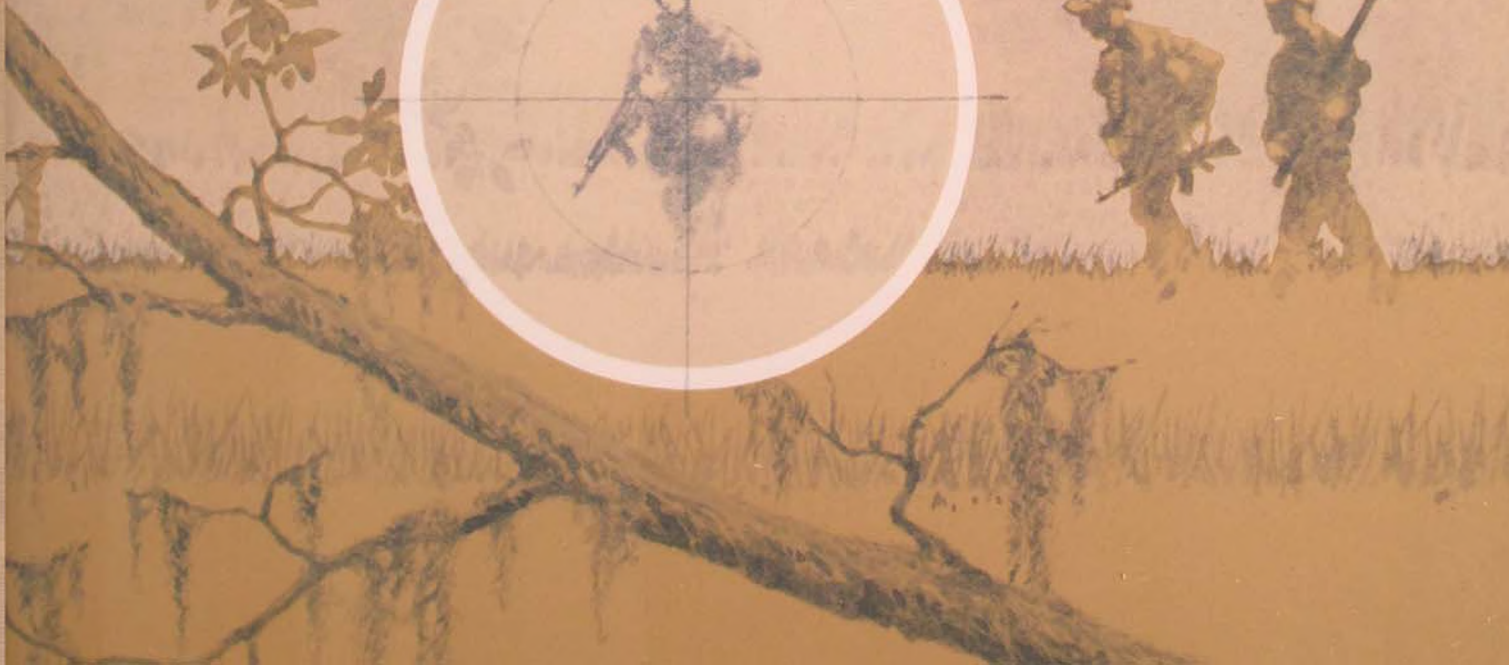
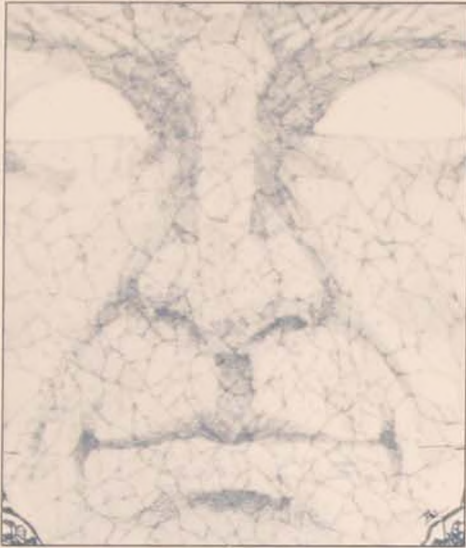


AIR
UNIVERSITY
review

JULY-AUGUST 1984





Lose a war game; win a war?—*page 4*



Military surprise. Reacting to it—*page 8*. Creating and using it for advantage—*page 17*



Could the Soviet Union be controlled by air power? Air University probed the matter in the 1950s—*page 22*

Attention

The *Air University Review* is the professional journal of the United States Air Force and serves as an open forum for exploratory discussions. The purpose of these discussions is to strengthen Air Force and DOD policies by presenting innovative thinking concerning military doctrine, strategy, tactics, professionalism, and related national defense matters. The *Review* is not to be construed as presenting policies of the Department of Defense, the Air Force, or Air University. Rather, the contents reflect authors' ideas and opinions that do not necessarily bear official sanction. Thoughtful and informed contributions are always welcomed.



AIR UNIVERSITY **Review**

July-August 1984 Vol. XXXV No. 5



Is divergence between military and social values sometimes necessary?—page 65

Address manuscripts to Editor, *Air University Review*, Bldg. 1211, Maxwell AFB, AL 36112. Review telephone listings are AUTOVON 875-2773 and commercial 205-293-2773. Manuscripts should be submitted in duplicate. Military authors should enclose a short biographical sketch, including present and previous assignments, academic and professional military education; nonmilitary writers should indicate comparable information.

Printed by Government Printing Office. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, Air Force Recurring Publication 50-2. ISSN: 0002-2594.

- 2 **WHAT COUNTS?**
Editorial
- 4 **CLAUSEWITZ AND MODERN WAR GAMING**
Lt. Gen. Raymond B. Furlong, USAF (Ret)
- 8 **CERTAIN UNCERTAINTY: INOCULATING FOR SURPRISE**
Dr. Roger A. Beaumont
- 17 **MILITARY SURPRISE: WHY WE NEED A SCIENTIFIC APPROACH**
Capt. Richard W. Bloom, USAF
- 22 **PROJECT CONTROL**
Lt. Col. David J. Dean, USAF
- 33 **IRA C. EAKER ESSAY COMPETITION THIRD-PRIZE WINNER
MARLBOROUGH'S GHOST**
Lt. Col. Dennis M. Drew, USAF
- 38 **AIR FORCE ROTC: ITS ORIGINS AND EARLY YEARS**
Col. William C. Stancik, USAFR, and R. Cargill Hall
- 52 **ULTRA**
Dr. Williamson Murray
- 65 **DEFENDING THE OPULENT REPUBLIC**
Dr. Nicholas J. Pappas
- Air Force Review**
- 70 **ORIGINS OF THE ORDER OF DAEDALIANS**
Lt. Gen. Harold L. George, USAF (Ret)
- Science and Technology Perspectives**
- 74 **INTRODUCING THE PARTICLE-BEAM WEAPON**
Dr. Richard M. Roberds
- Commentary**
- 85 **SEEKING A FORUM FOR THE MITCHELLS**
Maj. Denny R. Nelson, USAF
- 87 **ANOTHER PERSPECTIVE ON AIR POWER
AT THE LOW END OF THE CONFLICT SPECTRUM**
Lt. Col. David C. Schlachter, USAF
- 88 **ON MODERN WARFARE: PARADIGM CRISIS?**
Col. William R. O'Rourke, Jr., USAF
- Books, Images, and Ideas**
- 90 **CONCEPTS, DOCTRINES, AND PRINCIPLES**
Maj. Gen. I. B. Holley, Jr., USAFR (Ret)
- 93 **PROBLEMS OF THE THINKING MAN IN UNIFORM**
Dr. Russell F. Weigley
- 97 **JOHNNY REB AND BILLY YANK:
CULTURE AND TACTICS IN THE CIVIL WAR**
Dr. John F. Guilmartin
TSgt. Klaus J. Schiffler, USAFR
- 100 **Potpourri**
- 111 **Contributors**

WHAT COUNTS?

national style in war

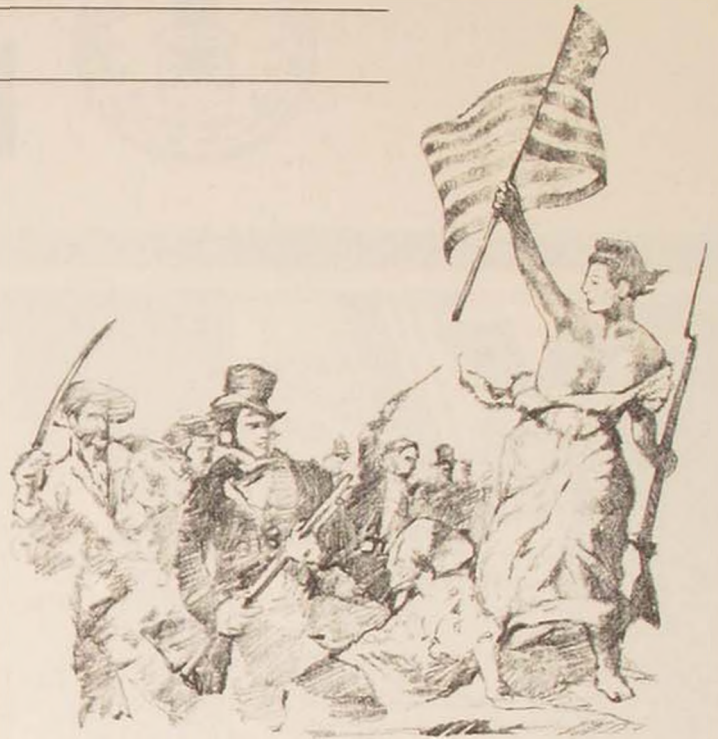
The situations arising out of war are infinitely varied. They change often and unexpectedly and can rarely be foreseen in advance. Often it is precisely those factors that cannot be measured that are of the greatest importance. One's own will is confronted by the enemy's independent one. Friction and errors are everyday occurrences.

"Command of Troops," 1936 German Army Manual, quoted in Martin van Creveld, *Fighting Power: German Military Performance, 1914-1945*, p. 30

IF ONE is interested in discovering how America makes war, he can find no better place to begin his investigation than with Dr. Russell Weigley's *The American Way of War*. Weigley tells us that Americans tend to use a direct approach where strategy is concerned—the equivalent of a fullback plunge from the one-yard line. We define for ourselves the enemy's center of gravity and strike directly at that center with massed power. Such a strategy isn't subtle, but it worked for Grant against Lee and against *Festung Europa* in 1944-45.

We also tend to place great emphasis on technology in our approach to war. In America's formative years, we stressed the use of machines to overcome manpower shortages, in war no less than in peace; and we continue to do so. Indeed, it may not be far wide of the mark to say that a major element in America's national style in war is the view that superior technology is the key to military victory.

A third element in our approach to war is an image of war as a predictable, mechanistic phenomenon. War is reduced to a target system that can be destroyed by x number of rounds and bombs that require y number of guns, tanks, and planes to deliver. Given a specific, predicted improvement in weapon systems, the force structure can be reduced by a specific amount. This process seems to overlook the fact that in the hands of soldiers and airmen in the heat of battle, weapons seldom perform exactly as predicted. While the mechanis-



tic image of war may be of some value in preparing for war, we must be cautious that it does not control the way we fight, lest we become too predictable and unimaginative in waging war. To ensure that we keep our minds and eyes open, we might remember Clausewitz's description of war as a contest in which force is aimed at an animate object that reacts. Not only will an enemy react, but he will act to disrupt and/or destroy our own forces and plans.

Still another element of America's style in war is somewhat related to the mechanistic view of war and derives from our national emphasis on counting. Patricia Cline Cohen has pointed out that Americans are *A Calculating People*, as the title of her 1982 book puts it. In tracing the rising influence of quantification in American society, Cohen presents several interesting observations. While noting the increasing emphasis that Americans have placed on numbers in their efforts to understand social developments, Cohen observes that Americans came to believe that "something that was counted or measured was known. Someone else could count it and get the same result. The exactness and objectivity of numbers meant that quantified information was a more truthful form of information than opinion, intuition, or judgment." (p. 219)

Yet Cohen also spends considerable time discussing the difficulties one encounters in quantifying social phenomena, observing that what one counts and how one counts it are frequently indic-

ative of bias and preconceptions—one tends to count what one thinks is significant. This explains the American idiomatic expression “what counts,” meaning what is important or significant.

Furthermore, the idiom suggests another connection between numbers and what we consider important. What counts is what counts—what is important is what one *can* count: sorties, tanks, tons of bombs, howitzers, high-school diplomas, etc. The danger in military affairs of this national proclivity for counting becomes obvious when one stops to think about the nature of war.

War’s atmosphere is composed of “danger, exertion, uncertainty, and chance.” Within such an environment, the most important factors, the things that “count” most, are moral or nonquantifiable ones, such as discipline, morale, the genius of the commander, the quality of the officer corps, and plain old luck. At the most critical point in the officer’s professional career, in the white heat of battle, counting may be the least important skill in his kit bag.

Several articles in this issue of the *Review* should help to increase our awareness of the importance of war’s intangible aspects. Noting that the character of the commander is one of the most significant

moral factors, General Raymond Furlong uses his knowledge of Clausewitz’s *On War* to show how war games might help identify and develop officers with the qualities required in a successful commander. He points out that the best war game would be “unfair,” in that it would be impossible to win because it places the would-be commander under great pressure, presents him with inaccurate data, and confronts him with totally unexpected events. Professor Roger Beaumont’s article focuses on surprise and how its adverse effects on military organizations can be reduced. Surprise is also the theme of Captain Richard Bloom’s article, which analyzes surprise and discusses the things one should do to achieve it.

Articles such as these help us remember the things that count most in war—the moral factors. Our national style in war must be based on the idea that the most important moral factor in war is an intellectually superior officer corps which fully understands modern warfare, appreciates its intangibles, and is prepared to outthink and outperform any other officer corps in war’s demanding environment of “danger, exertion, uncertainty, and chance.”

D.R.B.

THE REVIEW INVITES COMMENTS

Moral Factors in War

There are many signs that intangible factors play an important role where success in war is concerned. Does the American way of war reflect this point?

This fascination with the quantifiable *means* of war—military budgets, nuclear missiles and warheads, tanks, ships, aircraft, and “human resources”—is mirrored by those critics of the military whose attention is also focused on monies, hardware, and numbers. The fallacy of attempting to understand war in mathematical terms is illustrated by a bitter little story that made the rounds during the closing days of the Vietnam War: when the Nixon Administration took over in 1969, all the data on North Vietnam and the United States were fed into a Pentagon computer—population; gross national product; manufacturing capability; number of tanks, ships, and aircraft; size of the armed forces; and the like. The computer was then asked, “*When will we win?*” It took only a moment to answer: “*You won in 1964!*”

COLONEL HARRY G. SUMMERS, JR., “What Is War?” *Harper’s*, May 1984, p. 75

Studies associated with the development of the new FM 100-5 show that the outcome of battle is as often determined by differences in intangible factors—such as leadership, courage, skill and unit cohesion—as by numbers and mechanical factors.

COLONEL HUBA WASS DE CZEGE, “Challenge for the Future: Educating Field Grade Battle Leaders and Staff Officers,” *Military Review*, June 1984, p. 4

Commentaries should be typed, double-spaced, and three to five pages in length. Address them to: Editor, *AU Review*, Bldg 1211, Maxwell AFB AL 36112.

The commander must trust his judgment and stand like a rock on which the waves break in vain. It is not an easy thing to do. If he does not have a buoyant disposition, if experience of war has not trained him and matured his judgment, he had better make it a rule to suppress his personal convictions, and give his hopes and not his fears the benefit of the doubt. Only thus can he preserve a proper balance.

Carl von Clausewitz, *On War*

CLAUSEWITZ AND MODERN WAR GAMING

*losing can be better
than winning*

RAYMOND B. FURLONG
LIEUTENANT GENERAL, USAF (RET)

ONE of the great paradoxes of the military profession is that experience is the best teacher where war is concerned, yet most military men learn of war predominantly from peacetime studies. Today, our combat experience is rapidly disappearing. All those who participated in World War II and most of those who served in Korea have left the service. Even those who fought in the Vietnam War are dwindling in numbers. In the absence of real war, war games help us learn about war and evaluate military concepts.



War gaming in the modern context was introduced during the Napoleonic era by George Heinrich Rudolph Johann von Rösswitz, a Prussian artillery officer. In the United States, the war gaming tradition began in the 1890s with the use of war games by the Naval War College, while in the Air Force we find the origins of war gaming in the 1930s when young captains and majors at Maxwell Field, Alabama, used such games to work out strategic concepts—concepts that later helped bring victory to the Allied forces in 1945.

Now, in the 1980s, the computer revolution has carried us into a new era of war gaming, one in which the potential of war games is greatly expanded. As we seek to take full advantage of computer simulations, it seems to me that we would do well to review some of the generalizations about war that are found in Carl von Clausewitz's classic study *On War*. Indeed, it might be worthwhile for all those involved with developing war games, including programmers, to take a special, intense course on the thoughts of Clausewitz.

GENERALLY, Clausewitz believed that war involved two basic types of factors: material and moral. The first of these refers to the things that can be counted in war—troops, wings, airplanes, tons of supplies, etc. Because every military commander must master the material factors of warfare, our modern war games must continue to train our officers in these more or less mechanical aspects of warfare. Logistical crises, such as airlift shortfalls, must be represented in the games. Adverse realities of warfare, such as a disrupted base structure, should be included also. These kinds of problems help commanders to understand the types of material problems they are quite likely to face in such operations as the wartime deployment of a unit to Europe. Other material problems help them to prepare for the process of actually directing their units and fighting in a wartime environment.

It is in the second area of war, the moral, where the designer of the modern war game will find his greatest challenge. And it is here that *On War* can be most helpful.

The moral factors in war, Clausewitz tells us, "are among the most important . . ."1 Certainly, one of the most significant of these moral factors is the character of the commander. A major concern in developing war games must be to produce a game that will help us to identify and develop those officers who have the character and intellect essential for success in warfare. Clausewitz's chapter "On Military Genius" is particularly useful in its description of the two qualities indispensable in the commander. The first is "an intellect that, even in the darkest hour, retains some glimmerings of the inner light which leads to truth . . ." The second quality is "the courage to follow this faint light wherever it may lead." (p. 102) In other words, intuition and determination are the special characteristics to be sought in the effective commander, and these are most likely found in "a strong rather than a brilliant" mind. (p. 103) Taken together, these two qualities (intuition and determination) give the commander the "presence of mind" he needs to deal with the unexpected that is so much a part of the atmosphere of war. (p. 103)

All of this is summed up by Clausewitz in a statement about the "sort of mind" that is "likeliest to display the qualities of military genius." It is "the inquiring rather than the creative mind, the comprehensive rather than the specialized approach, the calm rather than the excitable head to which in war we would choose to entrust the fate of our brothers and children, and the safety and honor of our country." (p. 112) I believe that modern military war games can play an important role in identifying and developing such individuals.

