 15 percent of the American troops in Vietnam while bearing only 2 percent of the combat deaths. American combat soldiers frequently came in contact with large numbers of officers with conspicuously greater privileges and immunity from harm than enlisted combat soldiers, causing officers to be unable to inspire the respect of the enlisted men who resented them for not sharing hardships and dangers.

Waller has greatly exaggerated the influence of Gabriel and Savage on the military reform movement while misrepresenting their ideas and the responses of social scientists to their ideas.

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clarifying "management"

There is reference on page 75 of the September-October 1985 issue of the *Air University Review* to the use of the terms *management* and *managerial skill* as detrimental to Air Force interests. It is time to take a hard look at such usage.

Stuart Symington, the first Secretary of the Air Force, used the expression "Management Control through Cost Control" early in 1948. He was testifying before a congressional committee, and this remark went over big, so he had to make it good.

Lieutenant General Edwin W. Rawlings, DCS/Comptroller, set up a project to develop a workable system for cost control. Everything went along nicely when one was working up cost data for direct expense, as for an airplane, its flight crew, ground crew, and immediate support. The difficulty came when one was working out a formula for allocating overhead to obtain a full cost. Specifically, "what share of the expense of operating USAF Headquarters should be assigned to that operating unit?" In this case, no agreement could be reached on a basis for allocating overhead, and the project died a natural death. I was then General Rawlings's deputy, and this instance was the first time that I recall hearing the term in the military.

Cost accounting is quite different from accrual or obligation accounting, both of which are historical and look to the past. (The government uses "obligation" accounting, while business uses "accrual.") Cost accounting looks to the future to determine a standard cost for the planning and control of operations. Being an estimate, it is subject to change as conditions change. "Cost effectiveness" is a variant and is meaningless without a standard of cost as a measure of effectiveness.

Our present ideas about management grew out of the work of pioneers in industrial management about 1900. These men sought to apply the principles of the scientific method to manufacturing work. They defined "industrial management" as the structure of relationships between the work to be done, the people who do that work, and the things and facilities used in the doing. Their purpose was to

develop objective standards for the planning and control of work. The manufacturing arsenals of the Army and the Navy yards were deeply involved in this effort.

Industrial management procedures were also referred to as "the systematizing of work." Numerous articles appeared in various business magazines of the day, including a magazine named *System*, which has become *Business Week* today. Frederick W. Taylor, the author of *Shop Management*, believed that the principles developed for manufacturing could be generalized and applied to other fields of work.

Colonel Walter Dill Scott applied the principles of psychology to the selection of officers and to the classification and assignment of personnel in the Army during World War I. That experience was the genesis of personnel management, and his textbook came out in 1923.

Colonel Edward L. Munson, author of *The Management of Men* (1921), described his work as "the systematic development of morale and the control of human behavior." His dedication was to "all future leaders of men." He also applied the principles of psychology.

The point here is that the term *management* alone can be interpreted in various ways, depending on the viewpoint: writer-reader; speaker-listener. It needs a qualifier. While Secretary Symington had a reputation as a successful businessman when he headed Emerson Electric Company, his business experience did not transfer when it came to cost accounting. The other examples show proper definition or limitation.

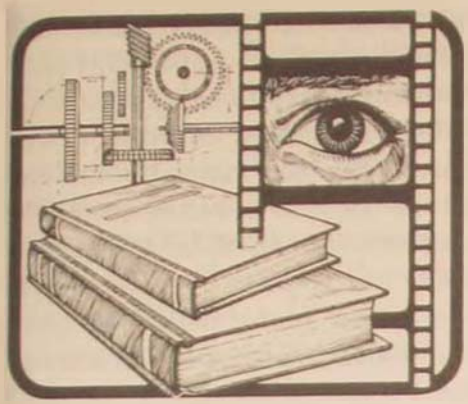
However, we have leadership and command with a long history and well-defined tenets. Simply stated, leadership has two primary functions: to build and sustain morale and to confront and meet changes affecting the organization. The primary functions of command are also twofold: to give orders and instructions and to police performers.

Since the matter is troublesome in communicating, the Air Force might be wise to stick to military language and avoid misunderstandings.

Major General Edmund C. Lynch, USAF (Ret)
Austin, Texas

Knowledge is not a loose-leaf notebook of facts. Above all, it is a responsibility for the integrity of what we are, primarily of what we are as ethical creatures. You cannot possibly maintain that informed integrity if you let other people run the world for you while you yourself continue to live out of a ragbag of morals that come from past beliefs.

J. Bronowski
The Ascent of Man, p. 436



books, images, and ideas

HOLLYWOOD AND THE BOMB

DR. LAWRENCE H. SUID

EVER since Hiroshima and Nagasaki opened the nuclear age, Hollywood has used the atomic bomb to create images of horror, doom, unremitting devastation, and mindless excitement. In countless science-fiction films, nuclear explosions have awakened assorted monsters, while radiation has shrunk men and women or spawned gigantic crabs, ants, or other mutants.

Apart from exploiting the horror engendered as praying mantises or giant ants threaten to take over the earth, filmmakers have attempted to instill in their stories a warning of the bomb's dangers. In the minor classic *The Day the Earth Stood Still* (1951), a visitor from outer space (played by actor Michael Rennie) lands on the Washington Ellipse to warn the world that it must banish nuclear war or face complete destruction. In *Them* (1954), a scientist responds to the appearance of giant ants—created by the Trinity bomb test in the New Mexico desert—by observing ominously that "nobody can predict" what people will find in the atomic age.

Despite such warnings, most of the science-fiction films suffered from absurd plots, atro-

cious dialogue and acting, and a lack of quality common to many low-budget productions of the past. As a result, few people took them seriously. Moreover, those who did attend these movies usually sought the enjoyment of witnessing horror and havoc on the screen, not revelations or warnings about the evils of the bomb.

Simultaneously, other filmmakers were creating a post-Holocaust genre of movies that provided a bleak image of man trying to cope with the aftermath of an apocalyptic atomic war. Although more serious in tone than the science-fantasy films, most of the nuclear-aftermath movies suffered from distortions of fact and blatant improbabilities. If an atomic war destroys all the world's population except the film's characters, who somehow have survived the conflagration and subsequent radiation, how do animals and plants continue to live without apparent trouble and where are the bodies of the dead?

Despite these shortcomings, such films as *The World, the Flesh, and the Devil* (1959) and *On the Beach* (1959) did raise the issue of the threat that atomic weapons posed to the world. However, the adventures and love stories of the central characters in these and such others of the same genre as *Panic in Year Zero* (1962) and the more recent *Mad Max* trilogy have tended to obscure the warning.

The World, the Flesh, and the Devil may have tried to provide too many messages. Beyond their concern about nuclear destruction, the filmmakers raised the issue of interracial relations, casting Harry Belafonte and Inger Stevens as the only apparent survivors of the holocaust. However, the then-sensitive subject of interracial romance loses much of its impact when another survivor (played by Mel Ferrer) shows up, leading to the movie's ridiculous conclusion: the three people walking off holding hands. Likewise, for most people, the current *Mad Max beyond Thunderdome* has used an unexplained nuclear war only to create the environment in which Max can wage wild battles and embark on spectacular chase scenes.

Of course, Hollywood has not always portrayed the bomb as the creator of such circumstances. Initially, Hollywood did mirror people's enthusiasm with the atomic bomb for having helped end the war. In a little-seen 1946 movie, *The Beginning or the End*, MGM producers attempted to tell the story of the development of the atomic bomb before the government had revealed much of the history of the Manhattan Project to the public. General Leslie Groves, the military head of the Manhattan Project, and Colonel Kenneth Nichols, his deputy, provided some technical advice to the filmmakers. However, for the most part, the screenwriter and director had to fictionalize their story and rely on Buddy Gillespie, MGM's special-effects wizard, to provide realistic visual effects. Although the film distorted history and inaccurately portrayed the technology, the recreation of the atomic bomb blasts seemed so realistic that Manhattan Project personnel thought they were seeing actual footage. These near-facsimiles also won Gillespie an Oscar for his special-effects work.

Nevertheless, as with so many Hollywood efforts to exploit a major event quickly, *The Beginning or the End* used the development of the atomic bomb primarily as background for a love story. To the extent that it conveyed a serious message, the film suggested that dropping the bomb had been necessary and that atomic energy would be used for the benefit of man.

With the cold war raging in the early 1950s, Hollywood returned to the bomb as a marketable subject, focusing first on the story of Colonel Paul Tibbets, the commander of the bomber group assigned the job of delivering the atomic bombs against Japan. Based on his own story and starring Robert Taylor and Eleanor Parker, *Above and Beyond* (1952) portrayed Tibbets's training of the unit and his sortie against Hiroshima aboard the *Enola Gay*, the B-29 that was named after his mother. However, the filmmakers compromised the

movie's documentary nature, devoting excessive attention to Tibbets's domestic problems with a wife who refused to appreciate the secret nature of his assignment or sense its importance to the war effort. Writer/directors Norman Panama and Melvin Frank also attempted to create in Tibbets a sense of guilt about what he had done. Since the flyer retained control over his portrayal and had expressed no regrets at having dropped the first atomic bomb, the effort to introduce the morality issue failed. The film ultimately became the story of a strained marriage and also a military melodrama, although it captured the dedication that Tibbets and his men had brought to their assignment. Like *The Beginning or the End*, it also conveyed the idea that dropping the bomb was necessary to end the war.

Having put the bomb in a positive historical perspective, Hollywood turned to the use of nuclear weapons in the contemporary world. In *Strategic Air Command* (1955), *Bombers B-52* (1957), and *Gathering of Eagles* (1963), filmmakers ignored any philosophical debate concerning the morality of the bomb, choosing instead to portray it as the preserver of peace. To General Curtis LeMay, the creator of SAC and its first commander, these movies offered the U.S. Air Force the opportunity "of letting the public see what is going on" in its operation, although LeMay admitted that he

> never did particularly like any movie that came out of Hollywood about our activities. They always had to throw this Hollywood stuff into it, a *little sex, the hero had to have a problem he had to* surmount and conquer, and so forth.

While arguing that the Air Force "didn't have people with mental problems and things of that sort," LeMay helped to arrange for the cooperation that provided filmmakers full access to men and equipment, thereby ensuring accuracy in the films' depictions of operation and policy.

The first two films, made during the height of the cold war, focused on the sacrifices that the Air Force men made to safeguard the nation. In *Strategic Air Command*, Jimmy Stewart played a star baseball player called back to active duty (much as Ted Williams had done during the Korean War). After some soul-searching, the recalled officer elects to stay in SAC to help safeguard the nation. As his understanding wife, June Allyson created the model of how military spouses should support their unsung husbands.

These portrayals benefited the Air Force in its efforts to retain its highly skilled personnel while reminding the American people of the importance of SAC and the bomb in preserving the peace. *Bombers B-52* conveyed the same message by focusing on a senior NCO (Karl Malden) who decides to stay in the Air Force. It also introduced to the nation the real star of the film, SAC's newest weapon to deter war.

In neither of these two movies did Hollywood portray the bomb as anything other than a positive force for peace. Perhaps this circumstance helps to explain why Stanley Kramer created such a stir in 1959 when he brought to the screen Neville Shute's *On the Beach*. With its vision of the apocalypse, Kramer's film presented the bomb as the destroyer of the earth at a time when people had come to accept nuclear weapons as an everyday fact of life and the primary safeguard against Communist domination of the world.

On the Beach left no room for hope. At its end, radioactivity from an undescribed world war envelopes Australia while a U.S. captain (Gregory Peck) takes his submarine out to sea on a voyage of no return. As much as anything else, this bleak vision of the end of the world brought the slogan "Better Dead Than Red" to the American consciousness. Within four years after the film's release, the United States and the Soviet Union signed a Nuclear Test-Ban Treaty.

By then, Hollywood had begun to portray the bomb without a socially redeeming feature, and in January 1964, the bomb became the ultimate villain. Stanley Kubrick's black satire *Dr. Strangelove* offered a bleak prediction of

the dangers the bomb presented to the world. Having for some time "been keen on the theme of a nuclear war being started by accident or madness," Kubrick had initially intended to approach his subject in the same antiwar manner as his minor classic, *Paths of Glory*. Using the novel *Red Alert* as his initial source, Kubrick soon found it impossible to maintain the serious tone of the book. He later recalled, "How the hell could the President ever tell the Russian premier to shoot down American planes? Good Lord, it sounds ridiculous." Consequently, the film turned into a satirical nightmare, a surrealistic portrait of humans blundering through war rooms, carrying on absurd dialogues on a hot line, and committing sheer lunacy while the world moved inexorably toward destruction.

If *Dr. Strangelove* had a flaw, apart from the factual errors in its portrayal of military procedures, it made people laugh and too often forget the serious nature of the subject. In contrast, *Fail Safe*, released later in 1964, may have taken itself so seriously that people perceived it as a semidocumentary. Based on the novel of the same name, the film conveyed the idea that a faulty computer tube could bring the world to the edge of nuclear war. Max Youngstein, the producer, said that the novel had "hit a very important nerve with me" because of his belief that accidental nuclear war was possible, the Air Force's claim notwithstanding. Although SAC maintained that its Fail-Safe procedures were absolutely foolproof, Youngstein argued that nothing is absolutely certain. Making a great leap of faith, he suggested that if something is not absolutely impossible, it is probable, and so he set out to show how the Fail-Safe system could fail.

Despite his clear antibomb statement, the producer requested Air Force cooperation to make the film. This petition produced a surrealistic exchange. The Air Force turned down the initial request for assistance, saying that the script portrayed the Fail-Safe system incorrectly. When Youngstein asked for information on how to show it accurately, the Air Force refused to provide help on the grounds that there was no reason to show the system working correctly if the filmmakers still intended to have it fail. Moreover, since the Air Force maintained that the system could not fail, Youngstein would have no film if he did portray Fail Safe accurately.