The war game that develops and identifies the officer with the qualities desired for command must reproduce the elements of war: "danger, exertion, uncertainty, and chance." (p. 104) While the presence of danger might lie

only in the minds of the participants, exertion, uncertainty, and chance must lie in the design of the game. A war game should always overtax its players, giving them too much to do and too little time in which to do it. Warfare is the realm of uncertainty; "three quarters of the factors on which action in war is based are wrapped in a fog of greater or lesser uncertainty." (p. 101) Part of the reason for this fog of uncertainty is the poor quality of intelligence. It is no less true today what Clausewitz found: "Many intelligence reports in war are contradictory; even more are false, and most are uncertain." (p. 117) The battlefield commander must learn to expect the unexpected and must be able to live with the stress that is concomitant with decision making under conditions of uncertainty. If our games are to reflect reality, they must provide the kinds of information that commanders will receive in combat: correct, wrong, late, and unavailable. The war game that provides only timely and accurate information is unrealistic and counterproductive. A good war game will immerse the commander in a sea of poor information and faulty or inadequate intelligence. Only this kind of war game equips the commander for the circumstances he will encounter in real war.

The absence of information about some factors in war introduces a close relative of uncertainty—the unknown. The unknown, like uncertainty, will result in surprises for the commander, but it need not paralyze him. Instead, the wise commander will seek to identify what he does not know, aware that knowledge of what one does not know can help illuminate darkness and ease fear. It is fear that is most dangerous, for fear can drive commanders into despair and inaction.

To those things Clausewitz wrote about uncertainty and chance, I would add a few comments on unknown unknowns—those things that a commander doesn't even know he doesn't know. Participants in a war game would describe an unknown unknown as unfair, beyond the ground rules of the game. But real war does

not follow ground rules, and I would urge that games be "unfair" by introducing unknown unknowns. How many war games introduce players to new, even imaginary, enemy weapons that have capabilities previously unasccribed to a prospective enemy? How many present the player with the catastrophic failure of his own critical systems?

The relationship between training and the surprise that uncertainty, chance, and the unknown unknown produce in wartime was perhaps expressed best by General Curtis LeMay:

What little schooling I got, I found was more likely to be wrong than right when you got out where the lead was flying around. So, we can be surprised, and we should expect to be surprised. That means that our training should provide for this. People should be trained to be surprised and react properly when it happens. This means to me that we should be prepared for this not only in training our people, but in being prepared with our weapons systems. This is the primary reason that I think we have to have manned systems in our strategic forces. They can react to surprise much better than the unmanned systems. And I'm sure we're going to be surprised.²

In addition, because warfare is a quintessentially human experience, war games need to reflect the fallible human element. If the game assures commanders that their orders will be carried out flawlessly, the game is unrealistic. One of Clausewitz's most useful insights is his idea of friction, "the only concept that more or less corresponds to the factors that distinguish real war from war on paper [or in a computer]." (p. 119) In the real world, some orders are carried out, some are executed poorly or too late, and others are not carried out at all. War games must expose commanders to these real-world frustrations.

INDEED, if a war game is developed properly, encompassing all of those aspects and factors that I have described, it may well end in the ultimate frustration for a game player—defeat. Because Americans like to win, games won are likely to be validated, while games lost may be

viewed as unfair, unrealistic, or both. Thus, a properly developed war game may well be not only an unpleasant experience for most participants but also an unpopular feature of one's military career. We must make our prospective

commanders understand that where war games are concerned, we all might learn more by losing than by winning. Let us be prepared to win where victory really counts.

Montgomery, Alabama

Notes

1. Carl von Clausewitz, *On War*, edited and translated by Michael Howard and Peter Paret (Princeton, New Jersey: Princeton University Press, 1976), p. 184. All other quotations cited with page

numbers are from this edition of *On War*.

2. General Curtis E. LeMay, U.S. Air Force Oral History Interview, Maxwell AFB, Alabama: Albert F. Simpson Historical Research Center, March 1965, p. 24.

coming . . .

in our September-
October Issue

- America and the International Order
 - Thunder out of Zion
 - Kremlin Politics
-

CERTAIN UNCERTAINTY: INOCULATING FOR SURPRISE

DR. ROGER A. BEAUMONT



CLAUSEWITZ called war the “province of chance,” for, in essence, war is a collision of opposing *imperfect* systems. How much victory (or defeat) is a product of skill, leadership, situation, subsystem, or chance is not anywhere nearly as clear as searchers after a science of war would like it to be. Unhappily, much military history tends to present war as a kind of athletic contest, with much anecdotalism plus maps that suggest an order and precision that were not apparent to winners or losers at the time. In any case, the image of military commanders as martial virtuosos, or maestros of violence, lives on. The mythology of generalship is based on an assumption that commanders constantly and boldly impose their will on the complex tangle of sinews and tendrils of modern combat. The realities, while less glamorous, are not less real for their being undramatic: detailed logistical planning, lag-time, error, and the technical intricacies of the administration “tail” and of communication nets—these stand in tension with the popular images of combat at the cutting edge, where skill, courage, aggressiveness, craftiness, stamina, speed of thought, and reflex are at a premium. War is, after all, similar to football in more than one sense.

THE game of football, often drawn on symbolically by Americans in war, does have some analogies that are rather less apparent than is usually noted, particularly in the domain of roles. In the same way that support roles in military operations are well out of the picture in most fictional renditions and in much military history, so are the many people involved in the support of players and coaches, e.g., trainers, scouts, publicists, accountants, clerical personnel, and even owners and alumni. Beyond that, like war, football is unrelenting in its pressure on the coach and his quarterback. The case of “squad leaders in the sky” in Vietnam showed how some commanders, like some coaches, found it difficult to leave the



game in the hands of those actually "playing."

There have, in any case, been many instances of a split in view between sidelines and teams in the military realm, as the development of new technologies of transport and communication have extended the battle zone far beyond what any one commander's view could physically encompass. Thus, it has become necessary to extend the commander's abilities through the addition of a staff.

Staffs and headquarters have existed well back in the modern period. From their beginnings, the staff's function evolved incrementally from essentially housekeeping and personal service to the commander into a kind of administrative arm. After Waterloo, the rate of this evolution was accelerated as the synthesis of railways and telegraph systems began to have a radical impact on the scale and pace of warfare. It was also in the nineteenth century that technical functions and services became increasingly important as the industrial revolution gained momentum.

Nevertheless, the image of the heroic warrior lived on, creating a tension between the need for individual aggressiveness and skill in combat and the growing bureaucratization and mechanization of war. This tension was similar to the one that existed in the dichotomy between dashing entrepreneurship and anonymous professional management that appeared in the late nineteenth-century business world.

Under these conditions, friction and invidious comparisons between staff and line officers began to appear, compounding as time progressed. Such examples as the organizational battle between sailors and engineers in the U.S. Navy after the Civil War and the epithet "gabardine swine" aimed at some British staff officers in World War I indicate the trend. More recently, in the 1960s, this tension between line and staff personnel was revealed in the remark of a French paratroop commander in Algeria who distinguished between "those who fight—and the others." The result has been that line officers and troops and staff

and support elements often have lost sight of their vital symbiotic relationship and have forgotten if they were to attain effective levels of teamwork, they would have to reappraise their predisposition to struggle for turf.

While the tension between the combat "teeth" and the supporting "tail" elements was aggravated by many who lamented the increase in the "tail," few in the military wished to address the difficulties. Thus, when military professionals, such as Charles de Gaulle in the 1930s in France and William Hauser in the 1970s in the United States, pointed out the expanding boundaries of the "tail" and the need to rationalize the player-quarterback-coach-manager boundaries to maximize the impact of the team, they met apathy or substantial hostility.

In the United States, some critics (e.g., Gabriel and Savage's *Crisis in Command* and "Cincinnatus's" *Self-Destruction*) traced the dilemmas of Vietnam to the rise of a managerial ethic, while many since then have called for a return to feudal-heroic values, pointing most often to the German model as the best prototype. Overlooked is the fact that although the self-image of "manager" has remained unpopular in the U.S. military, much of the career of professional officers is spent in performing bureaucratic-managerial tasks in a peacetime setting. The dominant prestige of the role of wartime commander-combat unit leader remains, creating an imbalance and generating disdain for these "tail" tasks—tasks that are vital if fighters are to battle effectively and win. The current evocation of Patton as a warrior in tension with a bureaucratic system is notably ironic, given Patton's great sensitivity to the need to avoid interfering with his subordinate commanders. In spite of his image, sensitive discussions of what Kipling called "the sweet-leaving-well-enough-alone" are threaded through the *Patton Diaries*. More recent recognition of the problem appears in stark form in Field Manual 100-5, *Operations*, which defines the role "battle captains," to achieve an American equivalent of the German *auftrags-*

befehlgebung/auftragstaktik—i.e., the giving of the general-mission orders, rather than calling in detailed plays from the sidelines.

The most critical point of tension between players/quarterbacks and the sideline coach in the military realm is seen in respect to the threat and realization of surprise. Obviously, an attack on the nuclear triad by an enemy would be a catastrophe far worse than any experienced in history. Indeed, prognostication may prove ultimately to have been a wholly futile exercise. However, even before nuclear weapons appeared, the torrent of increasingly refined weapons pouring forth from the industrial revolution had increased the sense of uncertainty and futility on the part of planners and commanders. In conventional wars, great and small, and in guerrilla wars (and terrorism to an even greater extent), the point of decision-reaction has been forced down upon the young leaders on the spot, a phenomenon carefully traced by S. L. A. Marshall, while simultaneously a countercurrent to that trend has appeared in the form of C³ technology. Thus, in the United States, presidential authority has been extended into even such very small-scale operations as the Gulf of Tonkin incident and the subsequent Rolling Thunder air war, the *Mayaguez* affair, and the *Eagle Claw* raid in Iran. It should be kept in mind, however, that such intervention at the combat contact level has been mainly in individual crises or in the closely controlled context of limited conflict related to the cold war. Thus, preemption of on-the-spot command discretion has been driven by anxiety radiating from the "red phone," i.e., the fear of nuclear escalation.

As much as some military professionals dream of a world in which they could proceed free of politics, it has been a very long time since generals had a freewheeling time of it—if they ever did. As a general, George Washington grappled with the Continental Congress; President Polk sent a special agent to oversee Winfield Scott in Mexico; Lincoln and Congress, like Johnson and Congress more than a cen-

ture later, wrestled for control of the Army; and General Sherman exiled himself to St. Louis, Missouri, in deference to the reality of civilian control by Secretary of War Robert Lincoln. Similarly, General Arthur MacArthur was checkmated by Governor-General William Howard Taft in the Philippine Insurrection, General Pershing was constantly fending off inter-Allied pressures during the AEF's buildup and the Meuse-Argonne offensive, and General Henry "Hap" Arnold was subjected to constant nudging from President Roosevelt during the fitful course of deploying the not fully developed B-29 in China and the Pacific. President Eisenhower's problems with Admiral Darlan, the MacArthur-Truman controversy during the Korean War, and the politico-military Gordian knot of Vietnam are still fresh in the minds of many. Nevertheless, the myth of civil-military exclusivity dies hard. But a myth it is. In spite of the constitutionally defined preeminence of civilian authority, many military enthusiasts still seek an ideal world in which professionals practice the military art, free of sordid political concerns.

Interpenetration has, of course, run both ways; the *Grossegeneralstab* helped stifle German liberalism and gave Hitler a hand up to power at least twice. To be obedient and effective requires the ability to read nuances, to anticipate and to advise, to see political factors, and to be far from naïve. To return to the analogy: professional football coaches, players, and trainers must read the sports page, recognize the existence of a team budget, and develop a feel for the concerns of the managers, the owners, and the fans.

The anticipation of surprise, in any case, is very closely related to the realm of politics, inside the military services and outside, since surprise has as its target the coping capacity of not only the commanders and their staffs but the political elements in the opponent's society. The launching of Sputnik in 1957 may not have been a surprise to U.S. officials or to many scientists, but it was to many Americans.



In a sense, the failure to cushion the public in advance led to a kind of strategic defeat in itself. It is hardly surprising that much current concern over C³ circulates around the problem of surprise in the realm of combat.

Every major modern military power has suffered major surprises and dealt them out as well in battle. Insomuch as recent studies suggest that these are growing in frequency, they must be coped with in a practical way. Forms of surprise vary. They include technological surprise, like the German "smart bomb" during the Salerno landing, the atomic bomb at Hiroshima, and the very skillful use of state-of-the-

At Pearl Harbor in December 1941, the rhythms of peacetime routine had precluded alertness and serious planning for war. U.S. ships and planes arranged in orderly array proved easy prey for Japanese attackers.

art equipment, e.g., in the Pearl Harbor attack and the Israeli preemptive air strike of 1967. Or they may stem from artful fusion or modification of on-the-shelf weapons and forces, as was the case when the British navy used shallow-draft aerial torpedoes against the Italian fleet at Taranto in 1940, and during the Doolittle raid of 1942, when U.S. Army medium-size bombers flew from Navy carriers to attack Japan. The

time, place, and shape of force deployment may be the key element in surprise, as it was in the German blitzkrieg campaigns and at El Alamein during World War II and at Inchon, South Korea.

In a recent study, Barton Whaley identified sixty-nine cases of military surprise in the twentieth century. The implicit question is: What can one do about surprise in advance? The target of a surprise attack is the sense of self-confidence, the stability of mind, and the competency of the target, as well as physical destruction of forces. As Martin Blumenson has pointed out in analyzing relief of commanders in the U.S. Army, such actions may often not be necessary changes but reactions to stress felt by the relievers. Certainly, the pattern

Elaborate deceptions diverted the attention of German armies guarding Festung Europa so that Allied forces landing in Normandy had the advantages of surprise on D-day.

has been to relieve or otherwise humiliate commanders after a major surprise—i.e., to hunt for heads. General Short and Admiral Kimmel, the commanders in Hawaii, were shunted offstage after Pearl Harbor; General Fredendall, II Corps commander, was sent home after Kasserine Pass; General Bradley had one of his armies transferred to Field Marshal Montgomery's command immediately after the Germans struck the Bulge; and the failure to anticipate Chinese entry into the Korean War in 1950 made MacArthur's relief much easier, if not inevitable.

One can debate the question of competence in these cases, and one can argue that losers should be dumped to avoid spreading gloom through the ranks. This latter logic, however, denies victims a chance for redemption and ignores the fact that defeat is often the goad to dramatic action. Anthony Wayne avenged the Paoli Massacre, after much anguish; Admiral



Kelly Turner erased the stain of losing a ship; MacArthur "returned." Too quick a tendency to relieve overlooks the fact that relief can deprive an organization of leaders who have some practical knowledge of prevailing conditions. Even the most brilliant replacement will need some time before he can take charge effectively. The matter is certainly not as simple as it might seem on the surface. Relief can produce an atmosphere in which fear of risk-taking and near-hysteria can affect successors, and a broader sense of anxiety and resentment can build in the force as well. The sense of caution and rigidity prevalent among Union commanders (1862-64), in British forces after Dunkirk (1940), in the Red Army from the mid-1930s to 1942, and within the U.S. Navy from December 1941 to May 1942 are evidence of the effect. The frequency with which General Omar Bradley referred in his memoirs to senior officers being relieved is both alarming and thought-provoking.

IS THERE an antidote or an anti-toxin to surprise? Certainly a need for a kind of inoculation is evident, a rigorous program of preparation, based on the fact that surprise is quite *likely* to happen. Techniques for preparing to cope after a disorienting attack include:

- operation of staffs, commanders, and units in conditions of zero and minimal communication, stressing the need for skill and initiative in using primitive techniques of communication and movement.
- development of a strong consciousness of the need to rest and rotate commanders and staffs.
- avoidance of single-option or obvious, linear strategies.
- minimization of blame assignment and browbeating in the command process.
- use of shadow staffs and commanders to feed major surprises into exercises, without regularity, pattern, periodicity, or frequency.
- training and maneuvers that include oper-

In October 1973, combining imaginative and innovative strategy with the technological surprise of such weapons as the SA-6 surface-to-air missile, the Egyptians caught the Israelis and most Western intelligence analysts comfortably contemplating past Ramadan "exercises." Their unexpected attack across the Suez changed the complexion of Middle East relations. . . . Ten years later, as U.S. forces began to move (below), most observers assumed that the mobilization was in response to the terrorist bombing of the Marine compound in Beirut. Actually, the troops' destination was Grenada.



ation of individual headquarters with key personnel removed and of headquarter nets with key headquarters removed.

- preparation of "fire-brigade" teams in major headquarters to establish alternate headquarters and to bolster them in cases of destruction or trauma.
- familiarizing troops with what staffs and support branches do and how the overall system works in a combined arms mode.
- avoiding "school-solution" standards in training and during exercises.
- rotating staff and commanders among roles and echelons.
- cross-training and assigning in order to break the sense of psychological surety that comes with familiarity (in obvious tension with the need for battle-unit cohesion).
- constant reminding of troops and headquarters that perfection and surety are not attainable and that the rectilinearity and detailed thoroughness sought for in a garrison can be a source of psychological discomfort to order-seekers in the turmoil of an operation.

The last point seems to fly in the face of traditional military organization and operations, which emphasize discipline, hierarchy, and authority. Yet that is not the case: the chaos, turmoil, fear, pain, and destruction inherent in war (words rarely used and not kept at very high levels of reality in much training maneuver or in doctrine) require discipline, hierarchy, authority, and high morale. Demanding the unobtainable or nitpicking in this context detract from these essentials.

Information that flows in a system under high stress is only an approximation of reality. How much can be learned about a game by reading play diagrams? In the same sense, graphics of command in combat and crisis, even in modern C³ systems, are approximations. Under conditions of stress, people lose some of their ability to monitor, respond, and cope effectively. Simultaneously, they tend to be prey to pessimism and pettiness; hence, the maliciousness and blame-assigning that one can find in

military history, biography, and autobiography. Fear manifests itself in many forms—from compulsiveness and fixation to pointless anger and rashness. Pretending "it isn't so" or imposing standards of unattainable excellence to generate stress may be useful up to a point, but such responses also can preclude both awareness of human limitations and methods of monitoring and controlling actual trauma. Just as the "care of the flier" program was a response to the unusual demands of aircraft piloting, "care of commanders and staffs" provision is needed in the sphere of C³ networks and systems so that current barriers to commanders' disqualifying themselves are removed. In the same way that pilots can ground themselves when they sense problems developing or football players can seek medical aid when injured, the command-staff nexus should have a circuit-breaker available so that there is no stigma attached to temporary inadequacy and withdrawal from decision making. The tradeoff between establishing a reputation for toughness by overstressing *versus* ensuring the safety and needs of the command is a matter already under review but in need of far more scrutiny.