Having reached an impasse, Youngstein made his movie without assistance from the Air Force. In it, a U.S. bomber group heads toward the Soviet Union when a computer malfunctions and issues an attack order. One plane gets through and drops its atomic bomb on Moscow. In an effort to prove to the Russian premier that the United States had launched the attack accidentally, the President (Henry Fonda, in his standard U.S. President characterization) orders atomic bombs to be dropped on New York City.

Critics of the book and film argued that no U.S. President would take such a course of action. But no one offered a viable alternative, and trading New York City for Moscow did prevent World War III. In the end, despite its serious factual inaccuracies, *Fail Safe* was a serious attempt to warn the American people of the ongoing risks of nuclear confrontation.

Unfortunately for Youngstein and his message, his movie was overshadowed by the brilliance of *Dr. Strangelove*. Nevertheless, taken together, the two movies helped to create an atmosphere within the country in which people continued to discuss the bomb from the antibomb perspective that Stanley Kramer had introduced only a few years before in *On the Beach*.

Even while *Dr. Strangelove* and *Fail Safe* were still in production, General LeMay recognized the damage that the two films might do to the image of the bomb and of SAC. As a result, he fought with reluctant Pentagon officials to secure cooperation for *Gathering of Eagles* (1963) at a time when criticism was growing in Congress and the media against the long-standing relationship between the film

industry and the U.S. Armed Forces. LeMay felt that the story of a stalwart SAC wing commander might be "the closest any of them ever came to showing a true picture of what the military was all about."

Despite the efforts of two Oscar winners, director Delbert Mann and screenwriter Robert Pirosh, however, *Gathering of Eagles* lacked the crusading force of *Fail Safe* or the ribald vitality of *Dr. Strangelove*. Instead, people perceived it as only a pseudodocumentary Air Force movie containing rhetoric of the 1950s and an image of the bomb now at odds with their new perception of nuclear war. Moreover, *Gathering of Eagles* appeared at a time when the screen was offering a different vision of the military, one no longer as admiring as in the immediate postwar period.

Seven Days in May, carrying the new image to its logical conclusion, showed an attempted coup d'état by a ramrod chairman of the Joint Chiefs of Staff (Burt Lancaster), who confronts a president seeking to end the arms race (played by Fredric March). The cause of the military's dissatisfaction focuses on the nuclear disarmament treaty that the President of the United States has negotiated with the Soviet Union. Fearing the Russians will cheat on the treaty and believing that the U.S. President is weak

Produced in the early sixties, A Gathering of Eagles *focused on the way that a dedicated SAC wing commander, played by Rock Hudson, dealt with the demands of his job. With public attitudes toward the military on the verge of a dramatic change, the film was the last in a genre of upbeat movies about the U.S. Air Force dating back to* Strategic Air Command, *which starred Jimmy Stewart.*

because he opposes use of the bomb, most of the top generals and admirals throw in their lot with the takeover attempt. Ultimately, the cause of peace and efforts to control the bomb triumph, thanks to a Marine colonel (Kirk Douglas) who discovers the plot and alerts the President.

The story was not one to thrill military people. Although President Kennedy liked the novel and believed that it contained an important message, the Pentagon did not want anything to do with the film even while Kennedy was still alive. Perhaps sensing the negativity they would encounter, the filmmakers made no official request for assistance, but the production crew was able to wrangle their way aboard an aircraft carrier and obtain some footage while they were filming in San Diego.

The director of *The Bedford Incident* (1965) did not manage to do even that when he tried to film aboard a destroyer. After checking with the Pentagon and finding that the Navy had turned down a request for assistance, an alert officer refused a request from the producer to take a few exterior shots of the ship. Not surprising, the Navy had little interest in cooperating with a story about a confrontation between a U.S. vessel and a foreign submarine that showed an American captain (Richard Widmark) pursuing the unseen foe with Ahab-like obsession until the two vessels ultimately destroyed each other with their nuclear weapons. The empty sea at the close of the movie provided all too stark a warning to the world about possible outcomes of confrontations allowed to continue unchecked.

Undoubtedly, the changed image of the bomb that Hollywood provided during the 1960s contributed to the growing concern within the United States about the continuing nuclear arms race. However, it did little to deter the willingness of the nation's leadership to enter a war involving conventional weapons. Moreover, the daily reporting of the Vietnam War on television changed public support for the war over time and for the most part destroyed the market for Hollywood movies about the military, including stories depicting the bomb.

Ironically, Robert Aldrich's *Twilight's Last Gleaming* (1977), the first major production of the 1970s portraying the dangers of nuclear arsenals used dissatisfaction with the Vietnam War as the starting point for its story. In this film, an unstable Air Force officer (played by Burt Lancaster) seizes a missile silo and threatens to start World War III unless the United States acknowledges its mistakes in Vietnam. The world is saved from nuclear holocaust when the President coaxes the officer into the open, where both men are shot down.

Having to a significant extent helped to create first the pro-bomb attitude within the country during the 1950s and then the anti-bomb sentiment of the 1960s, Hollywood in the 1980s has assumed its more traditional role of reflecting the nation's attitudes and in recent movies has depicted the growing anxiety about nuclear weapons and nuclear war that has been developing throughout the country. *Wargames* (1983), like *Fail Safe* in the 1960s, drew heavily on the idea of computer failure that might trigger an accidental nuclear war. As with the earlier movie, *Wargames* depended on viewers' willing suspension of belief so that its plot could unfold. In this instance, the film viewer was presented with a situation in which a computer could launch a missile attack and only a young computer hacker (played with suitable élan by Matthew Broderick), could figure out how to stop it. The fast-paced story to a significant degree overcame the implausible premise and provided visions of atomic destruction that helped to reinforce the antinuclear movement in the country and make the movie a box office success.

Meanwhile, television has taken both sides in portraying the bomb in recent years. The 1980 made-for-television miniseries *The Enola Gay* covered virtually the same ground as the earlier movie *Above and Beyond*, adding only some docudrama-type scenes conveying events in Japan related to the atomic bomb mission

against Hiroshima. However, despite vignettes of the Japanese side of the story, the production ended up with a dull recreation of the preparation and dropping of the bomb and simply underlined again the conclusion that the United States had made the right decision in using the first nuclear weapon.

In contrast, the controversial and top-rated *The Day After* and the PBS broadcast of *Testament* (a movie already shown earlier in theaters) reflected and, at the same time, reinforced the sentiments of the growing nuclear freeze movement in Western countries. Unlike *On the Beach*, which did not portray the actual destructiveness of nuclear war, or *Fail Safe* and *Dr. Strangelove*, which ended as the bombs went off, *The Day After* and *Testament* used images of the destructiveness itself to create their impact. (Turner Broadcasting System's airing of the British film *Threads* showed equally chilling scenes.) To the extent that antiwar feelings are best enlivened by showing the victims of war rather than the war or the instruments of war, these movies on television probably succeeded better in warning the nation about the dangers of nuclear war than the earlier theatrical films. As often happens in Hollywood, they also have spawned renewed interest in other nuclear stories.

One ongoing project, *Radioactive Dreams*, will tell the story of two teenagers who emerge from a bomb shelter fourteen years after a nuclear attack. The filmmaker, Albert Pyun, has explained:

> We feel there's tremendous interest in the nuclear issue right now. What makes our project different from *Testament* or *The Day After* is that our story is about the survival of the human spirit.

In giving consideration to remaking *On the Beach*, Peter Bart has said that MGM/UA feels that "this is a very touching love story about those people who may or may not survive." Apprised of the possible new production, Stanley Kramer observed: "If it is being remade, then it's a little late in the game. These films are suddenly coming into focus, arriving late and out of breath everywhere."

In any case, Hollywood's many and varied portrayals of the bomb have undoubtedly reached more people and influenced more attitudes, both positively and negatively, than any other medium of presentation, whether factual or fictional. Very simply, Godzilla, giant ants, Dr. Strangelove, Slim Pickens riding a nuclear bomb down to its Soviet target, the freeze-frame montage of New York City at the moment of nuclear destruction, and countless other visual representations of the bomb have more power to instill images on the minds of the public than film documentaries, historical accounts, novels, polemic treatises, or even antinuclear demonstrations.

Washington, D.C.

Short Bursts

America in Vietnam: A Documentary History edited by William Appleman Williams, Thomas McCormick, Lloyd Gardner, and Walter LaFeber. New York: Doubleday, 1985, 345 pages, $19.95 cloth, $9.95 paper.

Four distinguished historians—William Appleman Williams, author of *The Tragedy of American Diplomacy* (revised second edition, 1972); Thomas McCormick, author of *China Market* (1967); Lloyd Gardner, author of *Safe for Democracy* (1984); and Walter LaFeber, author of *Inevitable Revolutions: The United States in Central America* (1983)—have each written an introductory essay to place the eighty-three documents contained in *America in Vietnam* in proper historical context. These documents, including newly opened presidential papers, congressional debates, military reports, treaties, and newspaper articles, should be a useful source for anyone trying to understand the causes, character, and consequences of American involvement in Vietnam. To be sure, the Vietnam story is complicated and convoluted, but when viewed in terms of America's traditional involvement in the Pacific, particularly with China, it becomes much more understandable. The introductory essays point out that, in a fundamental sense, the history of American involvement in Vietnam is an account of how the United States shifted from viewing that small country as a means to another end—America's position in China—to defining it as an end in and of itself.

Among the more interesting and beneficial documents are the following:

- National Security Council 68: Pivotal Report on the Future of the Cold War, April 1950—which reveals the fundamental American commitment to the militarization of the Cold War and provides a most elaborate analysis of the continuous circle of military protection, political stability, and economic growth.
- Acheson on Asia: An Amazing Dinner Conversation with the Secretary of State, December 1949—at which time Acheson argued that it was America's responsibility to "look after" not only Indochina but also Indonesia and the Philippines.
- A Gloomy Report, 5 May 1954—wherein Secretary of State John Foster Dulles reveals that he has conceded an election victory as well as a military triumph to the Vietminh.
- First Yes, Then No—Then Maybe, 31 August 1963—revealing how Washington gave its approval for a coup against Diem and then had second thoughts. (The discussion concluded with Lyndon Johnson's observation that it was time to stop playing cops and robbers.)
- The Costs of the Vietnam War, 1971—a report by the Library of Congress on the quantitative costs of the war. (Particularly noteworthy is the section on Agent Orange and the tests that confirmed the fact that the agent causes birth defects.)

Also included in the collection are a Vietnamese account of the French conquest of Vietnam and an excerpt from *Lao Dong* (Vietminh) Party journal. While it was somewhat surprising to find either of these items included in a book that is a documentary history of America's involvement in Vietnam, they serve as a valuable reminder of the "other" side.

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Vietnam: The War in the Air (A Pictorial History of the U.S. Air Forces in the Vietnam War: Air Force, Army, Navy, and Marines) by Colonel Gene Gurney, USAF (Ret). New York: Crown, 1985, 277 pages, $17.95.

This is a book about air warfare but may give more food for thought about the respectability of merchandising government publications, which are exempt from copyright and are in the public domain. Enterprising authors have long taken such open literature and repackaged, copyrighted, and marketed it. The availability of cheaper printing, found in such places as Hong Kong, seemingly has made this enterprise more profitable and, therefore, more frequent. Even though serving up today's commercial hash from yesterday's feast of public writings may have become more commonplace, at $17.95 a plate this documentary repast is hardly common fare.

The dust jacket blurb credits Colonel Gene Gurney with "a book a year for the past twenty-five years." His list of credits includes such eye-catching titles as *Arlington National Cemetery, Beautiful Washington, D.C.*, and *The Pentagon*. So much for literary credentials!

Two-thirds of this volume is taken verbatim from *The United States Air Force in Southeast Asia, 1961-1973: An Illustrated Account*, which was published by the Office of Air Force History in 1977. The remainder comprises material taken from a Department of the Army study and *Naval Review* articles,

"condensed" (expurgated, not synthesized) to fit "printing limitations." New material consists of a title, an index, two pages of acknowledgments (taken mostly from the Air Force volume), some page numbers, a handsome dust jacket, and a foreword by General William Westmoreland, who is quoted as being pleased that the author is "writing about Vietnam." So much for authorship!

Should this volume appear in the Vietnamese language, Le Duc Tho and his countrymen who joined in the Paris talks might be amused by the author's acknowledgment of those "who helped produce this overall air-power treaty (sic) on the Vietnam War." So much for Hong Kong printing!

Other parts of this book would have profited from thorough editing. The practice of reproducing pages directly from the original copy or setting type word-for-word from it has repeated a multitude of misprints. Although the illustrated account has been one of the Office of Air Force History's most popular works, it was found to contain abundant editorial errors, numbering in the hundreds. These were corrected in a revised edition that the office published in 1984, but, unfortunately, the portions copied for this commercial version came from the original printing. So much for originality!

Owners of the official volume of the Air Force's illustrated history may be pleased to know that it contains nearly twice as many photographs as this commercial edition, together with more than 100 additional pages, including special coverage of such topics as air rescue, tactical and strategic airlift, reconnaissance, and air refueling. Potential customers for *Vietnam: The War in the Air* would probably get "more for their money" by buying the revised official history, which can be purchased for $14.00 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The GPO stock number is 00807000516-6.

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Long Time Passing: Vietnam and the Haunted Generation by Myra MacPherson. Garden City, New York: Doubleday, 1984, 663 pages, $19.95.

Myra MacPherson's expressed purpose for writing this book was neither to prove the rightness or wrongness of the war nor to refight old ideological battles, but rather, to show how the war affected the generation that was asked to fight it. In so doing, she has raised many questions that will be argued by succeeding generations.