Advances in science and technology, coupled with increasing knowledge of human behavior, have been changing the nature of warfare steadily for almost two centuries. Success in war has often gone to those who have most effectively woven together seemingly contradictory elements of feudal warriorhood and the industrial revolution. Blindness to or rejection of implications of oncoming technology is correlated strongly with the definition of military failure and incompetence.

The basic challenge is to identify the strengths and weaknesses of the interactive system of command networks and to take advantage of them. It is essentially a problem in organizational engineering, a field of activity often relegated to the staff level in major organizations, even in those in which industrial engineering has a strong tradition. Ironically, the idea that materials might fail is accepted and

“designed around” or worked to the best advantage of the system under consideration, while human fallibility is not. Nevertheless, the inoculation of people to surprise and to failure is not to create excuses in advance or to predispose to failure, but to acknowledge very real limitations in human abilities and to puncture myths which, if accepted and compounded, could be far more deadly; i.e., adhering to a system where key players neither sense when to get off the field nor understand that they should even think about it.

In considering the function of Kipling’s two imposters (triumph and disaster) in individual lives, it might be helpful to keep in mind that the principal wartime American commanders in chief (Washington, Lincoln, Roosevelt, and Truman) all suffered grave setbacks and disappointments to their ambitions and in their personal lives prior to assuming the burden of office. Many of the American generals who fit into the category of being at least contenders for great captains (e.g., Grant, Pershing, MacArthur, and Eisenhower) met similar adversities and tribulations. Their ordeals were seen later as a part of a hardening process, a hammering-out on the anvil of life that enhanced their greatness and, indeed, contributed to it.

The intentional imposition of stress on indi-

viduals, however, even for the purpose of preparing them for roles of increasing responsibility as commanders and controllers of expensive and critical networks at first glance appears to be inhumane and unethical. Yet, complex societies are literally cluttered with rites of passage: medical doctors, lawyers, academics, certain categories of business executives, chartered life underwriters, aircraft pilots, astronauts, and various skilled-trade people pass through arduous selection processes in which failure of some people aspiring to that status is implicit.

The intentional stressing of people to the point of failure in certain kinds and levels of military training is generally tolerated, even though labeling those who fail causes some anguish. Disappointment, stress, and a sense of limit are a part of the business of selection and preparation. Sensitizing commanders and controllers to recognize their own limits and allowing them to experience some degree of failure may thus be seen as a kind of prudent testing. As long as there are people in the loop of warfare, reliability and limitations will be somewhat uncertain but important factors. A continuing growth of knowledge about limits within the fusion of people and systems is vital to maximizing the benefits that each element can offer in a world of surprises.

Texas A&M University, College Station

MILITARY SURPRISE: WHY WE NEED A SCIENTIFIC APPROACH

CAPTAIN RICHARD W. BLOOM



MILITARY surprise is an intriguing phenomenon. It is easily identified, it is highly prized, but it is not always easily available. Many historical accounts and theories of military surprise support this opinion. They include graphic accounts of past exploits, glowing reports of success, but only incomplete advice on how to achieve this dumbfounding action.

The advice takes one of two main approaches. First, we are told that military surprise is nothing that leadership, professional military education, and career broadening assignments cannot handle, i.e., that special training in military surprise is not needed. Such may be the case for the operational geniuses of U.S. military surprise from George Washington to George Patton. However, without specialized training, the typical operational commander will obtain surprise infrequently and usually by chance.

Second, we are told that if a set of principles, maxims, or commandments are followed, military surprise cannot be far behind. This approach is effective, when based on past accounts of military surprise. But it does not address how to handle novel and unique situations with characteristics that cannot be influenced or understood by a "tried and true" approach. Like the purveyors of books on how to succeed in business, sports, or life itself, our maxim makers offer some good information, but we are still not ready to set the world on fire.

In contrast to these two approaches, there is a psychological approach. It is based not only on historical accounts and theories of military surprise but on research and descriptions of

surprise as a human experience in all walks of life. It also presumes competence in the vital tools of achieving any military victory—logistics, intelligence, and operational savvy. Using this approach, it is possible to develop a definition and planning considerations for military surprise. Although these may not ensure success, they should reveal the kind of specialization needed to do it right.

What Is Military Surprise?

Military surprise is a combination of three psychological experiences: one of thought, one of emotion, and one of behavior.

First, a gap between what is real and what is thought to be real arises in the mind of the enemy; a “reality gap” occurs. How can we cause such a reality gap or maintain one that already exists? In low- or high-intensity military conflict, it is easiest to strengthen what the enemy already thinks and then to act contrary to it. In low-intensity conflict, the enemy has little need to question preconceptions; in high-intensity conflict, there is little time to do so. In moderate-intensity conflict, however, it is sometimes more beneficial to reverse or radically change the enemy’s preconceptions, and then act contrary to these. Here, the enemy has both a need and the time to consider alternative views of reality.

Along with a reality gap, an emotional experience arises in the enemy. Usually, it consists of fear, anxiety, or anger; occasionally, boredom or apathy. These emotions are expressed bodily by changes in many hormone and nervous system functions. Mentally, they are expressed by changes in the speed, quality, and content of thought. These expressions, along with a reality gap, contribute to poor decision making. The enemy will tend to make decisions either too suddenly or too hesitantly. Historical accounts of military surprise reveal both types of reactions.

With poor decision making arises the *sine qua non* of military surprise: the enemy behaves in a manner more beneficial to us than to

his own interests. Usually, this behavior involves a misallocation of operational, logistical, and intelligence resources—a reaction that may be only temporary as the enemy closes the reality gap and reduces the harmful effects of emotion on mind and body. However, by then, victory may already be ours tactically and/or strategically.

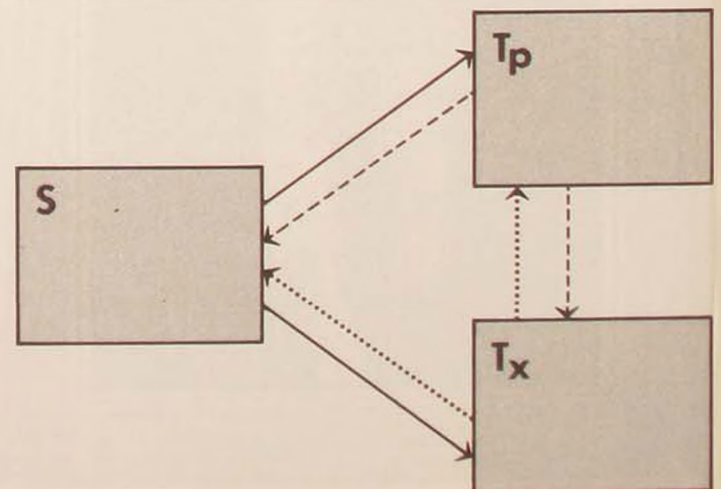
How Do We Achieve Military Surprise?

To surprise the enemy, we need to create or maintain both a reality gap and some emotion leading to poor decision making by the enemy. Doing this is an example of psychological influence. It can be accomplished through speed of maneuver, concentration of forces, security, or a separate deception plan.

As with any attempt at psychological influence, we must plan a coordinated sequence of operational actions that convey information to the enemy. These might include operational security (OPSEC) measures, cover and concealment, and anything else in the realm of human behavior, from writing a bogus letter to *not* moving a squadron.

Obviously, which sequence to develop depends on the scenario at hand. However, all scenarios have basic similarities. (See the accompanying diagram.)

Basically there are three classes of “players” in any scenario: *S*, the initiators of surprise; *T_p*,



the primary targets of S ; and T_x , other targets. S , T_p , and T_x , may be any combination of people, groups, and organizations. For example, T_p can be the leader of a nation-state, a segment of a military planning staff, an entire tactical intelligence system, or all of these.

From my analysis of historical accounts, I have found that military commanders and planners have had an intuitive feel for who or what T_p should be. On the other hand, they seem to ignore or only superficially consider T_x , which can be either inadvertent or intended. T_x might be any or all of the following:

- A less vital target of S : an enemy operational staff without direct authority over troops; enemy forces that are not an immediate threat to us.
- Any potential player in the scenario who observes our actions: a friendly or neutral commander not briefed into our plan who observes the unfolding of our execution schedule.
- Any potential player in the scenario who does not observe our actions: a friendly or neutral commander not briefed into our plan who does not observe the unfolding of our execution schedule but nevertheless may become a "fly in the ointment" unintentionally. (This possibility emphasizes the importance of coordinating with all affected commands before implementing any attempt at surprise.)
- A potential player in a future scenario: an enemy operational commander whom we may face soon, who notes our style and track record in military surprise.

Having identified the players, we can now examine the playing field.

S , T_p , and T_x interact within a context (the oval in the diagram). In analyzing historical accounts, I have found it useful to segment this context into five dimensions (politico-military, economic, sociocultural, psychological, and physical) and three levels (global, regional, and local). The resulting fifteen types of information are interdependent and affect the enemy's behavior, as well as our own.

Instead of quibbling about the exact number and nature of these information types, note that nonmilitary (e.g., sociocultural) factors can significantly affect attempts at obtaining military surprise. Such factors may have played a large part in our being militarily surprised by the People's Republic of China in Korea during November 1950, for example. Also note that while many commanders and planners focus on surprising T_p and perhaps T_x (the solid lines in the diagram), in reality, all players may be trying to surprise the others (the dotted and dashed lines in the diagram). Thus, with the many webs of surprise and countersurprise, many arrows might emanate from and be directed toward S , T_p , and T_x simultaneously.

WITH these thoughts in mind, let us consider a planning sequence that can facilitate obtaining military surprise. Six sequential considerations seem to be necessary.

What is our goal? First, we must decide what we ultimately want to happen. For what purpose should we attempt military surprise? Usually, this comes down to the specific operational goals or national objectives we wish to support. Too often, however, commanders and planners start right in, developing ways to surprise the enemy without being sure of what they want to achieve. The "give me ten pounds of military surprise" approach is not the way to go.

What are our objectives? Next, we must determine the targets (friend and foe). Who are they, and what should they do so that we realize our goal?

In general, anyone or anything that can influence the goal is a potential target. For example, facing a "cultlike" totalitarian adversary, we might select a single individual decision maker as the primary target. More often, however, we would like to influence some combination of leaders and operational/planning staffs.

Once we have chosen a target, how should

we influence the target's behavior to help achieve our goal? There are many possibilities, all involving the misallocation of target resources—personnel and materiel. We might influence when a target behavior will occur, what the behavior will be, where it will occur, how it will be carried out, how frequent or intense it will be, and what purpose the adversary will hope to fulfill. In short-term situations, we would usually seek to affect the target's operational, support, and intelligence actions during battle. In long-term situations, the target's order of battle during a series of skirmishes may be the object that we wish to influence.

What are the psychological parameters? We must next consider how our targets must think and feel so that our objectives will be achieved. What reality gap and emotions will lead to poor decision making and the target behavior we desire?

To identify these parameters, it is imperative that commanders and planners empathize with the target, seeing the world as the target does. Too often, we tend to ascribe our motivations, our way of looking at things, to those who see the world differently. For example, "acceptable losses" may mean one thing to U.S. infantry commanders but something quite different to Iranian clergy who influence revolutionary followers. Our intelligence community has been making significant progress in collecting, analyzing, and disseminating psychological parameters in recent years.

What story should we devise? Here, we must develop the pieces of information that the target must have so that the relevant psychological parameters arise. We must consider both denial and communication of information. The information package must fit together like a story or a script in the mind of the target.

Often, commanders and planners think that this story should be simple, clear, and identical with what they wish a target to think and feel. That is not necessarily the case. If we want an

enemy commander to believe we are planning to attack at Point A, there may be many different stories to cause this belief. One such story might even be that we appear ready to attack at Point C. Another might have nothing to do with an attack. The only requirement is that the story should help establish the psychological parameters.

What are the techniques of surprise? Somehow we must convey the information making up our story. Commanders and planners are usually good at this—at working up coordinated sequences of actions, at setting up execution schedules—but often they underestimate bureaucratic inertia that may preclude an exact carrying out of orders. So too, they tend to intensify OPSEC procedures so much that the enemy knows "something is up."

How will we get feedback? We need indicators to tell us—once we have implemented our plan—whether the actions and reactions we outlined in our planning are tending to occur as we desire. (From historical accounts of military surprise, I have found it useful to classify indicators as either covert or overt, long-term or short-term, direct or indirect.) According to the dictates of our feedback, we may fine-tune, modify substantially, or abort an attempt at military surprise. We should also recognize that indicators or clear feedback may be unavailable sometimes. Here we might decide to press on nevertheless, well aware of our risks in going ahead blind.

FOR future considerations regarding techniques and tactics for military surprise, there are three main contributions that the psychological approach has to offer:

- A scientific foundation for inferring targets' psychological parameters. If we believe that military surprise is a means to victory, we need to understand and predict the mind and behavior of those controlling opposing forces.
- A scientific foundation for modifying psy-

chological parameters. If we have decided to attempt military surprise, we need to know what information or events that we can arrange will affect the enemy's mind and behavior, and we must manipulate these factors to our advantage.

- A scientific foundation for selecting and training specialists in military surprise. As I intimated previously, unlike many "generalist" skills of administration and communication, military surprise is not for everybody. A psychological approach will identify not only

what individual, group, and organizational skills are needed, but how they can be measured and taught.

In our modern era, we have many implements to enhance the war-fighting skills of our armed forces. By applying psychology along with the other vital tools of the military profession, we can approach the ideal of having military surprise available when we need it for victory.

*Armed Forces Medical Intelligence Center
Fort Detrick, Maryland*

Eleventh Military History Symposium

The Department of History at the United States Air Force Academy will host its Eleventh Military History Symposium on 10-12 October 1984. The theme is "Military Planning in the Twentieth Century." Session topics include: the approach to planning before and during World War II, the effect of technology on planning in the United States Air Force, the impact of the cold war on military planning, and planning for limited warfare during the 1960s and 1970s.

For additional information, please contact: Captain Bernard E. Harvey, Executive Director, Eleventh Military History Symposium, Department of History, United States Air Force Academy, Colorado Springs, Colorado 80840. Telephone (303) 472-3230.

PROJECT CONTROL

*creative strategic thinking
at Air University*

LIEUTENANT COLONEL DAVID J. DEAN

THROUGH the years, professional military education (PME) has been the primary task of Air University. While Air University also strives to be a center within the Air Force for creative thought about air warfare, its study of doctrine, concepts, and strategy has been simply one aspect of its larger PME curricula. Establishing an atmosphere for innovative thinking is difficult, even within Air University, especially when the aim is to study such ethereal topics as strategy and doctrine. Several examples of attempts to do so dot the history of Air University: some have been successful; others, much less so. The criteria for evaluating the success of such efforts are imprecise, particularly when compared to the specific parameters we can use to assess the effectiveness of professional military educa-



tion. Moreover, we must often overcome bureaucratic inertia, group think, and established ways of doing things. That is a situation that has always existed, as evidenced by the motto of the Air Corps Tactical School: *Proficimus More Irretenti* (We Progress Unhindered by Tradition). In some situations, a less formal effort may be more conducive to creativity. One individual (or even a small group) may generate enough interest in an idea that an ad hoc organization will form to analyze that concept in depth.

Air University's Project Control is a premier example of creative strategic thinking in the Air Force. It had its beginning as an informal, ad hoc effort to pursue the ideas of one man, Colonel Raymond S. Sleeper. While a member of the Air War College faculty, Sleeper was able to gather a group of people into an organization to study, test, and project his ideas on how a strategic concept of air power could be meshed with the political goals of the United States. He was most concerned with developing a strategy of using our air power to control or modify the behavior of a potential aggressor, especially the Soviet Union.

Inspiration for Project Control

Colonel Sleeper became interested initially in the concept of air control in 1948 when he attended an Air Force briefing on identifying strategic targets in the Soviet Union. This briefing, addressed to key officials in the State Department, stressed the importance of destroying large Soviet cities that were strategic military, industrial, and political centers. However, George Kennan and Charles Bohlen, two of the State Department's leading Sovietologists and two of the most influential foreign policy advisers in the Truman administration, expressed strong dissent about a strategy of atomic bomb attacks on Soviet population centers.¹

The reaction of Kennan and Bohlen con-

vinced Colonel Sleeper that a serious gap existed between U.S. military thinking and planning and the goals that were being set by political leaders. He began to consider how the Air Force could use the air power of the United States to protect and advance our national interests in ways other than by the atomic devastation of Soviet cities. Soon he was challenging the prevailing post-World War II Air Force doctrine that the chief value of U.S. air power was as a powerful retaliatory force that could crush the Communist monolith when, or if, the Soviet Union attacked Western Europe. Sleeper wanted to find new means of using the deterrence value of our overwhelming strategic air power in combination with economic, political, conventional military, and psychological warfare pressures to force the Soviet Union to acquiesce to strong U.S. policy initiatives and national interests. The rhetoric of Eisenhower's first presidential campaign—to roll back communism and to undertake bold new initiatives—provided added impetus to Colonel Sleeper's thinking.

Background of "Control by Air"

Colonel Sleeper first encountered the idea of control by air while studying the techniques used by the British to control obstreperous tribes in the Middle East during the 1920s and 1930s. The British found that the use of air power to enforce their will in colonial areas was cheaper, more effective, and more politically appealing than the use of land forces. Basically, the focus of British air control doctrine was coercion with minimum force. By the end of the 1930s, air control had become a recognized method of achieving political ends with the minimum use of force.²

Elements of Air Control

From his analysis of British air control doctrine, Sleeper identified five factors that were

critical to establishing effective air control. The United States would need to have air superiority; detailed military, economic, political, and psychological intelligence about the target population and nation; clearly stated and communicated objectives (which must be compatible with our military capabilities); and continuous overt and covert communications with the enemy's leaders. In addition, there would have to be an indigenous political structure or group in effective control that could be persuaded to accept our terms. It might be necessary to replace the group in power with another organization more amenable to U.S. terms. Under these conditions, air power could be used in incremental steps to serve as a tool of persuasion, to apply direct pressure or force, and to aid in administering or policing the target country if direct occupation became necessary.³

Building the Project Control Organization

After his arrival at Air War College, Sleeper's thoughts began to coalesce into his central thesis: control of the air, supported by all facets of national power, could enable the United States to modify the actions of a potential aggressor before a situation deteriorated and actual conflict or full-scale war became necessary. Colonel Sleeper dubbed his concept "control by air and other means." Others at Air University grew interested in his ideas and gradually an ad hoc group formed to analyze the concept of air control. Sleeper labeled this growing research effort "Project Control."