Through the use of various studies, MacPherson pointed out that America's upper middle class did not fight. Mostly, the war was waged by the working class, who may well be tomorrow's defectors. The problems of Vietnam veterans—unemployment, psychological and physical breakdowns, and other ills—are cruel and provide a significant deterrent to volunteering for another war. (p. 69) America's democratic ideology complicated the process of finding a fair method for selecting soldiers for the war. The draft was not based on equality.

> The fittest—those with background, wit, or money—managed to escape. Through an elaborate structure of deferments, exemptions, legal technicalities, and noncombat military alternatives, the draft rewarded those who manipulated the system to their advantage. (p. 32)

MacPherson reports about the many scams used to avoid the draft and suggests that many opportunists took advantage of them. Indeed, feigning of injuries (such as temporary psychological impairment), purposely inducing great weight loss, claiming to be homosexual, causing bodily injury (cutting off one's trigger finger), and falsely claiming student status were just a few of the ruses used. Others just refused to serve, either escaping to Canada or choosing prison. MacPherson claims that the veterans accepted these methods without too much vindictiveness, but what infuriates many of them is the fact that many of the nongoers of yesteryear now champion the draft, often on the grounds that the all-volunteer Army is so disproportionally poor and black.

The author examines the veterans' wartime experiences, their postwar adjustments, and emotional problems characterized as posttraumatic stress disorder. This latter condition has been manifested by poor motivation, inability to stay at one thing for any length of time, fear of being intimate with loved ones, suicidal tendencies, anger, depressions, low self-esteem, and basically not caring about anything. MacPherson also has dealt with the experiences of those who did not go. What becomes clear is the entirely different perspective between parties who were concerned about the war and did not have to go and those who did. The sheer apprehension experienced by those who had to go can never be grasped by those who worried but did not go.

In dealing with the combat narratives of Vietnam veterans, MacPherson largely ignores the professional Air Force and Navy flyers who courageously fought the air war over North Vietnam. Her focus is rather with the ground army, which was composed basically of draftees and those who would have been

drafted if they had not volunteered.

The author's main interest was to explore what happened to the generation asked to fight. She has interviewed more than 500 individuals affected by the war: veterans, their wives, nurses, doctors, draft dodgers, reservists, mothers, and fathers. She found the Vietnam War uniquely different from other wars for several reasons. She points to the prevalent anti-war element as one and identifies the societal indifference toward the returning veteran as another. There was a punitive attitude toward veterans, expressed by meager GI benefits and a lack of concern for Viet Centers and Agent Orange studies. Also, because the lines of combat in Vietnam were not clearly drawn, there was no real rear area. Most base camps were constantly subject to rocket attacks and enemy penetration. Fear and constant anxiety were there. The author sees a turning point for the veterans coming in January 1981, with the nation's extravagant euphoria over the return of the fifty-two hostages from the American Embassy in Teheran. Across the nation, veterans were outraged at the hostage homecoming celebration in comparison to the hostility that they had met when returning from war.

Apart from a few confusing incidents—such as the chronological account of Hamburger Hill, which happened in May 1969, not August (p. 585)—the author has drawn together an excellent compilation of combat and noncombat memories and has succeeded in weaving them into an interesting and memorable piece about the American Vietnam generation.

The generation that fought the Vietnam War will remain only a lost generation if this country fails to understand the realities of attempting to fight the next war. Certain questions should be asked before this country undertakes another war. What will be the moral fiber of the nation? How noble is the cause? Will the people accept the government's reason for going to war? How willing are the citizens to die for this cause? The Vietnam generation and their reaction to their war ought to have imbedded these questions into American ideology. *Long Time Passing* has done much to aid this thought process.

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Advice and Support: The Early Years, 1941-1960, the U.S. Army in Vietnam by Ronald E. Spector. Washington: Center for Military History, 1983, 391 pages, $18.00 cloth, $11.00 paper.

Ronald Spector has written an important book on the early years of U.S. involvement in Indochina. While much attention has been paid to the French and American wars, less than thorough scholarly attention has been paid to the seminal years of 1944-46 and the start of the shooting war against the French—listed as December 1946, by Spector and others, but which really began (as the Communists have written) in September 1945 in Saigon.

Advice and Support contains a useful, short overview of Vietnamese history but deals mainly with the evolution of U.S. policy, and subsequent actions, in Indochina from the closing months of World War II to about 1960. In his position with the U.S. Army's Center for Military History, Dr. Spector had access to pertinent archival materials both in the United States and in Europe. The result is the production of what must become a standard reference book on the period.

The author acknowledges the controversial nature of the subject, and while he renounces any bias toward any organizations or groups, a subtle and perhaps understandable bias may be detected in the treatments of certain events, such as the Allied occupation of Saigon, 1945-46. His treatment of General Douglas Gracey, the British Force Commander, and his description of events in Saigon in 1945-46 are inaccurate and reflect the fashionable writings of some of the historians whose help and advice is acknowledged by Dr. Spector. Since General Gracey's specific orders are available for scholarly review—and they state specifically that France was to retain sovereignty over Indochina—criticisms of Gracey's refusal to accept the Viet Minh "government" must therefore reflect a bias about the events or an ignorance of the facts.

There is one fault with the bibliographic notes. Dr. Spector cautions readers about the use of the late Bernard Fall's groundbreaking works, citing Fall's "strong pro-French bias," yet nowhere are similar strictures on the use of the works of Joseph Buttinger, for example, whose anti-French and anti-British biases are more pronounced.

However, *Advice and Support* is a book which must be read, and kept, by any serious student of the history of that turbulent part of the world, from whose influence we are not yet free.

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Into the Mouth of the Cat: The Story of Lance Sijan, Hero of Vietnam by Malcolm McConnell. New York: Norton, 1984, 253 pages, $13.95.

Lance Sijan is a genuine American hero, the first U.S. Air Force Academy graduate to win the Congressional Medal of Honor. Every Academy cadet knows the details of how the young F-4C Phantom pilot, shot down over Laos and horribly disabled, dragged himself through the mountains and jungle, evading capture for forty-six days; escaped again after capture; and, while too weak to feed himself, delirious much of the time, and undergoing systematic torture, continued to resist and plan escape. He died from his untreated wounds on 22 January 1968 after a seventy-two-day ordeal.

Journalist Malcolm McConnell, an earlier graduate of Sijan's high school and a younger brother of a flyer killed in World War II, learned the saga of Sijan's travail through the memory of a fellow POW, Captain Guy Gruters. Gruters and Major Bob Craner ministered to the dying Sijan and heard both his account and the stories that the North Vietnamese told about him. McConnell calls his book a recreation of actual events in dramatic narrative. On television, it would be termed a docudrama. The captivity account is augmented with revealing excerpts from Sijan's earlier years and with details of the unsuccessful rescue effort when the young pilot first went down.

The Sijan story deserves a larger audience, and this volume is gripping and moving. However, *Into the Mouth of the Cat*, for my taste anyway, comes across as too sacchrine, is too didactic, and reads too much like *Readers' Digest*, which, indeed, sponsored the volume. I was very much reminded of the great escape literature that intrigued me in junior high school (e.g., *The Colditz Story*, *Stalag 13*, etc.). Very likely, *Into the Mouth of the Cat* will be a book that will find its way onto high school reading lists. I am glad that Lance Sijan's story is in print, but, for more sophisticated readers, I would recommend the more substantive POW literature available, starting with Scott Blakey's *Prisoner at War* (1978), John Dramesi's *Code of Honor* (1975), or James and Sybil Stockdale's recent *In Love and War* (1984).