The goal of Project Control was to study, test, and plan ways to support U.S. political goals with a strategy based on air control. Then, as now, the main target of such a strategy was to be the Soviet Union. By examining the experiences of World War II in terms of the political, social, and military histories of Japan and Germany between 1930 and 1950, Colonel Sleeper hoped to determine whether

the United States and its Western allies could have controlled the aggressiveness and prewar development of those two nations (or, failing that, shortened and made the war less costly) by applying a strategy of "control by air and other means." From these historical analyses, Sleeper expected that we could then develop a policy toward the Soviet Union for the mid-1950s and beyond that was based on a strategy of control by air.

Colonel Sleeper recognized that this project would require a large, dedicated team to do the necessary research and analysis. He also realized that Air University lacked the organizational resources to undertake such a large-scale effort. Thus, he turned to Headquarters USAF with hopes of obtaining the necessary resources and support from the Air Staff. After a 5 January 1953 meeting at the Pentagon, Brigadier General Hunter Harris, Air Force Director of War Plans, was quick to give his strong support to Project Control. In a letter to Sleeper, General Harris stated that a study on air control would prove worthwhile to the Air Force; he further stated that correspondence from the Air Staff to Air University requesting such a study would be forthcoming.⁴

On 10 June, Sleeper was back at the Pentagon to brief the Air Force operations staff on his progress on Project Control. He outlined the expected scope of the research: Project Control would consist of six major studies—the Concept of Air Control, the Air Control of Japan, the Air Control of Germany, and a three-volume work, *The Persuasion, Pressure, and Administration of Russia by Air*.

Colonel Sleeper's briefing brought quick results. Lieutenant General Thomas D. White, Deputy Chief of Staff for Operations, in a letter to Air University's commander, Lieutenant General Laurence S. Kuter, said that the Air Force considered Project Control as "unusually significant." General White directed that

every practicable effort be made to expedite a full and complete development of the subject matter [and] that the study should be regarded as a high

priority charge against the resources available to the Air University Any assistance you may require from other agencies of the Air Force will be accorded high priority by this headquarters.⁵

In July, Air War College was given the responsibility for Project Control and the initial operating requirements were set.

Initially, the Project Control team consisted of four officers from Air University, six officers on temporary duty from other Air Force commands, six professional civilian employees of Air University, and seven clerk-typists. In late July, Colonel Sleeper outlined requirements for additional staff to carry out the work of Project Control. He asked for ten more officers from Headquarters USAF, two more from Air University, and three from both the Army and Navy; thirty-seven professional civilians from Headquarters USAF, the Central Intelligence Agency, the Department of State, and civilian universities; and twenty-one additional typists from Air University. Sleeper's further request for funds to hire twenty university scholars as consultants pushed Project Control's estimated budget to nearly \$220,000 and a projected staff of almost 100 people. His requests were ambitious and would have caused any manager to gasp in dismay. The Air Staff, in fact, did just that; in a 30 July 1953 message, the Air Force stated that the project was an "additional requirement" to be achieved within the current resources of Air University.⁶

The message seemed to spell a quick end to Colonel Sleeper's daring enterprise. Not even Major General Roscoe Wilson, Air War College commandant and a strong advocate of Project Control, could afford to support the effort at these levels without undercutting the ability of his school to fulfill its mission. Colonel Sleeper was faced with a serious challenge of finding ways of keeping Project Control alive. However, Major General Franklin O. Carroll, commander of the Human Resources Research Institute (HRRI), a tenant unit at Maxwell Air Force Base, came to the rescue; he offered \$100,000 from the HRRI budget to hire the

academic consultants. In the meantime, Colonel Sleeper had briefed Brigadier General Lloyd P. Hopwood, commandant of the Air Command and Staff School (ACSS), on the project. General Hopwood offered to provide eighteen officers from the Field Officers Course to work part-time on Project Control. The ACSS students were to be organized into special study groups and would fill gaps not filled by the Air Staff or Air University. The civilian scholars hired as consultants would critically review and guide the work done by these ACSS study groups, as well as contribute their own original material to the effort.⁷ In time, more than 100 students became involved in the Project Control studies.

Project Control finally got off the ground in August 1953 with a staff of two officers from Air University, four civilians, and a stenographer. General Kuter authorized hiring three additional stenographers and promised to assign twelve military clerks. He also promised to have a building ready to house Project Control by 30 September. The Air Force directors of intelligence and strategic plans had provided specialists on temporary duty to help analyze Japanese, German, Soviet, and U.S. military capabilities. Nonetheless, it was clear that Project Control was to be an Air University effort. Colonel Sleeper would need to rely on imagination and dynamism to beg, borrow, and "steal" the personnel and resources to stay in business.

In December 1953, Project Control faced another crisis. It came just as the air control hypothesis was being analyzed and tested in detail against the German and Japanese experiences in World War II. Major General Donald N. Yates, director of research and development at Headquarters USAF, challenged the continued use of civilian scholars as consultants. Apparently, he was reacting to comments from a U.S. senator who had criticized the Air Force for doing social science research.⁸

On 21 December, Colonel Sleeper briefed General Yates and others on the objectives of

Project Control and the progress made to date.⁹ Although he agreed that the project was important, General Yates did not relent on his decision to cancel the contracts of the consulting scholars. The critical input of high-quality scholarship seemed doomed. Colonel Sleeper engaged in desperate discussions with the Air Staff to try to find some way of continuing the contracts to hire academic consultants. But no immediate solution was forthcoming. Thus, the consultants' visits for early January 1954 had to be canceled.

The new year began with frantic attempts to keep Project Control viable. Finally, through his personal intervention, General Kuter was able to convince General Yates to extend the contracts for another thirty days.¹⁰ Air University hired back fourteen of the consultants immediately. The consultants' critical reviews of the analyses done by Project Control added immeasurably to the quality of the final reports and ensured that the work could withstand the test of academic scrutiny.

At the end of January, Project Control had only six weeks left to complete the analytic substance of the project. These six weeks were a critical phase in the success of the effort. Colonel Sleeper now found that he had to juggle his time between working with the Project Control study groups and trying to obtain adequate professional editorial help. The latter task proved to be as difficult as getting money for the academic consultants. During this time, the remaining Project Control staff (four full-time officers from Air University, fifteen ACSS students who had stayed for ninety days' TDY after graduation, four full-time civilians, one full-time ACSS officer, one part-time employee, and nineteen clerical employees) worked at full speed to put the studies into final form before the end of March, when the last of the ACSS students would leave. The research and analysis phase of Project Control was completed on 10 March. Largely due to Sleeper's personal energy, Project Control was able to get both the continued consultant support and the profes-

sional editing that were necessary to the success of the project. But these administrative headaches required much perseverance and fortitude by everyone. A handful of remaining officers and civilians continued working to complete the editing and publishing of the study as the end of March 1954 approached. All involved in the project were relieved to see Project Control finally wind down. Or so they thought.

A Bombshell out of the Blue

On 31 March, a bombshell message (also sent to the commanders of the Far East Air Forces and the Tactical Air Command) from the Vice Chief of Staff, General Nathan F. Twining, was received at Air University. The Vice Chief was disturbed about the doubts being raised in the "New Look" debates regarding the capability of the Air Force to "do anything other than [take] massive retaliatory action in the event of a major war." General Twining noted that: "Most of the doubts expressed and many of the outright charges made concerning the limitations of [Air Force's role in the] 'New Look' contain a fundamental implication that surface forces are more capable of dealing with localized aggressions than are air forces." The Vice Chief did not believe that the Air Force had projected a capacity to combat local aggression. Therefore, the Air Force did not "appear capable of justifying increased air power to meet the military threats [of] anything short of major war." He wanted to know: "What can air forces do to resolve the military problem in Indochina?" General Twining tasked his commanders to explore possible solutions to the Indochina problem. One option he mentioned specifically was air control.¹¹

Here was a new challenge for Air University: a real-world problem that touched on a weakness in Air Force doctrine and capability. The mention of air control made Sleeper the obvious choice to organize and direct the Air University effort to analyze the situation in Indochina and propose an Air Force role in arriving

at a military solution to that problem. Because of the high-level interest, support from all agencies at Air University abounded. The team concept used so successfully in the original Project Control was tailored for a high-intensity effort on Indochina. Again, Colonel Sleeper spearheaded the effort; he led a coordinating team that supervised the work of the eleven study teams that analyzed narrow segments of the overall problem in Indochina. Fifty-one officers from throughout Air University were tapped to participate in the Indochina Project Control. Only one day after receiving General Twining's message, Sleeper had the new project well under way. Six senior officers from Washington, D.C., Air Training Command headquarters, and Tactical Air Command arrived to assist the study teams.

By 3 April a rough draft of a proposal for action in Indochina was completed. The study was considered "hot" enough to send directly to Headquarters USAF without editorial refinement. It was received at the Pentagon on 11 April, just twelve days after the Vice Chief had issued his directive to Air University. Meanwhile, Air University had decided to initiate study on the air control of Communist China relative to the Indochina conflict. The team completed this aspect of the study on 21 April, and Sleeper briefed senior Air University officials on the findings.

The Indochina team crammed into its studies several proposals and observations about the ability of the United States to intervene in that conflict. In general terms, the Indochina studies concluded that:

- Before it intervened, the United States must get the French to agree to an independent Indochina and must dissociate itself from French colonialism.
- The best way to fight Communists is with native guerrilla forces that have helicopter mobility and are backed with both airlift and interdiction aircraft and a naval blockade.
- Any intervention force must have a com-

mand structure that integrates political, economic, and sociopsychological measures with military activities. Also, the force in the field must have the power of decision in all these areas.

- The Indochina conflict is primarily politico-military in nature; thus the employment of force must continually emphasize the political goal(s) desired.

- Because targets are transient in the Indochina War, weapons must be applied quickly; tactical intelligence and air control teams must be established in various areas to locate targets and control air strikes.

- China should be a target of persuasion and, perhaps, pressure because Chinese support of the Vietnamese Communists was crucial to their success in the south.¹²

The teams also provided specific recommendations on command structures, force structure requirements, logistics requirements, and related subjects. All in all, they produced impressive results for only a twelve-day effort. The studies showed clearly that intensive analyses done in small, specialized research groups modeled after the Project Control study could produce results quickly and efficiently. After the crash effort of the Indochina study, the air control team got back to its chief business: selling a new strategy to cope with the Soviet Union.

Impossible Dream?

Born as it was during the era when the new Eisenhower administration still talked of rolling back communism, Project Control had rather ambitious goals for a U.S. policy toward the Soviet Union. Project Control produced three major works on air control of the Soviet Union. The factors and concepts analyzed in these three works grew out of the research and analysis that the teams had done on Japan and Germany.

The first book presented a detailed analysis

of Russian history from early czarist days up to 1953 and concluded with essays on perceived U.S. national objectives toward the Soviet Union and perceived Soviet objectives toward the West and other areas of the world. The attempt to determine the primary goals of the Soviets generated much controversy. The view that Moscow's first priority was to perpetuate the Communist regime and internal security of Mother Russia won out over the belief that world conquest was the *raison d'être* of the Kremlin.

Book two was an in-depth examination of those factors that were critical to developing an air control plan for the Soviet Union. This volume analyzed such areas of central concern as the social structure of Russia and the communications capabilities and facilities between the West and the Soviet Union. The central hypothesis underlying the effort to develop the air control plan was:

If the U.S. could adequately analyze the social structure of Russia, it would be possible through control of the air . . . to exploit the vulnerabilities of Soviet society, disintegrate the iron curtain and assist and develop a new government in Russia, and achieve a stable world peace through persuasive measures.¹³

An aspect of the Project Control analysis was to identify indigenous power groups that potentially could replace the ruling Communists. Thus, this second book analyzed the size, composition, psychological characteristics, and vulnerabilities of the major elements in Soviet society: the armed forces, the Communist party, the Soviet elite, internal security apparatus, bureaucracy, labor force, peasantry, and regional nationality groups. Studying these elements was a significant departure from the norm for Air Force officers more accustomed to examining straightforward military methods for dealing with the Soviet Union.

The third part of the Soviet study described in general terms the types of operations that the West might take against the Soviets during the persuasion, pressure, and administration phases

of an air control plan. While stressing that the goal was to coerce the Soviet Union to change its actions and policies, Project Control officers nonetheless recommended some ambitious methods of persuasion: forward air patrols, an air reconnaissance offensive, dismantling of the iron curtain, and the unification of Germany. The key to the success of a strategy of persuasion stemmed from the underlying belief among the control teams that the superior atomic power of the United States gave it a decisive psychological edge over the Soviets. Thus, the United States should be able to use this advantage, along with diplomatic actions, to attain our national objectives, given that the United States also had a definite economic and moral superiority over its adversary. But this rationale assumed that the United States would maintain its superiority over the Soviet Union in both nuclear weapons and delivery vehicles until at least 1957. Once the Soviets achieved nuclear parity, then the ability of the United States to coerce the Soviet Union through control techniques would be ended.

Project Control suggested that through forward air patrols, the United States could defend against Soviet air attacks and provide intelligence on the northern air operations of the Soviet Union by extending U.S. air defenses across the Arctic Circle to the periphery of the Soviet Union. The control officers recommended that we use RC-121 aircraft for this mission—a primitive form of airborne warning and control for early warning only. (Later, this idea was adopted by the North American Defense Command; it represented a new direction in air defense thinking—putting the line of defense as close to the enemy as possible.)¹⁴

The air reconnaissance offensive proposed by Project Control involved our initiating a program of shallow and deep overflight penetrations of the Soviet Union. The control analysts argued that such flights would demonstrate to the Soviets that the United States had shifted from a purely defensive posture of striking back only if attacked to adopting a more

offensive posture of using U.S. air power in a dynamic role. Moreover, a reconnaissance offensive would give the United States intelligence about the location, disposition, and operations of Soviet air forces. To carry out such an offensive, the Air Force would need aircraft designed specifically for strategic reconnaissance rather than modified fighters and bombers.

Colonel Sleeper's briefing on this aspect of the air control concept to then-Colonel Bernard Schriever (later a full general) may have been the first step in developing the U-2 spy plane.¹⁵ This briefing also may have had some impact on President Eisenhower's 1955 "Open Skies" speech, in which the President proposed that the United States and the Soviet Union voluntarily allow reconnaissance overflights of their territories to preclude any possibility of surprise attacks.¹⁶ The proposal never received much acceptance, but that did not stop the United States from overflying the Soviet Union and China once the U-2 became available.

Project Control analysts also foresaw the advent of reconnaissance satellites that would fulfill the intelligence functions in later reconnaissance offensives. Should all such "persuasive" tactics fail, however, they believed that the United States could initiate a campaign of direct pressure to force the Soviets to submit to our will while we were still in a position of strategic superiority.

Several interesting concepts emerged from the Soviet phase of Project Control. First, Project Control analysts saw the use of strategic air power as clearly the cheapest way to achieve national objectives. Second, although a strategic atomic offensive was the main feature of the pressure phase, they advocated that it be directed primarily at military targets, especially the long-range elements of the Soviet air forces. Project Control proposed a dramatic shift away from city busting and massive retaliation to a concept of gradually increased pressure, which would lead to early negotiations that would be favorable to the United States.

This proposal had much in common with the doctrine of graduated response of the early 1960s. Project Control also strongly recommended that an aggressive act be redefined as clear indications of aggressive preparations by the Soviets that would require a preemptive strike. Most of the operations proposed in Project Control were radically different from initiatives then contemplated by the military. Therefore, control analysts urged that their scenarios be war-gamed, that the intelligence needed to implement an air control plan be gathered and evaluated, and that the concept of control by air be studied further.

The Impact of Project Control: The Briefings

The research analyses developed during Project Control, even after careful editing, filled several thousand pages. Dumping this highly classified and monumental study on potential users would have ensured that it received little attention. Few people would have the time, inclination, and security clearance to read and digest it. To solve this problem, the control team prepared a summary volume. Colonel Sleeper recognized also that to get his ideas circulated widely at the top, he would have to synthesize the major findings and proposals of Project Control into a concise, polished oral briefing. Beginning in the spring of 1954, he was busied with a cycle of briefings.

After a series of briefings in Washington, Sleeper was called to brief the Air Force World Wide Commanders Conference at Eglin Air Force Base, Florida, on 24 May 1954. This meeting brought together the commanders of all Air Force major commands and key members of the Air Staff; the elite of the Air Force leadership was present—Generals LeMay, Norstadt, White, Partridge, Twining, and Weyland. In a memorandum to Sleeper, General Kuter reported that the Secretary of the Air Force wanted to get this briefing to the White House immediately. He also wrote that the conferees

were quite reassured to know “that the Air University is not planning to fight World War II½ . . . , but that it is apparently doing as well in planning for World War III as the Air Corps Tactical School for World War II.”¹⁷

In June, Colonel Sleeper was assigned to temporary duty on the Air Staff, where he began an exhaustive briefing cycle to many of the nation’s top leaders, including Secretary of Defense Charles E. Wilson, Robert Cutler (Executive Director of the National Security Council), Allen Dulles (Director of the Central Intelligence Agency), and Admiral Arthur W. Radford (Chairman of the Joint Chiefs of Staff). Many of the senior staff officers in the armed forces also attended the briefings.

The concept of control by air proved controversial; many argued against its feasibility, while others said that it had great potential. Admiral Radford believed that Project Control’s proposals should be pushed all the way to the White House even though he was uncertain about the reception that they would receive in the top echelons of government or from our allies. He believed that only unanimous agreement with our allies would make control of the Soviet Union practical. Yet Admiral Radford himself felt that the United States had, at the time, the military capability to implement the concept of air control; and he was enthusiastic about the potential applications of Project Control.¹⁸

But control concepts were certainly not in the mainstream of the Air Force thought in 1953-54: this was a time when massive application of atomic weapons was considered to be the best deterrent against the Soviet Union. Such a radical departure from mainstream thinking would prove difficult to sell to the civilian leadership and established bureaucracies. Thus, in 1954, Colonel Sleeper returned to an operational bomb wing. Project Control had lost its prime spokesman, and the aggressive control proposals that the project had produced faded quickly from the scene.

So What?

Why dredge up an ancient research effort from the archives of Air University? The example of Project Control is worthwhile for many reasons. Project Control points up a critical role that Air University can play in the Air Force: to generate new ideas without being burdened by the special operational requirements of a major air command, the daily crises of staff work, or the fiscal constraints and joint agreement requirements that are inherent in Air Staff planning. The project also showed that it is difficult to obtain resources—to justify people and money—for an effort that does not have a clearly defined output at its inception. And without a dynamic, committed spokesman, a new concept will certainly fail to survive if faced with opposition and inertia within the bureaucracy.