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Defense Facts of Life: The Plans/Reality Mismatch by Franklin C. Spinney and edited by James Clay Thompson. Boulder, Colorado: Westview Press, 1985, 260 pages, $35.00 cloth, $16.00 paper.

Born out of a late 1970s debate as to how U.S. military forces should be strengthened, *Defense Facts of Life* offers some informed reflection over the need for and the shape of basic changes in the collective process of defense decision making. Although Franklin Spinney, a senior systems analyst in the Pentagon, imparts nothing new in explaining what factors are at work increasing the costs of individual weapon systems, his use of the case study is a revealing way to acquaint us with how the search for high technology adds to the chief uncertainty facing the defense planner, namely, reconciling tension between desires and scarce resources or between plans and reality.

Spinney invites us to explore the plans/reality mismatch through his assessment of the "impact of budget growth on readiness and modernization in Air Force tactical aviation." (chap. 3) It is with this case study that he persuasively demonstrates how increased funding of tactical aviation programs has not only led to a measurable increase in the complexity of the weapon systems but also affected readiness and modernization adversely. For example, he points to how complexity decreases the "tooth-to-tail" ratio—that is, the ratio of soldiers in actual combat (the "tooth") to soldiers required to support those in combat (the "tail"); increases the ties that an aircraft must have with maintenance depots located in the United States and makes forces more vulnerable to disruption between base and depot; causes a decrease in training and hence a reduction in the experience levels of personnel; and, most disturbingly, may ultimately reflect a desire to actually hold down growth in operations and support (a means of increasing readiness) in favor of increasing high-technology investment. For Spinney, this situation in tactical aviation is indicative of a condition that has long afflicted the Department of Defense (DOD) as a whole. The relationship between increased funding and complexity "leads to long-term growth in the cost of *low* readiness" which, in turn, slows modernization "because the cost of replacement is increasing so rapidly." (p. 46)

How is the plans/reality mismatch to be reconciled? According to Spinney, "hedging strategies" are called for. (p. 171) These entail the "repricing" of the procurement budget in order to deal with "structural" problems in estimating costs and the establishment of a "macrolevel planning" activity within the Office of the Secretary of Defense, whose "unifying theme" would seek to understand the threat to and deficiencies of U.S. forces and to identify alternatives designed to create modernization options matched to the combat task. (pp. 171-77) Both measures would appear to be self-denying practices that would not warrant further congressional attempts at managing DOD.

Defense Facts of Life has a voluminous number of

charts and graphs but lacks any comments by the editor, James Thompson, on how Spinney's work might support or challenge the Grace Commission's diagnosis of and prescription for DOD's ills. Nevertheless, Spinney's book deserves close attention.

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The American Retreat: The Reagan Foreign and Defense Policy by Joseph Churba. Chicago: Regnery Gateway, 1984, 251 pages, $18.95.

America's ability to keep the peace and protect freedom is in decline around the world. Joseph Churba argues forcefully, in this final installment of his trilogy on America's loss of prestige, that America's retreat is a result of Washington's inability to come to grips with the goal of the Soviet Union—world expansionism. He believes that President Reagan's verbal attacks on the Soviet Union are all that remain of candidate Reagan's plans to counter Soviet aggression and subversion of Third World countries. The Soviet Union's deliberate drive to isolate the United States, neutralize NATO, and choke off the flow of oil and other strategic minerals to the West has met with little resistance from the United States. It is Churba's contention that U.S. policies are strictly defensive in nature, attempting to maintain the status quo, which in the end fail in preventing Soviet expansionism.

The author has detailed, starting from 1975, Soviet-fomented unrest in the Middle East, Latin America, and Africa. Although Churba does not hold President Reagan solely responsible for recent U.S. inaction, he does contend that the President is destined to repeat the mistakes of the Carter administration unless the President changes from election-year rhetoric to a coherent global strategy.

Citing deteriorating relations with traditional allies (in particular, Israel), indecision over the deployment of major weapon systems (intermediate-range nuclear forces and the MX), and the importance of budgetary and political considerations in the formulation of defense policy, Churba warns that "U.S. military forces are now virtually incapable of fighting and winning any war with the Soviet Union." However, he believes that a total national commitment to improve U.S. defenses, coupled with the formulation of a strategy to counter Soviet aggression, could eliminate the Soviet advantage in five to fifteen years. Among the suggestions he makes is the relocation of a majority of NATO troops to northern Germany, prepositioning of U.S. troops and supplies in the Middle East, promoting economic stability and eliminating corruption within authoritarian Third World regimes, reinstituting the draft, and depriving the Soviet Union of needed capital and technology.

This strategy is costly and controversial. In fact, the Reagan administration, since taking office, has attempted to implement many of the proposals that Churba advocates but has drawn criticism from both friends and foes alike. Furthermore, the budget deficits that are plaguing the United States are limiting the implementation of many of these defense strategies and will do so for the foreseeable future.

Readers may not always agree with Churba's assessments, yet they will acknowledge that *The American Retreat* is well organized, insightful, and easy to read. Students of foreign and defense policy will profit from reading this book.

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Industrial Capacity and Defense Planning: Sustained Conflict and Surge Capability in the 1980s edited by Lee D. Olvey, Henry A. Leonard, and Bruce E. Arlinghaus. Lexington, Massachusetts: Lexington Books, 1983, 192 pages, $19.95.

Industrial Capacity and Defense Planning is the umbrella title for a collection of essays that address the problems of using NATO's (including the U.S.) industrial capacity effectively to deter war and mobilizing it to win a European war should one occur. Major issues examined include cooperation in arms production within the NATO alliance, stockpiling war reserve material, arms standardization within NATO, the need to develop a surge capability in the alliance's defense base, and the always-present political considerations inherent in coproduction and collaboration as a means of strengthening NATO's defense industrial capacity. To at least some extent, each issue is examined in the context of the debate of whether a war in Europe will be a long or short one.

As in any collection of essays, some are very good, while others could have been profitably omitted. The best essay is James Golden's "NATO Industrial Preparedness," in which he concludes that "the evidence suggests that the major impetus for a restructuring of the NATO defense industrial base must come from the political, rather than the economic arena." Lawrence Korb has done a craftsman-like job in "A New Look at U.S. Defense Industrial Preparedness." One of his key conclusions is that "the parameters of warning time and pace of combat are major determinants in the trade-off equation for

production base versus war-reserve stockpiling." Worth reading are Henry Leonard's "Absence of Incentive: Malaise in Our Defense Industries" and Michael Gordon's "If Defense Spending Is on the Rise, Can Inflation Be Very Far Behind." James Bowden's "Defense Acquisition and Decision Making: The F-16 Case" is a reasoned rebuttal to some points on defense procurement raised by James Fallows in his book *National Defense*. Bruce Arlinghaus does a good job in summing up in his conclusions. A major point that cannot be made too often is that "mobilization potential itself should be considered as a part of our deterrent posture and assigned a higher priority in the planning process."