Furthermore, Project Control was a valuable learning experience for the Air University students, officers, and civilian employees who took part. They were given the chance to analyze, test, and evaluate a concept in an attempt to influence current Air Force operational doctrine and current national policy. The “real-world” application of their work drove these participants to a level of effort rarely seen in a bureaucratic or academic setting.

Project Control was a richly satisfying experience but lacked a basic sense of political realities, at least in the eyes of Morris Janowitz.¹⁹ He is perhaps correct; it is difficult to imagine such an aggressive, single-minded policy being adopted as a national strategy in our open and diverse society. The fundamental problem is one that Clausewitz identified: soldiers and policymakers must understand one another’s basic capabilities if military power is to be used effectively for political ends.²⁰ Colonel Sleeper perceived that our military and political leaders were not communicating well with one another. On the one hand, top policymakers in 1948 were saying that the military’s strategic war plan could not be implemented; on the other

hand, as the Eisenhower administration settled into office, it gradually embraced a policy of massive retaliation. Military planners were left with the apparent dilemma of developing a strategy that they could never employ. At least in Colonel Sleeper's eyes, this was a classic situation in which the policymaker did not understand the fundamentals of war in the atomic age, while the military commanders did not have a clear grasp of national policy.

Today, no less than in the early 1950s, the Air Force needs to recognize individuals with ideas worth pursuing and to encourage them to analyze, test, refine, and present their conclusions. Similarly today, the military must be able to articulate its capabilities, limitations, and potential to political leaders. In fact, bridging the gap between military and civilian perceptions may be a problem with which military leaders will have to contend more diligently than ever before. Developers of the concept of air control believed that it would be valid only as long as the United States retained its strategic air

power advantage over the Soviets. Once the Soviet Union attained a credible strategic missile force, the possibility of applying Project Control's strategic plans evaporated. But what happens in the contemporary world if a technological breakthrough were to give the United States a significant, temporary strategic advantage? The possibility of space-based lasers capable of effectively countering the Soviet's strategic offensive force may be such a breakthrough. Who in the Air Force is considering ways to exploit this advantage if it occurs, and who can effectively communicate such ideas to the top echelons of government? Or, conversely, do our adversaries understand concepts such as Project Control, and are they willing to seek political advantages based on a strategy of superiority? These matters and questions certainly merit our serious consideration within the Air Force.

*Center for Aerospace Doctrine,
Research, and Education
Maxwell AFB, Alabama*

Notes

1. Keenan: If you drop atomic bombs in Moscow, Leningrad, and the rest, you will simply convince the Russians you are barbarians trying to destroy their very society and they will rise up and wage an indeterminate war against the West.

Bohlen: The negative psychological results of such an atomic attack might endanger postwar peace for 100 years.

In *A History of Project Control, Vol. II, Supporting Documents*, Tab 1. Unpublished document in Air University Albert F. Simpson Historical Research Center (AFSHRC), Maxwell AFB, Alabama.

2. For specifics on how British air control worked, see Lieutenant Colonel David J. Dean, "Air Power in Small Wars: The British Air Control Experience," *Air University Review*, July-August 1983, and Colonel Kenneth J. Alnwick, "Perspectives on Air Power at the Low End of the Conflict Spectrum," *Air University Review*, March-April 1984.

3. *A History of Project Control, Vol. I, Narrative*, pp. xii-xiv, in the USAF Historical Collection, AFSHRC.

4. Brigadier General Hunter Harris (Chief War Plans Division, USAF) to Colonel Raymond Sleeper (AU/AWC), 6 February 1953.

5. Lieutenant General Thomas D. White (DCS/Operations, USAF) to Commander Air University, 22 June 1953. Emphasis added.

6. Chief of Staff USAF message, date time group 301351Z July 1953.

7. Dr. Clyde Kluckhohn, director of the Russian Research Center, Harvard University, began working on the project in September 1953. Other academicians who participated as consultants on Project Control included Professor Frederick Barghoorn of Yale, Dr. Robert Butow and Professor William Ebstein of Princeton, Drs. Merle Fainsod and Edwin Reischauer of Harvard, Dr. Morris Janowitz of Michigan, Dr. Walt Rostow of MIT, and Drs. Louis Nemzer, Harold Zink, and Kuzuo Kawai of Ohio State. The scholars were chosen for their expertise in relevant areas to ensure a critical evaluation of every aspect of the project. Other distinguished people who provided advice and assistance on the project included Dr. A. A. Berle, Assistant Secretary of State; Major General O. A. Anderson, USAF; Sir John Slessor, RAF; General Carl Spaatz, USAF; and Major Alexander de Seversky. In *A History of Project Control, Vol. I, Narrative*, AFSHRC, pp. xv, 94-95.

8. *Ibid.*, pp. 82-85.

9. *Ibid.*, p. 83.

10. *Ibid.*, pp. 89-90.

11. Chief of Staff message date time group 302128Z March 1954

12. *Project Control Research Memorandum 4.5: Resolution of the Indo-China Conflict through Control by Air and Other Means*, AFSHRC.

13. *Project Control Report 4.2, Book 2, the Control of Russia by Air and Other Means*, AFSHRC, p. 354.

14. General Kuter told Colonel Sleeper years later that Air Defense Command had been very impressed with the control briefing, which stimulated thinking for forward air defense using the RC-121s.

15. As reported by Colonel Sleeper in a 17 June 1982 letter to Lieutenant Colonel Dean.

16. Dwight D. Eisenhower, *The White House Years: Mandate for Change, 1953-1956* (New York: Doubleday and Co., 1963), pp. 520-22. In addition, *Time*, in its 1 August 1955 issue (p. 17), reported that Open Skies "got its start a year ago among a group of young Air Force officers, who were bemoaning the thinness of US intelligence about Russia . . ." Eisenhower's adopting it and forming it into a specific proposal, was a secret he shared with barely half a dozen men. The final "I-dotting and T-crossing," said one of them, "was done on the shores of Lake Geneva, with two Eisenhower military colleagues: NATO Supreme Allied Commander in Europe, General A. M. Gruenther, and CJCS Admiral Radford." The timing of

the Air Force officers concerned with intelligence on the Soviet Union corresponds closely with the postproject briefings on Project Control, which so impressed Admiral Radford that he became one of the most enthusiastic supporters of Project Control. Many Air Force intelligence officers, including then-Major George Keegan, later USAF DCS/Intelligence, worked on Project Control.

17. Memorandum by Lieutenant General Kuter to Commandant, Air War College, 26 May 1954.

18. Memorandum for Record dated 13 September 1954 by Colonel G. V. Davis, DCS/Plans/USAF, on Presentation of Project Control to Chairman, JCS (25 August 1954).

19. Morris Janowitz, *The Professional Soldier* (New York: Glencoe Free Press, 1971), p. 284. Janowitz was one of the consultants hired for work on Project Control.

20. Carl von Clausewitz, *On War*, edited and translated by Michael Howard and Peter Paret (Princeton: Princeton University Press, 1976), p. 607.

"Damn this day," he said. "A fool would know that Zeus had thrown his weight behind the Trojans. All their stones and javelins hit the mark, whoever flings them, good soldier or bad! As for ourselves, no luck at all, our shots are spent against the ground."

HOMER, *The Iliad*, p. 427
translated by Robert Fitzgerald

In 1914 the French regular officer and N.C.O. were inferior to the German not merely in military education but in leadership, in management of their men. Instead of the close sense of teamwork that united the officers and men of a German company, the flexible discipline of the German army, there was too often deep personal and professional gulfs between officers, N.C.O.'s and privates in the French army; there was a brutally stiff discipline that had survived from the Second Empire.

CORRELLI BARNETT, *The Swordbearers*, p. 227



IRA C. EAKER
THIRD-PRIZE WINNER

MARLBOROUGH'S GHOST

eighteenth-century warfare in the nuclear age

LIEUTENANT COLONEL DENNIS M. DREW

THE scarlet-clad soldiers stood shoulder to shoulder facing out across the open field. On command, they moved forward in precise lines with measured cadence, marching with the skill engendered by years of practice on the drill field. But on the far side of this field stood blue-clad soldiers in equally precise formation awaiting the advancing troops. On they came in their closely ordered drill, stopping on occasion so their brigadiers could realign the ranks. The fateful command rang out when less than forty yards separated red from blue. A thunderous roar erupted from the volley-fired muskets as fingers of flame and rolling clouds of smoke poured forth to obscure both lines of soldiers. This parade-ground image of eighteenth-century European warfare is etched on the American consciousness. Even grammar school textbooks in the United States portray derisively the linear tactics imported by the British army during the American Revolution and exult in

the clever tactics of the American rebels who refused to fight in the stylized European fashion.

The peculiar strategies and tactics of eighteenth-century European warfare would be little more than interesting footnotes in military history were it not for the many parallels between the problems that created the style of war in that earlier era and the problems confronting the United States today. These parallel problems lead one to speculate about the role of the U.S. military in the pursuit of national objectives during the decades that lie ahead. However, before we can examine current parallels and raise questions about the future, we must address two questions. First, beyond the peculiar linear tactics already briefly described, what was the nature of eighteenth-century warfare? Second, what factors made warfare in that century so distinctive?

Military historians commonly refer to the

time period extending from the latter part of the seventeenth century to the dawn of the French Revolution as the age of limited warfare. The limitations so implied were neither in terms of the number of wars fought nor in terms of the number of years in which war occurred. Wars in that era were frequent and often prolonged. Nor was war limited in terms of combat casualties. Eighteenth-century battles often resulted in disastrous casualty rates. The limitations on war were instead much more fundamental. Wars during that period were generally fought for limited objectives, with limited resources, and with a very limited number of actual battles. Such circumstances seem difficult to imagine in the twentieth century, which has witnessed unlimited warfare fought for unlimited objectives.

The eighteenth century was the age of absolute monarchies in Europe (England being the obvious exception). The dynastic armies that supported these monarchs fought "foreign" wars for what can be classified only as dynastic objectives—a slice of land here, a city there, and succession to various thrones. Given such objectives, the common man had little to arouse his enthusiasm, little to fire his imagination, and little over which he would willingly risk his life. The passions raised by the religious wars of the seventeenth century were but a dim memory, and the ideological passions of popular revolutions had not yet appeared. The limited dynastic objectives of European monarchs spawned limited and relatively restrained warfare.

The limited size of dynastic armies also restrained warfare in the eighteenth century. Few volunteered to serve, and the primitive economic system of the time militated against conscription that could strip away the most productive members of society. As a result, mercenaries became valuable members of most western European armies, sometimes becoming the dominant faction. To fill out the ranks, monarchs often impressed non-mercenary soldiers into service from the dregs

of European society. Another damper on the size of eighteenth-century armies was the limited taxation base of preindustrial economies. Limited tax revenues provided meager means with which to finance armies of any great size.

Generals in that era struggled to make the most effective use of the available technology. The standard infantry weapon was the muzzle-loading musket. Slow to reload and accurate only to about fifty yards against a man-sized target, these weapons dictated the tactics used on the battlefield. Rigid linear formations, maneuvered under the strictest discipline, made maximum use of short-range volley fire. But the exactions of linear tactics created significant problems. A new recruit required two years of drill and discipline to become a first-class infantryman. Such extensive training and the expense of mercenary soldiers made eighteenth-century armies expensive to train and maintain, particularly in relation to the limited financial base available to most monarchs. As a general result, monarchs hesitated to put their expensive and hard-to-replace armies at serious risk.

Linear tactics also made the general style of warfare less than intensive. Commanders in the field had to agree tacitly to battle. The slow maneuvers of clumsy linear formations meant that either side could quit the field of battle if the situation did not appear favorable. Consequently, maneuvering was much more common than battle itself. The acme of generalship was to maneuver across an enemy's lines of communication and force him to retreat or quit the area in question.

As strange as it may seem today, this stylized and restrained method of making war in the eighteenth century was a useful system for rulers to achieve limited objectives. All of the European monarchs faced essentially the same fundamental problems. Each army used the same basic technology, required the same training, and faced similar economic constraints. To a large extent, all of the European monarchs played the game of realpolitik us-

ing the same general set of rules. The system was upset at midcentury by Frederick the Great, a monarch who was much more aggressive and ready for battle. He believed that hard fighting, rather than maneuver, decided the issue in war. He also considered his position desperate enough to impose both crippling taxation and a form of conscription on his Prussian subjects. Frederick served as a precursor to the changes wrought by the French Revolution, which returned ideology to European warfare and introduced the concept of the nation in arms. Both of these developments led Europeans down the path toward modern total war.

THE objectives of wars fought in the nineteenth and twentieth centuries approached totality as nation-states often fought for their survival. The costs of achieving these objectives escalated as the tools of war became more efficient in their deadly purpose. This trend culminated in the Second World War, when the advent of nuclear weapons indicated that the costs of total war in the nuclear age could well exceed the value of any objective (which is, of course, the basis for the nuclear deterrence theory).

To a large extent, costs limited eighteenth-century warfare. In many respects, warfare since the dawn of the nuclear age has reentered the eighteenth century, at least from the U.S. perspective. The fear of a nuclear holocaust and its ultimate cost has limited not only U.S. objectives in war but also the means used to achieve those objectives. But there are many other uncanny parallels between eighteenth-century limited warfare and the American situation in the latter half of the twentieth century. In the 1980s, Marlborough's ghost would have a sense of *déjà vu*. These parallels suggest some disturbing prospects and raise some difficult questions that Americans must face if the military is to remain an effective instrument of national power. A few

examples of the most obvious and important parallels will illustrate the point.

The objectives of warfare in the eighteenth century were dynastic rather than popular and ideological. Rarely did these objectives evoke the wholehearted and unflagging support of the common man. In the post-World War II era, the United States has cloaked its objectives with the ideological struggle against communism. But at the same time, these objectives have become difficult to articulate effectively and are thus "distant" from the common man. It is very difficult to infuse the bulk of the American citizenry with great enthusiasm to risk life and limb for the concept of "containment."

The lack of popular objectives was one (but certainly not the only) reason that mercenaries and the impressed dregs of society populated eighteenth-century armies. Some contemporary observers maintain that an analogous situation exists in the current U.S. military structure. They fear that the "all-volunteer force" is, in effect, a mercenary force. Rather than stressing patriotic duty, recruiting campaigns now emphasize pay, allowances, training, and experience applicable to civilian life. "A great way of life" seems a far cry from the stern visage of Uncle Sam saying, "I want you." Critics also point out that at times (generally dependent on domestic economic conditions), recruits in the all-volunteer era have had inadequate educational backgrounds and formed a less than representative racial mix.

Funding military forces continues to be a difficult task for modern governments. In the eighteenth century, the preindustrial taxation base severely limited the funding available for military forces. In the twentieth century, in contrast, the tax base is broad and deep in a mature American economy. However, the U.S. government has assumed an extraordinary number of expensive responsibilities to fulfill the perceived needs of society. Thus, despite the fact that revenues of the U.S. government dwarf those of eighteenth-century

monarchs, the fierce competition for available funds places severe limitations on the monies available for military purposes.

The heavy expense of building and maintaining eighteenth-century armies compounded the problem of limited funding. Monarchs had to recruit and pay mercenaries. Linear tactics required endless months of drill to instill both the requisite skills and discipline. In all, the European monarchs faced expensive problems. The twentieth-century parallels are painfully obvious. Recruiting the all-volunteer force becomes particularly expensive during robust economic periods. The training required to produce competent weapon system operators seems endless (note, for example, the time it takes to train a combat pilot—nearly two years in some cases—to attain minimum combat competence). One must also consider the costs of modern high-technology weapons, staggering costs not faced in the eighteenth century. The considerable costs of bronze cannons and soldiers' muskets pale to insignificance in comparison to the costs of modern aircraft, tanks, and ships. The modern American military is a very expensive undertaking.

Limited funding capabilities and the expense of operating armies were two of the factors that limited the size of eighteenth-century armies. The casual observer might believe that the parallels between the eighteenth and twentieth centuries would break down on this point. After all, even in peacetime the U.S. military is substantial, some two million strong. However, one must consider the scale of today's U.S. military commitment and the nature of modern warfare. Sophisticated weapon systems are critical in high-technology war. It is instructive to look at a few examples of these weapon systems when measuring the size of the U.S. Armed Forces in relation to their global commitment. When one considers that the United States has only a handful of aircraft carriers, seventy-odd of its largest transport aircraft, and plans to pur-

chase only a hundred new heavy bombers, then the true size of the modern military begins to come into better perspective. Many of the critical elements of high-technology warfare are in short supply and nearly impossible to replace with any degree of celerity.

Knowing that the general result of the problems faced by eighteenth-century monarchs was a reluctance to place their expensive and hard-to-replace military forces at serious risk leads one to a troubling question about the utility of modern U.S. military forces. Over what issues will the government place these forces, or elements of these forces, at risk? For example, can the United States afford to wage "gunboat" diplomacy with modern aircraft carriers, knowing that if one is lost or badly damaged, nearly 10 percent of this particular form of power projection capability would be lost? Considering their cost and their limited numbers, can the United States afford to use B-1B bombers to drop iron bombs in some small conflict? How long would it take to replace a ship or aircraft lost in such an adventure? The replacement factor—the same problem faced by eighteenth-century monarchs—continues to plague modern military planners and may offer the most disturbing and limiting prospect.

One would suspect that given the nature of the U.S. Armed Forces, they would be placed at risk only in those situations of perceived paramount importance to the nation. But what utility will U.S. military forces have at lesser levels of realpolitik? If we fear to use our forces because we may lose them, will the U.S. military be an effective instrument of power when less than vital interests are at stake? Are we doomed to suffer death by a thousand cuts as we wait for that singular moment when the issue is great enough to risk the use of our forces?

These questions elicit interesting speculation and give a new perspective to the quality/quantity controversy. However, they form just one part of a much more fundamental

problem relating to the parallels between eighteenth- and twentieth-century limited warfare. Monarchs in the eighteenth century faced common problems and arrived at relatively common solutions. The military establishments of that era were effective instruments of power because everyone engaged in power politics with an accepted set of rules. The great upsets to the system came when someone broke the rules. The changes wrought by these upsets doomed the age of limited warfare and many European monarchies.

THE experience of the United States in the modern era of limited war has been quite different. Rather than facing our major adversary (both the United States and the Soviet Union have been very wary of even limited direct confrontations), the United States has engaged in limited warfare with minor powers on the periphery of its vital interests. Success has been limited, at best. The U.S. experience in Southeast Asia illustrated clearly the complex problems faced by a superpower attempting to wage limited war against a minor military power. Unlike the limited warfare of the eighteenth century, the problems faced and the solutions reached were different for each side. There were no accepted rules of the game.

The United States fought a truly limited war in Southeast Asia. Less than vital American interests led to limited, vaguely defined objectives. As a result, the military means used were both limited and tightly controlled. The U.S. government did not attempt to mobilize the home front. On the contrary, the government pursued a "guns and butter" philosophy, as it attempted to wage war overseas and effect social reform at home simultaneously. Finally, since it was a limited undertaking, the United States sought a negotiated settlement, believing that reason would pre-

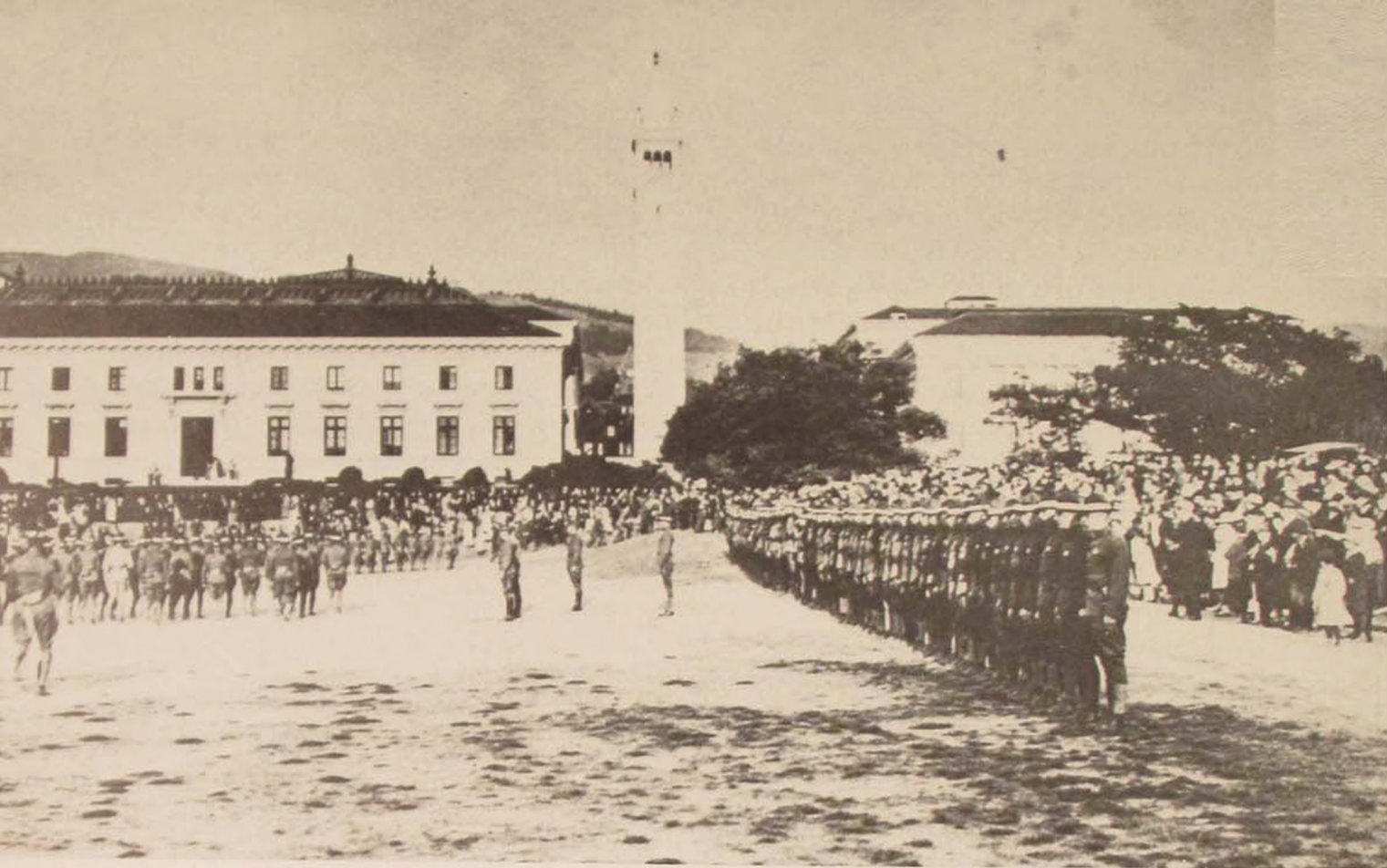
vail and that all the belligerents could reach mutually acceptable compromises.

America's adversaries orchestrated their efforts from a different sheet of music, however. They perceived that their vital interests were directly at stake. As a result, they fought not a limited war, but a total war. They mobilized their population and economy, fought with all the means at their disposal, and persevered despite awesome losses. Finally, they viewed the American willingness to negotiate and compromise as a weakness to be exploited.

In retrospect, the eventual outcome of the U.S. involvement in Vietnam should have been obvious from the beginning. The United States was unwilling to unleash all of the power at its disposal. In contrast, the North Vietnamese were willing to make any sacrifice to achieve their objectives. The war was a test of willpower rather than of firepower. In such a struggle of wills, a mobilized and motivated society with vital interests at stake has an incalculable advantage.

BUT, what of the future? Many believe the most likely kind of future U.S. participation in armed conflict will bear a striking resemblance to the war in Southeast Asia—a limited war against a minor power contesting less than vital U.S. interests. As the end of the twentieth century approaches, it becomes clear that if the United States is to be effective in protecting its interests throughout the world, it must learn to deal with the paradoxical situation of fighting limited wars against opponents who are fighting unlimited wars. Ironically, 200 years ago, as the end of the eighteenth century approached and the French Revolution began, the soldiers who marched shoulder to shoulder in the dynastic armies of Europe faced a similar predicament.

*Center for Aerospace Doctrine,
Research, and Education
Maxwell AFB, Alabama*



"Pass in review!" This command has been a part of drill from the eighteenth century through the present and has been heard by ROTC cadets at American colleges and universities for more than a century. During the 1920s, cadets of the University of California, Berkeley, not only learned valuable leadership lessons from drill periods but acquired technical skills, such as field stripping machine guns and other weapons.

AIR FORCE ROTC

*its origins
and early years*

COLONEL WILLIAM C. STANCIK, USAFR
R. CARGILL HALL

JUSTIN Smith Morrill believed implacably that an educated citizenry, prepared to defend the state, best ensured the well-being of a democratic republic.¹ His faith in public education and in other egalitarian notions was as unshakable as the granite of his native Vermont. The people of the region recognized and appreciated the man and his principles, electing and reelecting Morrill to public office between 1855 and 1898, first to the U.S. House of Representatives and then to the Senate. Indeed, Morrill had no sooner found his seat in the House in 1855 than he began to work vigorously for both vocational and military training

in state-supported colleges. Before the end of his first term, he introduced numerous bills to "provide education for the working classes." All of them languished in committee or expired on the floor.² In 1857 his land-grant bill passed both the House and Senate, only to be vetoed by President Buchanan. But a few years later, in a country deeply divided and at war, the measure passed. Signed into law by President Lincoln on 2 July 1862, the brief, two-page Morrill Act would move the distinguished educator Andrew D. White to exclaim: "In all

the annals of republics, there is no more significant utterance of confidence in national destiny out from the midst of national calamity."³

Citizen-Soldiers

The Morrill Act, or Land Grant College Act of 1862 as it became known, directed that public land be apportioned to state governments in blocks of 30,000 acres for each U.S. senator and representative.* The states were to use funds

After World War I, a lean defense budget and antimilitary sentiment combined to prune the size of Army ROTC. Air ROTC units were cut back severely, but the School of Military Aeronautics at Berkeley proved viable through the era.

*The Morrill Act owed a special debt to an act passed by the Congress of the Confederation in 1787—the Northwest Ordinance—which provided for the admission of territories as states. Under that ordinance, one-sixteenth parcel of land in the new state was to be allocated to education; hence, a precedent for the land-grant programs of the nineteenth century.



from the sale of these lands, a combined area greater in size than Rhode Island, for the "endowment, support, and maintenance of at least one agricultural and mechanical college offering military studies."⁴ The state of Connecticut agreed immediately to the provisions of the Morrill Act and, based on the sale of script, established a permanent endowment of \$135,000. The interest that accrued on this endowment by 1881 helped establish the University of Connecticut.⁵ Two other states, Iowa and Vermont, also requested funds through their legislatures in 1862, leading to the expansion of Iowa State University and the University of Vermont. A year later, thirteen more states in the Union sponsored fourteen universities and colleges. After the Civil War, Arkansas and Mississippi applied for land-grant status; and by 1886, colleges in all eleven states of the old Confederacy were also funded under the act.⁶

Although establishing the foundation for student "military training," the Morrill Act contained no specific provisions for a military curriculum. Each university developed its own course of study. Following the Civil War, veterans, retired Army officers, and academic members of the faculty served as military instructors. Among land-grant schools, the number of hours invested in military class or drill varied greatly. More often than not, however, funding was inadequate, college military training was of poor quality, and the Reserve graduates, although entered in the Army Register, were not awarded commissions.⁷ Among college faculty across the land, the training of Reserve officers received scant support; among students, the Officer Reserve Corps evoked little interest.

If the Civil War guaranteed that the United States would remain a single, undivided continental power, the four-month Spanish-American war in 1898 brought to the nation an overseas empire. The Philippines, Midway, Guam, and Puerto Rico ensured that the country would enter the twentieth century a world power. These new territories required, at least temporarily, troops of occupation. Meanwhile,

the Western frontier had disappeared, troops had fought their last major battle with the Indians, and the Army concentrated its units into battalions and regiments. Garrison schools at every post taught military skills, while a service school established at Fort Leavenworth offered infantry and cavalry tactics. The Army conducted regimental troop maneuvers directed from Washington by the General Staff and the Army Chief of Staff.⁸ But Americans, secure behind oceans on the east and west, preoccupied with expanding commercial opportunities and a flowering of industrial technology, remained little disposed toward supporting things military, Regular or Reserve.

A few years later, however, the Great War in Europe prompted Congress to pass the National Defense Act (NDA) of 1916. That act increased the General Staff from forty-five to fifty-five officers; authorized peacetime units of divisions, corps, and armies; and raised the manpower ceiling of the Regular Army. Building on the Morrill Act of 1862, it also created a formal Reserve Officer Training Corps (ROTC). The NDA authorized the President to establish ROTC units not only at land-grant colleges but at all accredited four-year institutions. Officers of the Regular Army would serve as the professors of military science and tactics, and each participating institution had to provide "at least 100 physically fit male students." The act instructed the Secretary of War to establish "standard courses of theoretical and practical military training" and provide "arms, uniforms, and equipment" to the units. Graduates who completed successfully the four-year course of military instruction* and signed under oath to serve the United States in the Officer Reserve Corps for ten years would be appointed Reserve officers by the President.⁹ The Officer Reserve Corps and the fledgling

*The NDA gave to the participating institutions the option of making the course of military instruction elective or compulsory for the first two years.

ROTC program together furnished 30,000 of 200,000 officers during World War I. These reservists became an important component of the officer corps as the Army grew from 127,500 to 4,000,000 soldiers between 1917 and 1919.¹⁰

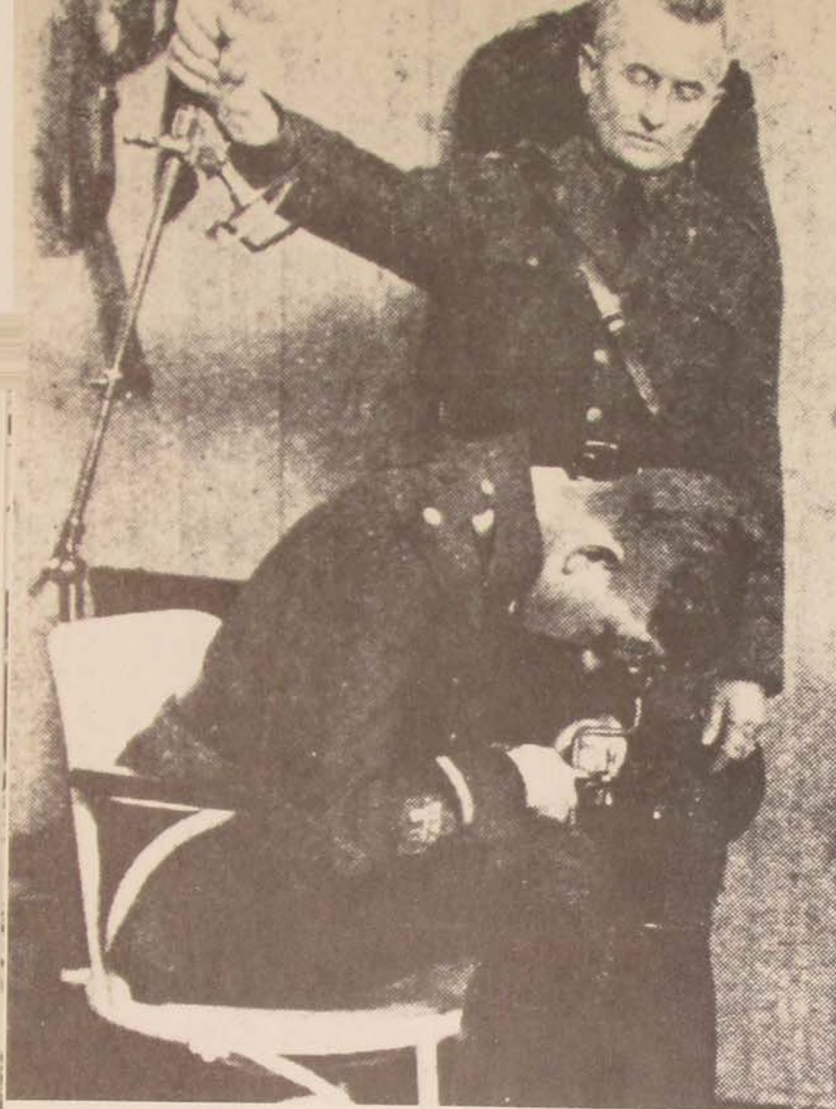
After the defeat of Germany and conclusion of the Treaty of Versailles, Congress amended the National Defense Act in 1920, reducing the period of inactive Reserve duty from ten to five years. That same year, the Army Air Service established separate Air ROTC units at four schools with strong engineering departments: the Universities of California (Berkeley) and Illinois, the Massachusetts Institute of Technology, and Texas A&M. The next year, the Air Service established units at the Georgia Institute of Technology and the University of Washington. New York University joined the group in 1923.¹¹

In the face of postwar demobilization and a sharply reduced manpower ceiling, however, Army leaders in the 1920s struggled just to retain the best qualified Regular officers. Though rendering standard many aspects of ROTC instruction, they offered this program, which turned out still more officers, little active support. In the meantime, various civilian groups, appalled by the enormous destruction of the four-year "Great War," protested standing armies and military training and advocated abolishing all 223 Army and Air ROTC units across the country. Congress, little inclined in the 1920s toward spending for national security, slashed Reserve training funds; by 1925 only seven Regular officers and five enlisted men remained assigned to the Air ROTC units.¹² By 1935, further cuts in the Army budget eliminated all Air ROTC units,¹³ and a committee of the American Association of Land Grant Colleges and State Universities charged: "No expense, explanation, or alibi can persuade anyone that the Army is not indifferent toward ROTC . . ."¹⁴

By the end of the 1930s the order in Europe, struck at Versailles, collapsed. On 10 May 1940, Nazi Germany struck at France through the

low countries; on 22 June, France surrendered. The threat of a widening war, tension between the United States and Japan in the Pacific, and an impending shortage of trained Army officers and other military resources, overcame isolationist sentiment among America's political leaders. On 27 August 1940, Congress passed a joint resolution that authorized the President to call the National Guard and Reserve components to active duty for twelve months. Secretary of War Henry Stimson called up 2700 Reserve officers immediately, and by June 1941 the number of Reserve officers on extended active duty had grown to 57,039 out of an available pool of 73,922.¹⁵ Virtually all of these reservists were ROTC graduates. Reservists now outnumbered 14,477 Regular officers on active duty four to one. Acknowledging the importance of this Reserve cadre, Army Chief of Staff General George C. Marshall later confided to Secretary of the Army Frank Pace: "Just what we would have done in the first phases of our mobilization and training without . . . [the ROTC graduate], I do not know."¹⁶

The 200 Army ROTC units that existed in December 1941 simply could not meet the enormous demand for trained officers that followed the U.S. declaration of war against Japan and Germany. The Navy and War departments abandoned their four-year college ROTC programs in favor of special ninety-day officer candidate schools. In spite of American ambivalence toward college military training in the interregnum between wars, ROTC cadets trained during the 1920s and 1930s served with distinction in the Army Air Forces during World War II. Ohio State University could claim Curtis E. LeMay, who pioneered strategic bombing tactics in Europe and became the first ROTC graduate to serve as a Chief of Staff. Texas A&M's cadet corps produced Bernard Schriever and O. P. Weyland. General Schriever served in the Southwest Pacific and retired in 1965 as commander of the Air Force Systems Command. General Weyland, who retired in 1959 as commander of the Tactical Air



Command, supported Lieutenant General George Patton's Third Army in its historic dash across France; Patton termed him "the best damn general in the Air Corps."¹⁷

From Khaki to Blue

U.S. military forces demobilized rapidly after World War II. Between June 1945 and May 1947, the Army Air Forces, an air force that had counted 2,300,000 men and women and 68,000 aircraft, nosedived to approximately 300,000 active-duty personnel and 25,000 aircraft.¹⁸ While millions of American servicemen returned to civilian pursuits, how best to recruit and train officer candidates in the ROTC again presented the military a difficult challenge.

Instruction and course content varied in ROTC during the 1920s. At New York University, a cadet (left) peered through a primitive bombsight as a part of his aeronautical training. . . . Traditionally, cadets get acquainted with military aircraft during summer camp. In June 1927, cadets of New York University inspected a DH-4 at Mitchel Field (below).