The remaining essays were disappointing for several reasons: they were dated, generally relied on reprinted material, were somewhat pontifical, or were too brief, as in the case of Felix Fabian's four-page "The Soviet Industrial Base."

Overall, there is more good than not in the book, and *Industrial Capacity and Defense Planning* must fairly be judged as recommended reading. Certainly the subject matter is deserving of all the attention that it can muster.

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The Government Press Connection: Press Officers and Their Offices by Stephen Hess. Washington, D.C.: Brookings Institution, 1984, 160 pages, $22.95 cloth, $8.95 paper.

This is a gold mine of a little book, one that should go a long way toward stabilizing and correcting the mutual distrust and misperceptions between the government and journalists that turned bitter during the Vietnam era and have been sour ever since. One hopes, in fact, that *The Government Press Connection* becomes a part of the core curriculum at university journalism schools and at public information courses for government officials.

Stephen Hess, a senior fellow at the Brookings Institution, spent a year (1981-82) observing press operations at the White House, Pentagon, State Department, and several other key government departments. He also was granted a security clearance so that he could gain relatively unobstructed access to some of the policy planning councils. This book is the result of that year of observation.

Right up front it should be noted that Hess comes across as sympathetic to government press officers, whom he portrays as misunderstood, unappreciated even within their own departments, and largely viewed (by outside journalists) as "incompetent manipulators." (p. 4) Hess attacks these notions but with careful and unemotional observations that manage to convince the reader that, by and large, press offices are not just a government subsidy but "an entitlement that flows from the nature of a free society and the relationship of the state to the citizen." (p. 115)

The Government Press Connection is especially strong in providing insight concerning the various "rules of the game" for both press officer and reporter. Readers will be intrigued, for example, by the sliding scale of situational ethics portrayed by Hess's discussion of the lie. "On a scale of decreasing acceptability to reporters," he notes, "the types would be the honest lie, the inadvertent lie, the half-truth, and the lie." (p. 24) While most reporters apparently will understand the first three categories and will even forgive their use, it is the "Big Lie" that will turn the most forgiving among them into "inflamed civil libertarians." (p. 25) His chapter titled "Leaks and Other Informal Communications" is similarly intriguing, offering important insights into the practice of leaking information; here Hess also provides a typology of leakers and explanations of why these individuals leak.

Hess's work comes up short in several important areas, however—most notably, in his treatment of crises. A scant five pages are devoted to crisis reactions. This brevity, to a military reader, leaves the scent of a missed opportunity by the author.

It will be interesting to observe how other journalists accept Hess's work. One recent indicator could be the fairly positive, though often grudging, good marks by the *Columbia Journalism Review* (January/February 1985 issue). Although the *CJR* couldn't resist sniffing aloofly that Hess enjoyed the patronage of a think tank, that the government press officer continues to be best known by the term *flack*, and that Hess's motives were questionable in not naming "inner-ring reporters" who had asked for favors, *CJR* did admit that *The Government Press Connection* contains some "pioneering work." This admission alone suggests that perhaps that chasm of suspicion which has lingered since the Vietnam era is beginning to close. It will never close completely (nor should it), but Stephen Hess has helped both government press officers and the journalists of our society find an important level of mutual understanding.

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European Security and France by François de Rose, translated by Richard Nice. Champaign: University of Illinois Press, 1985, 143 pages, $19.95.

Much of the analysis portion of this compact and readable book could have been written by a NATO desk officer in the Department of State. François de Rose's assessments of the issues—the threat, nuclear freeze, no first use, etc.—are very much in line with official U.S. and standard NATO communiqués. His prime concern is making deterrence more stable and discussing France's contributions to the security of Western Europe. The author sees greater stability in an increased European contribution to conventional defense of the continent, together with a "modification" of flexible response. It is this latter point that detracts from the otherwise tight study of the context of European security.

In effect, de Rose envisions a greater willingness on the part of NATO to initiate the use of nuclear weapons "on forces that had already invaded alliance territory," using, preferably, enhanced radiation warheads. So dear should this—and nuclear strikes deep in Warsaw Pact/Soviet territory—be that de Rose calls it "inflexible response." Such suggestions face so many monumental political obstacles on both sides of the Atlantic that it is a little surprising that they are in this otherwise balanced book. The second focus, to which the author devotes two excellent chapters, deals with the role of France in any confrontation with the Warsaw Pact or the Soviet Union. De Rose believes that France is moving back to its pre-1966 position of closer alignment with NATO. This observation may be controversial in many quarters.

This short work covers a great deal of ground. In spite of committing the all-too-common error of mistaking knowledge of a solution with the political feasibility of the solution, the author does a good job of outlining the main components of the book's charter: the role of France in maintaining European security. *European Security and France* is a useful addition to the conventional defense debate and will also interest students of French nuclear policy in the post-de Gaulle era.

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The Australian Economy: A View from the North edited by Richard E. Caves and Lawrence B. Krause. Washington: Brookings Institution, 1984, 415 pages, $12.95 paper, $32.95 cloth.

This study, undertaken by a team of nine economists in 1983, is supported by appropriate figures, index, and tables relating to macroeconomy, natural resources, the labor market, the financial system, manufacturing industries, and social welfare. Little attention is paid to the effect of oil price increases on Australian inflation. The chapters of this timely, workmanlike book are somewhat uneven. Some, particularly "Australia's Comparative Advantage in International Trade," by Lawrence B. Krause, are very good indeed. The editors acknowledge the help of a number of Australian colleagues, and the Centre for Economic Policy Research at the Australian National University, Canberra, cooperated in the project and organized the Brookings-Canberra Conference.

The final chapter's conclusions carry the caveat that outsiders with fresh perspectives and independent judgment risk trading on a tourist's incomplete perceptions and overvaluing conclusions. The chapter draws together threads to supplement the earlier chapters dealing with peculiarly Australian approaches to unions, foreign investment, and foreign subsidiaries. The national distrust of market outcomes and support of egalitarianism are rightly emphasized. Because Australian society resists international competition, it is hostage to politically powerful vested interests such as the labor unions and monopolistic business firms. Richard E. Caves contributes a valuable chapter on scale and productivity in manufacturing.

The economy of this important ANZUS ally needs to be better understood by Americans. High tariff protection hitherto has been an impediment to overseas trade. Today, as immigration policy changes and new markets develop, the Hawke government is striving to create a fresh economic climate.

In the domestic sphere, *The Australian Economy* includes reports on the distinctive wage-setting Conciliation and Arbitration Commission and trends related to Labour's reintroduction of a Medicare-type program. The U.S. economist-authors find fiscal federalism egalitarian but not very efficient.