Students in the Aeronautic College of New York University are given practical instruction in everything pertaining to the mechanics of flight. Army of-

Military leaders judged a pool of trained reservists to be essential in the postwar years, and on 22 August 1946 the Army Chief of Staff, General Dwight D. Eisenhower, signed General Order 124 establishing seventy-seven Air ROTC units under the Air Training Command (ATC). A few weeks later, on 15 November, Headquarters Army Air Forces transferred Air ROTC from ATC to the Air Defense Command (ADC).¹⁹

However essential the ultimate pool of trained Reserve officers might be, the initial, nationwide enrollment of 8700 cadets in the fall of 1946 fell far short of the 16,000-cadet goal set for the Army Air Forces. Worse to some military observers, the curriculum followed the format of the Army program closely. Basic air cadets

Cadets usually have attended summer camp between their third and fourth years of training. While the specifics change, the imposition of military discipline and order in relatively primitive conditions remains a traditional part of camp. A number of World War II leaders received their first real taste of military life at ROTC summer camps in the 1930s.

attended an Army class three hours a week for thirty-two weeks in their khaki uniforms. Only the third and fourth years featured military courses with a specific aeronautical flavor. Eventually, the newly commissioned second lieutenant would accept a Reserve assignment in an occupational specialty, such as administration, aircraft maintenance, communications, meteorology, statistical services, supply, or transportation.²⁰ In keeping with Army policy of the interwar period, the five-year Reserve commitment did not include a mandatory active-duty tour. The Army Air Forces filled junior officer mobilization billets from the ranks of Air ROTC Distinguished Military Graduates. Resident professors of military science and tactics nominated candidates for a commission in the Regular Army from these distinguished graduates. Upon accepting a Regular commission, a new second lieutenant reported for a tour of extended active duty.²¹

Air ROTC professors of military science and tactics in 1946 needed to have field grade rank and a pilot's rating and be between twenty-



seven and forty-eight years old. They also needed three years of active commissioned service, twelve months overseas duty, a bachelor's degree, and above-average effectiveness ratings. Military instructors, on the other hand, could be nonrated and less than twenty-seven years old. Enlisted instructors were exempt from specific educational requirements but, according to regulations, had to exhibit an excellent military bearing and "an outgoing personality."²² These requirements, established amidst organizational changes and an impending separation of the Army and Air Force, might have been adequate, had they not been largely ignored.

Transferring Air ROTC from the Air Training Command to the Air Defense Command in November 1946 hardly improved the quality of instruction. Most college units operated without training aids or texts. At the beginning of 1947, after observing the air detachments in New England schools, the Eleventh Air Force historian wrote: "The sum total of Air ROTC equipment on hand at each college could be contained in a cigar box and consisted of some 30 Kodachrome slides of cloud formations."²³ In April, Major General Thomas J. Hanley, Jr., commander of ADC's Eleventh Air Force, inspected Air ROTC units at Purdue, Ohio State, and Duquesne universities. In his report, Hanley not only confirmed his historian's contention about shortages of books and supplies but also declared ROTC instructors to be poorly trained.²⁴ But Lieutenant General George E. Stratemeyer, commanding general of Air Defense Command, immersed in organizing the country's air defense forces, did little more than acknowledge Hanley's report.²⁵ The Air ROTC program claimed a decidedly low priority at ADC.

In Washington on 18 September 1947, Chief Justice Fred M. Vinson administered the oath of office to the first Secretary of the Air Force, Stuart Symington. A few days later, President Truman formally appointed General Carl A. Spaatz the first Chief of Staff of the Air Force. A

Department of Defense order on 26 September transferred all units and personnel of the Army Air Forces, including Air ROTC, to the United States Air Force. Headquarters United States Air Force (USAF) announced plans in December 1947 to merge the Air Defense Command and Tactical Air Command to form a super command—the Continental Air Command (ConAC). This reorganization, completed one year later in December 1948 and intended to strengthen the air defense and close air support missions, placed all tactical fighter resources, including all active, reserve, and guard personnel, under a single commander. Besides its "flying and fighting missions," ConAC also gained along with ADC the responsibility for what was now termed AFROTC.²⁶

Although this consolidation appeared impressive on paper, the multiple missions and responsibilities created numerous management difficulties for the new command. ConAC leaders found themselves unable to solve all of them expeditiously, and within two years, Air Force Chief of Staff General Hoyt S. Vandenberg announced the separation of the air defense and tactical air missions. Headquarters USAF elevated Tactical Air Command from a subordinate to a major command on 1 December 1950; exactly one month later, Headquarters USAF returned ADC to major command status also. Within another year, both of these commands were led by four-star generals. ConAC, now charged primarily with the Reserve training programs, was reduced to a major general's billet.²⁷

All the while, vivid memories of the Axis powers and public awareness of postwar Soviet actions in Berlin, Czechoslovakia, and China helped ensure widespread support for the Reserve program. ConAC officials sought to develop an effective program that met both public expectations and the needs of the Air Force. Between 1948 and 1952, Headquarters ConAC provided military teachers, course curriculum, summer encampment, manuals, and training aids to the AFROTC. The director of AFROTC,

a colonel or lieutenant colonel at Headquarters ConAC, attempted to guide the program. He presided over a decentralized AFROTC, with units grouped among the command's four numbered air forces: the First at Mitchel AFB, New York; the Fourth at Hamilton AFB, California; the Tenth at Selfridge AFB, Michigan; and the Fourteenth at Robins AFB, Georgia. The numbered air forces conducted the annual AFROTC inspections, established new AFROTC units, and provided logistical support. In AFROTC matters, the Air Force commanders, who outranked the colonel-director, devoted most of their attention to resolving or papering over the interservice friction that arose inevitably on campuses with two or more ROTC units. The Deputy for Personnel at each numbered air force actually managed the program through his own AFROTC director, usually another colonel or lieutenant colonel.²⁸ At the end of 1951, AFROTC units with an enrollment of approximately 145,000 cadets could be found on 205 campuses around the country.²⁹ Within the decentralized ConAC structure, command supervision was casual; standards of uniformity between and among the numbered air forces and AFROTC were nonexistent.

The AFROTC director at Headquarters ConAC supervised the teaching of the specialized curriculum. In many cases, ConAC assigned noncommissioned officers to teach AFROTC courses. These instructors, qualified only in their own career fields, tended to emphasize detail in specialty areas, such as supply, administration, transportation, and the like. The specialized curriculum, in turn, forced ConAC officials to project USAF junior officer manning in each career field four years in advance, because the Korean War prompted amendments in 1951 to the Universal Military Training and Service Act that required Reserve officers to serve two years of their five-year Reserve commitment on active duty.³⁰

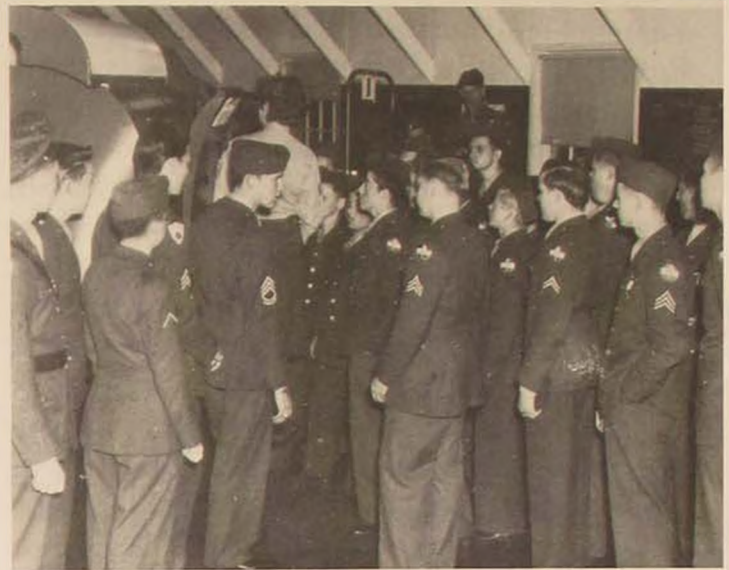
Air Force commanders at war in Korea, however, wanted more pilots and navigators—not nonrated specialists—for combat duty.

Responding to that demand, Headquarters USAF prepared in 1952 a revised educational statement of objectives that directed ConAC to train cadets as officers in the Reserve *and* Regular components of the Air Force.³¹ A new "general curriculum," introduced in September 1953, would allow all cadets to receive the same course of instruction. Only after he reported on active duty would a second lieutenant receive flight or specialty training. Where before the specialized curriculum had required about seventy-five different texts, the general curriculum required but thirty-one.³² Subsequent evaluations showed that the general curriculum better met the needs of the Air Force.³³ It became a permanent part of AFROTC, as did a new uniform and emblem.

During and immediately after World War II, members of the Army Air Forces had worn the standard Army uniform; only the arm-of-service colors distinguished the airman from the soldier. This situation changed on 24 January 1949, when President Truman authorized Secretary of the Air Force Symington to replace the khaki uniform, hallmark of the Regular Army since 1903, with Air Force blue. On 18 February 1953, Headquarters USAF approved an AFROTC emblem designed by Captain Edward P. Winslow and Second Lieutenant Arthur C. Kane.³⁴ The circular emblem, containing a thundercloud overlaid with a winged torch of knowledge, completed the AFROTC transition to blue. But however much the AFROTC cadet might have taken pride in his own new uniform, Air Force leaders had yet to decide where control of the program should best reside.

Air University Assumes Control

Back in 1946, the Army Air Forces had established the Air University at Maxwell Field, Montgomery, Alabama, under the command of Major General Muir S. Fairchild. Air University offered professional, specialized education to prepare commissioned and noncommis-



Because rapid mobilization of forces was required during World War II, four-year ROTC programs were scuttled and special ninety-day officer candidate schools were established. After the war, ROTC units were reestablished, the Air Force gained its independence, and Air Force ROTC became a major source of commissioning for the new service.

sioned officers for greater command and staff responsibilities. Between 1946 and 1951, Air University grew rapidly. The man responsible for much of this growth was General George C. Kenney, who on 29 October 1948 became Air University commander. During World War II, as General Douglas MacArthur's top air commander, Kenney had directed the successful air battle against the Japanese in the Southwest Pacific.³⁵ Now wearing four stars, he wrote to Headquarters USAF in mid-1951 that AFROTC should be removed from the jurisdiction of ConAC and added to Air University's professional education program. Kenney wanted a general officer in charge of a headquarters for AFROTC, reporting to Air University and responsible for the curriculum, comptroller, materiel, and operations. He also proposed ten intermediate headquarters (headed by colonels) to manage and control the detachments directly.³⁶ Kenney's recommendations triggered extended Air Staff studies and sharply worded ConAC rebuttals.

Another reduction in its mission unques-

tionably threatened ConAC as a major command. During September 1951, as the debate intensified in Washington, Major General Willis H. Hale, ConAC commander, wrote Headquarters USAF that ConAC's numbered air forces could best administer the AFROTC program and could do so with one-third fewer people than the number proposed by Air University. The Reserve program, he asserted, was "too large and geographically dispersed to be supervised from a central location."³⁷ But Air University had done its homework; its plan of organization, incorporating a single chain of command supported by a professional headquarters staff, appeared not only feasible but desirable when compared with ConAC's decentralized arrangement. Air Force Chief of Staff General Nathan F. Twining adopted Kenney's proposal, and on 1 August 1952, Air University gained responsibility for AFROTC.³⁸

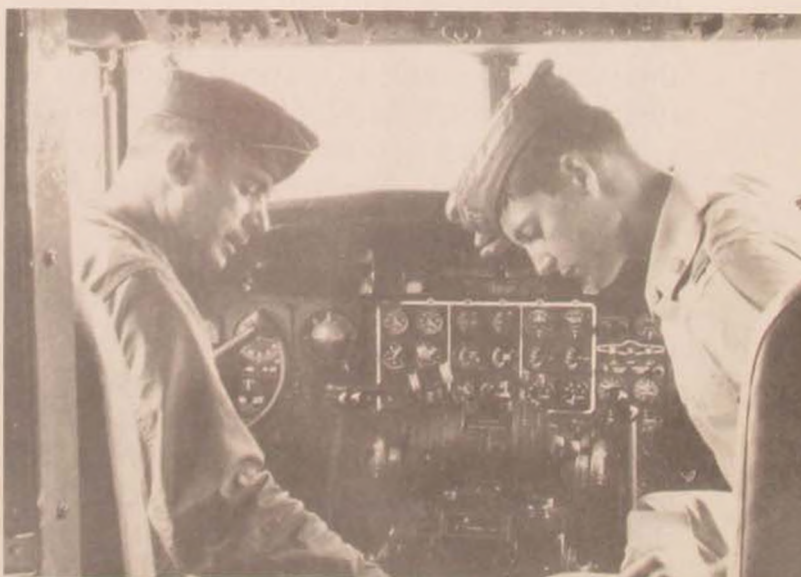
At Air University, Brigadier General Matthew K. Deichelmann, Deputy Commander for Education, had quarterbacked the efforts to secure AFROTC. Appointed as the first AFROTC



The Korean War shattered the last illusions of U.S. isolation, and the maintenance of a significant pool of trained Reservists took on greater importance. Air Force ROTC curriculum was revised to meet changing Air Force needs, and units acquired a new look. Wearing their Air Force-blue uniforms, cadets in a 1952 Memorial Day parade (above) marched proudly through a midwest town. . . . Orientation rides and flight instruction encouraged many cadets toward pilot and navigator training as active-duty commissioned officers.

commandant on 1 August 1952, he was authorized a headquarters and detachments, with an overall personnel strength of 1685 officers, 1555 airmen, and 29 civilians.³⁹ The new AFROTC headquarters opened a few weeks later in a commercial office building in downtown Montgomery, Alabama, about one-half mile from Maxwell Air Force Base. Two years later, on 2 July 1954, the headquarters moved to another downtown building. Finally, on 2 February 1956, AFROTC acquired its permanent headquarters at Maxwell Air Force Base. For AFROTC, a decade of turbulence that embraced major changes in curriculum, a change in uniform, four changes of command, and seven changes of headquarters location had come to an end.

Of all the changes, perhaps none was more profound than the increase in emphasis on the training of rated officers. Between 1946 and 1952, 25,072 cadets had pinned on gold bars;





During the Vietnam War, AFROTC produced many motivated, career-oriented officers. After college graduation and commissioning, flight training was often the next stop. This 1967 University of Alabama graduate received his set of wings in 1968.

however, only 2521 of these officers had entered pilot training.⁴⁰ Early in 1953, as the Korean War neared an end, AFROTC leaders made every effort to increase the pilot and navigator flying training programs. They invited Korean War veterans to speak to prospective cadets about the skills required for combat flying. They reduced the pilot and navigator active-duty commitment from four to three years, and they allowed the new lieutenants to schedule their flight training to coincide with that of their classmates. Finally, AFROTC leaders divided cadets among four broad categories: flying, engineering, administrative, and those with prior enlisted service.⁴¹

By the spring of 1953, the effort began to pay dividends when 2412 of the 11,259 AFROTC graduates entered flying training. In terms of rated officers, AFROTC now appeared to be more nearly in step with plans that called for an Air Force of 143 combat wings by 1955. But on 29 July 1953, President Eisenhower directed the Secretary of Defense to reduce that goal sharply and to aim instead for 120 combat

wings by 1956.⁴² Responding to this directive, Headquarters USAF reduced its Air Force officer requirements by 30,000.⁴³ The number of cadets entering the AFROTC junior class in 1953 was halved, from 15,000 to 7500. Only flying or engineering cadets remained in the most advanced programs. To establish a set annual rate of officers commissioned, Headquarters USAF directed AFROTC to establish a quota for flying, engineering, and administrative officers, in keeping with anticipated Air Force needs. Thereafter, no AFROTC detachment could exceed its quota without Headquarters AFROTC approval. The total quota for 1957, for example, included 4000 pilots, 1500 navigators, 960 engineers and meteorologists, and 225 administrative officers.⁴⁴ Like the general curriculum, the quota system and officer category designations became permanent features of AFROTC. Except for the period immediately following the Vietnam War, these features would allow the Air Force to meet educational cadet contracts and still tailor the production of officers to its needs.

On college campuses around the country in the mid-1950s, other changes improved the AFROTC program. The senior cadets assumed command of the cadet corps, replacing their Air Force instructors. They led the corps in drill, published orders, conducted promotion boards, recruited, and planned social activities. The Arnold Air Society, an honor society established at the University of Cincinnati in 1947 to recognize outstanding cadets, installed chapters at most colleges and universities. To further hone the selection of officers, Headquarters AFROTC began to administer a general aptitude test, later referred to as the Air Force Officers Qualifying Test, to all second-semester AFROTC sophomores. The test, developed by the Human Resources Research Center at Lackland Air Force Base, Texas, measured flying and technical aptitude and "officer potential." A passing grade kept the cadet selection process moving; a failing grade eliminated the cadet from further consideration. This test proved to

be an excellent indicator of leadership potential and remains a benchmark in the selection process.⁴⁵

Another change helped attract cadets to flight school. Professors of air science and tactics began in the early 1950s to offer sophomore cadets introductory airplane rides. The C-45—a small, two-engine multipurpose aircraft designed to carry five to seven passengers and generally available at nearby air force bases—served as the primary orientation aircraft. An afternoon flight with fellow cadets, including a few minutes at the controls, encouraged many young men to become pilots. This voluntary

Antimilitary sentiment on some college campuses, changes in defense needs, and other factors prompted some shifts and changes in AFROTC during the Vietnam years. Nevertheless, like these cadets in the early 1970s, thousands of students at universities and colleges across the country became cadets and continued to “pass in review!”

activity became known eventually as the AFROTC Flying Orientation Program. In the mid-1950s, however, a shortage of C-45 aircraft and base closures made full participation at every AFROTC unit impractical. Seeking to expand flight opportunities, AFROTC leaders proposed a Flight Instruction Program (FIP). The proposal gained support in Congress; and on 1 August 1956, President Eisenhower signed Public Law 879, authorizing the Air Force to establish contracts with local flying schools for thirty-six and one-half hours of flying instruction for senior cadets, including sixteen and one-half hours of solo time. Pilots assigned to the detachments also provided thirty-five hours of ground school training in weather and navigation. The senior cadets who completed and passed the Federal Aviation Administration examination received their private pilot's licenses.⁴⁶



On 1 October 1956, a few months after President Eisenhower signed Public Law 879, Brigadier General Turner C. Rogers, a 1936 graduate of West Point, succeeded General Deichmann as commandant of AFROTC. Rogers had piloted a P-51 Mustang for fifty combat missions in Korea and later served as commander of the 18th Fighter Bomber Wing. He knew the potential value of FIP and gave it his enthusiastic support. Headquarters AFROTC awarded forty-one flight instruction contracts during 1956-57, and about 1200 cadets enrolled.⁴⁷ By 1960, some 1550 cadets were enrolled in FIP in 162 universities across the country.⁴⁸ The higher graduation rate for FIP students justified continued funding, and nearly all pilot-qualified cadets participated. This program, too, would become a permanent feature of AFROTC.