Australia, endowed with mineral and food-producing resources, is part of the burgeoning Asia-Pacific region. As one of the authors notes, there is probably no other industrial country with such a complete specialization in natural resource exports. Therefore, the possibility of a breakthrough in materials technology affecting mineral exports has to be considered.

The nonspecialist reader may be daunted by economic modeling. However, for military readers interested in whether Australia can provide for adequate defense budgets, this Brookings study has expertly presented the geographic, social, and economic factors.

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German Military History 1648-1982: A Critical Bibliography by Dennis E. Showalter. New York and London: Garland, 1983, 331 pages, $45.00.

This excellent reference work, one in Garland's series of Military History Bibliographies, mirrors Dennis Showalter's wide-ranging interests in German military history. Its ten chapters (plus an introduction and an afterword of very recent publications that have come to the author's attention) are arranged chronologically, and each follows a consistent format: a critical essay, followed by an alphabetical list of the works evaluated. In the essays, Showalter deals also with special topics within a given period, such as the Prussian military reforms after the Jena defeat and the role of air power during the Nazi years. While the emphasis is on academic literature, including dissertations and essays in collective works, professional military writing and popular histories are not excluded. The result is an evenhanded, thoughtful book that takes into account traditional and recent Western views, along with those of East German scholars, on German (though not Austrian and Swiss) military developments since 1648.

Since the work is not intended to be a complete bibliography, it is especially open to criticisms from historians who might disagree with the author's interpretations or whose "favorites" were somehow overlooked. In the latter category, one could cite a lack of French scholarship and, in more specific instances, note the omissions of the annual *Jahresbibliographie* from the general works, Alfred von Wegerer's knowledge (and distortions) of the war-guilt question after World War I, and John Erickson's research on the Russo-German front during World War II. Nevertheless, obvious gaps seem relatively rare. One might have preferred also that the historical preface had been interspersed at the beginning of the various chapters rather than at the front of the book. These minor criticisms aside, as a reference tool, Showalter's bibliography will benefit novice and specialist alike.

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Clandestine Operations: The Arms and Techniques of the Resistance, 1941-1944 by Pierre Lorain, translated by David Kahn. New York: Macmillan, 1983, 185 pages, $24.95.

David Kahn's translation of a 1972 work makes available a vivid and interesting picture of the French Resistance against the Nazis. By recounting the specifics of the clandestine fighting in France, Pierre Lorain offers a catalogue of resistance tactics and techniques. Lorain also presents a memorial to the sacrifice and courage of the Resistance and Great Britain's Special Operations Executive (SOE).

Lorain focuses on the struggle between the Resistance and its adversaries. He presents both drama and technique of clandestine radio transmissions, German direction-finding, ciphers/codes, aerial resupply and pickup missions, and coordination of operations and weapons. His chapters brim with illustrations and descriptions of clandestine techniques and procedures. This short presentation is informative and can be read in one comfortable sitting. Kahn's translation flows easily, but the reader may stumble on some technical terms and procedures. *Clandestine Operations* constitutes more of a reference book or operating manual of the trade than a comprehensive analysis of the Resistance itself. Even so, Lorain condemns Nazi Germany, Hitler, and the Nazi occupation of France. He gives very little information about France's defeat in 1940 but shows how the French Resistance and the Special Operations Executive emerged from an occupied France. He explains the makeup and organization of the SOE, which he dubs the "company," and describes the cooperation between the French Resistance and the Allies.

Lorain offers nothing controversial or startling. His description of the French Resistance and the British SOE is for the most part very brief and technical. His last chapter pays tribute to the SOE; he personally thanks the British for helping the French resist Nazi tyranny.

Overall, the book presents an excellent overview of many aspects of the techniques of clandestine operations and some good examples of this type of warfare. While occasionally shallow and lacking historical cohesiveness, Lorain does offer interesting glimpses of the French Resistance and British SOE in Nazi-occupied France. If the reader wants a brief, concise, general work on the French Resistance techniques, he will be pleased with *Clandestine Operations*.

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A Time for Courage: The Royal Air Force in the European War, 1939-1945 by John Terraine. New York: Macmillan, 1985, 827 pages, $29.95.

It has been thirty-two years since the official three-volume history of the Royal Air Force (RAF) in the Second World War appeared. A lot of memoirs and

an even greater pile of documentation have come to light since then, especially with the opening of the World War II records in 1972. John Terraine, best known for his work on the First World War and his defenses of Field Marshal Sir Douglas Haig, the British commander-in-chief in France, has now mounted an immense effort and given us a book that is solidly based on both recent writings and the archives. In the latter case, he has, as anyone must in a field as big as this, relied to a certain extent on the Air Historical Branch narratives. These are available at the Public Record Office but are not yet on film. Xeroxing is limited to forty pages a day. (As editor of *Aerospace Historian*, I have learned that the secret history of the Air Ministry is now available at Maxwell AFB, although only about half of the 16-mm film made of it is readable.)

A Time for Courage is being favorably received in spite of the fact that Terraine has some strong opinions. The most controversial of these is probably that the Bomber Command offensive under the late Air Marshal Sir Arthur T. Harris was madness in its attack on cities and morale rather than concentrating on oil and other definable targets where results could be more quickly measurable. Underlying this argument is the far more basic one which he traces from the beginning of the war through the Mediterranean campaigns and back into Europe again, that old quarrel as to whether the proper use of an air force at the time was in support of the surface forces or only in independent grand-strategic bombing as an independent campaign. This larger question is well brought out in the arguments even in that minor campaign in Greece for which Terraine chastises D'Albiac, quite rightly, for sticking to the bombing of distant targets. What the Greeks needed was immediate assistance and many daily sorties per aircraft and aircrew member, not just one. But Army cooperation was at the bottom of the RAF ladder of priorities.

It is also pleasing to note that Terraine, with his balanced overall view, comes to the end of the war, having done his best to analyze along the way the various sets of statistics available, and rehabilitates the reputation of Air Chief Marshal Sir Arthur Longmore, Air Officer Commander-in-Chief Middle East, who fought a skillful war with next to nothing in the first eleven months of the conflict there. Terraine is equally judicious about the Battle of Britain. Not only does he treat the dismissal of Air Marshal Sir Hugh Dowding and Air Marshal Sir Keith Park with the sympathy they deserve, though not perhaps with a full recognition of all the factors involved, but he also argues for giving more credit to Bomber Command for its losses during the period as being part of the battle. One can argue also, however, that the Air Staff itself tended to view the battle as Dowding's and the Fighter Command's, not as the RAF's, and that the targets chosen for Bomber Command tended to have little to do with helping Park and company.

All in all, *A Time for Courage* is a most interesting book, which, for the first time in years, pulls together the story of one of the Second World War's major fighting forces and does so with an experienced, critical eye. It is well worth reading carefully.

Dr. Robin Higham
Kansas State University

AWARD

The *Air University Review* Awards Committee has selected "The Strategic Defense Initiative: Political Risks" by Dr. Stephen J. Cimbala as the outstanding article in the November-December 1985 issue of the *Review*.

the contributors

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The Professional Journal of the United States Air Force

AIR UNIVERSITY review

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