As the 1950s drew to a close, the Air Force increasingly emphasized career service. This change in emphasis affected all officer commissioning programs, but it struck at the land grant roots of AFROTC. The Air Force met its officer manning requirements (particularly pilots and navigators) at great expense. The rated officer simply had become too valuable a resource to be returned as a reservist to civilian

life after a brief three-year tour of active duty. Beginning with the entering AFROTC junior class in 1957, Headquarters USAF extended the tours from three to five years for rated personnel and from three to four years for nonrated personnel. That particular change, General Rogers declared emphatically, "indicates that the Air Force now views ROTC as a primary source of career officers."⁴⁹ The philosophy that sparked the Morrill Act of 1862 thus had turned sharply about: the career soldier had replaced the citizen-soldier, at least in the Air Force. Justin Morrill would have been hard pressed to recognize the program that he had set in motion nearly a century earlier.

WHATEVER the emphasis, career or Reserve, the officers that AFROTC prepared and brought to the Regular Air Force in the late 1950s would soon help meet America's military commitment to the Republic of Vietnam. The Vietnam War, in turn, would in the years to come markedly influence the course of AFROTC at various universities and colleges. But that is another story.

*United States Air Force
Historical Research Center
Maxwell AFB, Alabama*

Notes

1. William B. Parker, *Justin Smith Morrill* (Cambridge, Massachusetts: Ticknor and Company, 1924), p. 261.

2. *Ibid.*

3. Andrew D. White, President of Cornell University, as quoted in Edward Danforth Eddy, Jr., *Colleges for our Land and Time* (New York: Harper and Brothers, 1957), p. 45.

4. George P. Sanger, editor, *United States Statutes at Large*, Vol. XII (Boston: Little Brown and Company, 1864), pp. 404-05.

5. George Lester Anderson, editor, *Land Grant Universities and Their Continuing Challenge* (East Lansing: Michigan State University Press, 1976), Table 2 and Table 3 in Appendix 1.

6. *Ibid.*

7. Eddy, p. 93.

8. Robert Greenhalgh Albion, *Introduction to Military History* (New York: Century, 1929), pp. 152-53.

9. *Ibid.*, p. 160.

10. *Ibid.*, p. 157; and Leonard P. Ayers, *The War with Germany: A Statistical Summary* (Washington: USA Statistical Branch, GPO, 1919), pp. 16-22.

11. *Air Force ROTC Twenty-fifth Anniversary*, Command Edition, HO Study Series No. 45 (Hq AFROTC, Maxwell AFB, Ala-

bama, unpublished, 1971), pp. 3-4.

12. Lieutenant Colonel Dexter L. Hodge, Director of Air Force ROTC, "A Staff Briefing Designed to Acquaint Officers of Headquarters, Continental Air Command with the Air Force Reserve Officers' Training Corps," 28 October 1950, in *Air Force ROTC Miscellaneous Documents*, January 1950-November 1951, Source Document 24, p. 7.

13. William Addleman Gano, *The History of the United States Army* (New York: D. Appleton-Century Company, 1943), p. 499.

14. Eddy, p. 165.

15. Marvin A. Kreidberg and Merton G. Henry, *History of Military Mobilization in the United States Army* (Washington: Department of the Army, 1955), p. 605.

16. Eddy, p. 224.

17. Flint O. DuPre, *U.S. Air Force Biographical Dictionary* (New York: Franklin Watts, 1965), p. 255.

18. *United States Air Force Statistical Digest 1947*, Headquarters USAF/Comptroller, Washington, D.C., August 1948, pp. 16 and 132-34.

19. Msg, General Carl A. Spaatz, Hq Army Air Forces, Washington, D.C., to Lieutenant General George E. Stratemeyer, Com-

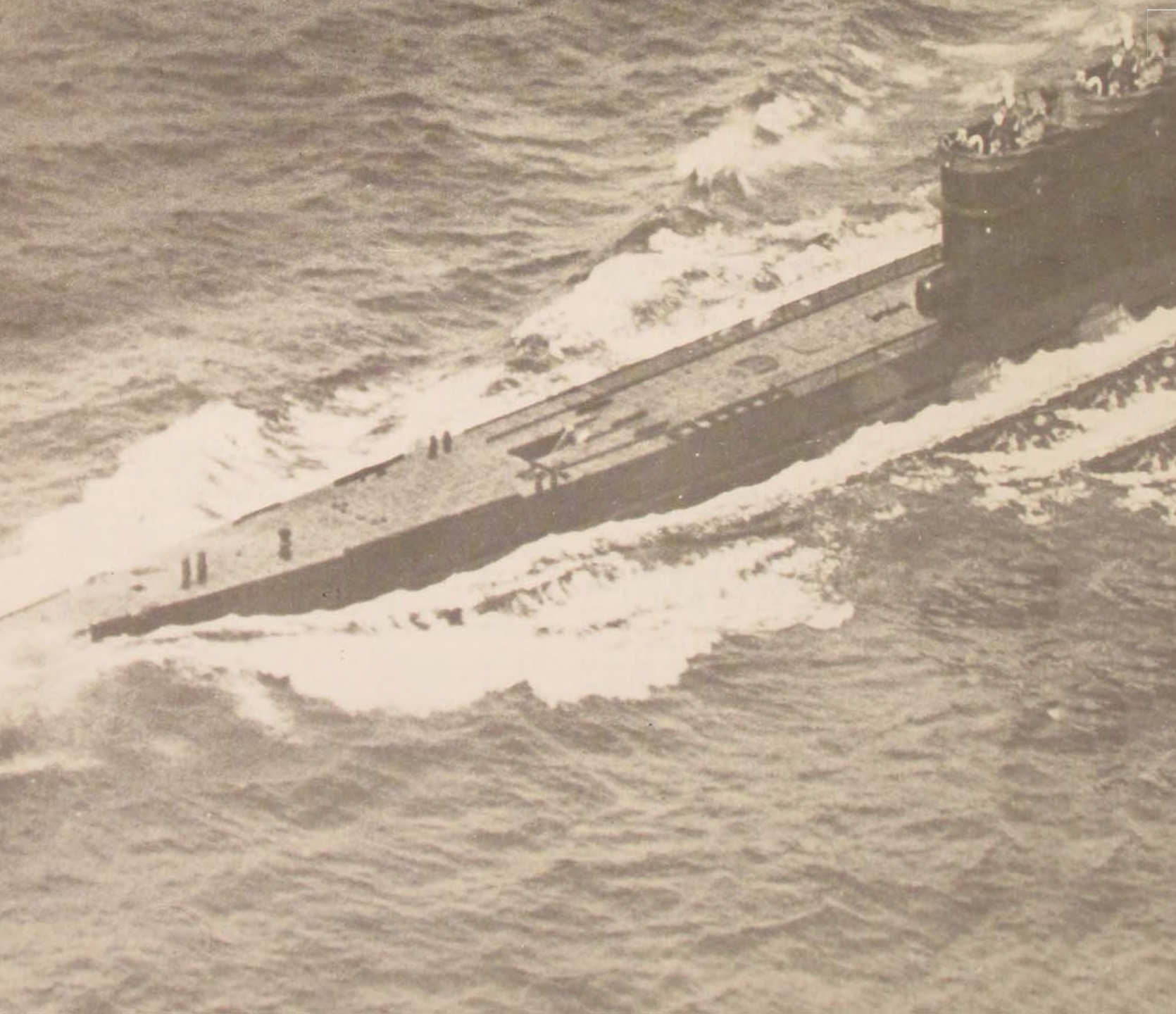
- manding General, Air Defense Command, 29 October 1946, in Richard Preston Eckels, *Air ROTC, The First Year 1946-1947* (Hq AFROTC, Maxwell AFB, Alabama, unpublished), Appendix 18.
20. "Army Air Forces Plan For the Air ROTC," 22 August 1946, in Eckels, Appendix 11.
21. Gene M. Lyons and John W. Masland, *Education and Military Leadership* (Princeton, New Jersey: Princeton University Press, 1959), p. 104.
22. Ltr, Colonel Charles Maylon, Hq Army Air Forces/PMP-1-N, Washington, D.C., to Lieutenant General George E. Stratemeyer, Commanding General, Air Defense Command, "Application for Assignment to Duty with the Reserve Officers' Training Corps," 2 July 1947, in *General Order 124 and Establishing Documents 1946-1947* (Hq AFROTC, Maxwell AFB, Alabama, unpublished), Supporting Document No. 25.
23. Eckels, p. 53.
24. Ltr, Major General Thomas J. Hanley, Jr., Commanding General, Eleventh Air Force, to Lieutenant General George E. Stratemeyer, Commanding General, Air Defense Command, 23 April 1947, in *History of Air Defense Command, July 1947-December 1948*, Supporting Document No. 336.
25. Ltr, Lieutenant General George E. Stratemeyer, Commanding General, Air Defense Command, to Major General Thomas J. Hanley, Jr., Commanding General, Eleventh Air Force, 23 May 1947, in *History of Air Defense Command, July 1947-December 1948*, Supporting Document No. 336.
26. *History of ConAC, July-December 1951*, Vol. I, p. 45.
27. Charles A. Ravenstein, *Organization of the Air Force* (Hq AFSHRC/RI, Maxwell AFB, Alabama, 1982), p. 19.
28. General Order 109, First Air Force, Mitchel AFB, New York, 13 September 1950; and *History of First Air Force, July-December 1950*, pp. 10-14.
29. *Air Force ROTC Twenty-fifth Anniversary*, p. 7.
30. Lyons and Masland, p. 106; *United States Code*, 1952 edition, Sup V, Vol. 3, Titles 44-50 (Washington: USGPO, 1958), p. 3173.
31. *Air Force ROTC Twenty-fifth Anniversary*, pp. 4-5.
32. *History of AFROTC, January-June 1953*, Vol. II, Bk. 1, pp. 55-56.
33. Lyons and Masland, p. 106.
34. *History of AFROTC, January-June 1953*, Vol. II, Bk. 1, frontispiece and accompanying ltr, Chief of Staff, General Nathan F. Twining, to Lieutenant General Idwal H. Edwards, Commander, Air University, "Unit Device For Organizational Flag," 18 February 1953.
35. DuPre, p. 123.
36. Ltr, Major General John DeF. Baker, Deputy Commanding General, Hq Air University, to Major General Gabriel P. Disosway, Director of Training, Hq USAF, "Field Responsibility for AFROTC Program," 24 July 1951, transmitting Air University Staff Study, same subject, in *History of AFROTC, 1946-1951*, Supporting Document No. 105; see also *History of ConAC, July-December 1951*, Vol. I, Sec. 1, pp. 45-46.
37. Ltr, Major General Willis H. Hale, Commanding General, ConAC, to Major General Gabriel P. Disosway, Director of Training, Hq USAF, 7 September 1951, in *History of AFROTC, 1946-1951*, unpublished, Supporting Document No. 115.
38. General Order 51, Hq Air University, Maxwell AFB, Alabama, 16 July 1952.
39. *History of AFROTC, August-December 1952*, Vol. I, Bk. 1, pp. 1-3.
40. *History of AFROTC, January-June 1953*, Vol. II, Bk. 1, p. 28.
41. Ltr, Brigadier General Matthew K. Deichelmann, Commandant, AFROTC, to Professors of Air Science and Tactics, "Reprogramming of AFROTC Effective in the Fall of 1953," 3 April 1953, in *History of AFROTC, July-December 1953*, Vol. III, Bk. 1, Appendix 2.
42. Ltr, Brigadier General Matthew K. Deichelmann, Commandant, AFROTC, to All Professors of Air Science and Tactics, "Change in Procurement Goals of AFROTC Program," 12 August 1953, in *History of AFROTC, July-December 1953*, Vol. III, Bk. 1, Supporting Document No. 4.
43. Ltr, Mr. H. Lee White, Assistant Secretary of the Air Force, to Honorable Errett P. Scrivner, Chairman, Subcommittee Air Force Panel, House Appropriations Committee, House of Representatives, 6 August 1953, in *History of AFROTC, July-December 1953*, Vol. III, Bk. 1, Appendix 4.
44. News Release, Brigadier General Matthew K. Deichelmann, Commandant, AFROTC, to Professors of Air Science and Tactics, "AFROTC Program Reduction," 29 July 1953, in *History of Air Force ROTC, July-December 1953*, Vol. III, Bk. 1, Appendix 3; *History of Air University, July-December 1953*, Vol. I, p. 52; *History of Air University, July-December 1957*, Vol. I, p. 40; and *History of AFROTC, January-June 1955*, Vol. V, Bk. 1, p. 6.
45. *History of AFROTC, January-June 1953*, Vol. II, Bk. 1, pp. 25-27.
46. *US Code, Congressional and Administrative News*, 84th Congress, Second Session 1956, Vol. I, p. 939; for narrative, see Vol. III, p. 3867.
47. *History of AFROTC, January-June 1957*, p. 31.
48. *History of AFROTC, January-June 1960*, p. 45.
49. Brigadier General Turner C. Rogers, Commandant, AFROTC, "Introduction" to *History of AFROTC, July-December 1957*, p. 2; see also pp. 3-5.

We are indebted for the photographs of Air ROTC in the 1920s to Major General Marvin C. Demler, USAF (Ret), and the estate of Robert G. Carr. General Demler completed Air ROTC at New York University and served on active duty until 1971. Carr completed Air ROTC at the University of California-Berkeley, and established the Robert and Nona Carr ROTC Endowment Fund at Angelo State University, San Angelo, Texas.

W.C.S., and
R.C.H.

ULTRA: SOME THOUGHTS ON ITS IMPACT ON THE SECOND WORLD WAR

DR. WILLIAMSON MURRAY





ONLY now, nearly forty years after the end of the Second World War, has the essential role and contribution of intelligence to the winning of that conflict become clear. Central to the new evaluation of that importance has been the discovery of the fact that throughout the war the intelligence services of the Western powers (particularly the British) were able to intercept, break, and read a significant portion of the top secret message traffic of the German military.¹ The dissemination of that cryptographic intelligence to Allied commanders under the code name Ultra played a substantial and critical role in fighting the Germans and achieving an Allied victory.

THE breaking of the German high-level codes began with the efforts of the Polish secret service in the interwar period. By creating a copy of the basic German enciphering machine, the Poles were able to read German signal traffic through the 1930s with varying degrees of success. However, shortly before the Munich Conference in September 1938, the Germans introduced additional rotors into their enciphering machine—the so-called enigma machine—and in approximately mid-September, darkness closed over the German message traffic.² The Poles continued their work nevertheless, and after the British guarantee in March 1939 to Poland, they passed along to Great Britain what they had thus far achieved. (Earlier, there had also been considerable cooperation between the Poles and the French.) Building on what they had learned from their continental allies, the British finally managed to break into some of the German codes in April 1940, just before the great German offensive against France and the Low Countries.³

This first success would soon be followed by others that would give Allied intelligence and commanders valuable insights into German intentions and capabilities. Nevertheless, these cryptographic successes covered only a small



An effective intelligence effort involves the ability to fit often diverse pieces into a mosaic. Captured equipment, such as this famous German cipher device, if properly exploited, can provide valuable parts to the puzzle.

proportion of the specific codes that the Germans used. The German navy at the end of 1943, for example, used up to forty different ciphers, all requiring different settings on the enigma machines. Given the priorities in the Battle of the Atlantic, the transmissions from U-boat to shore and from the commander of submarines to his boats received the highest priorities from British code breakers at Bletchley Park (the location of the major Allied code-

breaking effort in Europe). Even with the exceptional resources available at that location and at that time, it would take the experts several days and in some cases up to a week to find the solution for a particular day's settings to the enigma machine.⁴

The task of getting invaluable intelligence information out to the field where it could be of direct help to Allied commanders was, of course, immensely difficult, especially given the fear that should the Germans find out that their codes were being compromised on a daily basis, the entire source of Ultra would dry up. In 1940 during the Battle of Britain, this need for concealment was not a great difficulty; but as the war spread throughout Europe and the Mediterranean, it became an increasing prob-

lem. Basically, the British and their American allies evolved a carefully segregated intelligence system that kept the flow of Ultra information down to a limited number of senior commanders. The entire Ultra dissemination process lay outside of normal intelligence channels. For example, the intelligence officers at Eighth Air Force would not even know of the existence of Ultra and would not know what the Ultra officer's duties were. He, in turn, would talk only to General Carl Spaatz, General James H. Doolittle, and the Ninth Air Force commander. The system worked, for the Germans never caught on to how extensively their ciphers were being compromised.

Unfortunately, there were drawbacks. Intelligence can be of use only if it is placed in the hands of those who understand its significance. Three specific incidents underline this point with great clarity. The first occurred in early September 1944 as Allied armies were pursuing the beaten Wehrmacht back to the frontiers of the Reich. On 5 September, Bletchley Park made the following information available to Allied commanders in Western Europe:

For rest and refit of panzer formations, Heeresgruppe [army group] Baker ordered afternoon fourth [4 September] to remain in operation with battleworthy elements: two panzer, one arc six panzer, nine SS and one nought [ten] SS panzer divisions, elements not operating to be transferred by AOK five for rest and refit in area Venloo—Arnhem—Hertogenbosch.⁵

This intelligence (along with a second Ultra confirmation on 6 September)⁶ indicated that at the very time when British plans for Operation Market Garden were to move forward, some of the best panzer divisions in the German armed forces would be refitting in the town selected as the goal of the British 1st Airborne Division and the final objective on the Rhine for the operation. Putting this message together with intelligence that soon began coming out of Holland from the Dutch underground that SS panzer units were refitting in the neighborhood of Arnhem, Allied com-

manders should have recognized that Operation Market Garden had little prospect of success. Unfortunately, they did not put these pieces together, and those at the highest level in Field Marshal Sir Bernard L. Montgomery's headquarters with access to Ultra refused to draw the correct conclusions.

A second example comes from a period three months after Operation Market Garden: December 1944. One of the unfortunate results of the rush to print after the Ultra secret was out has been the appearance of a number of legends with little basis in fact.⁷ One of the most persistent is the legend that Ultra gave no advance warning to Allied commanders in December 1944 that the Germans were preparing to launch a major counterthrust through the Ardennes.⁸ It is true that Hitler's sixth sense that German security measures had been compromised led him to undertake a series of unprecedented measures to veil the Ardennes attack.⁹ Thus, there were no overt, operational indications as to what the Germans intended. However, a number of other indicators were uncovered by the decoding of enigma messages. These indicated that the Germans were moving supplies as well as large numbers of troops into the region behind the Ardennes.¹⁰ Since the Germans were desperately low on supplies and troops, such allocations of resources could only portend major operations in the Ardennes. The Germans had no reason to expect that the Allies were planning to launch a major offensive in this area—especially since the Allies were so obviously trying to kick in the door to the Reich at so many other points. Unfortunately, the mood in higher Allied headquarters and in intelligence circles was close to a feeling that the war was virtually over and the Germans could not possibly launch an offensive.

The third case in which Ultra information was available but remained unused was in one instance during the Battle of the Atlantic. The Allies moved their convoys through the North Atlantic very much on the basis of Ultra information, when available, so that these great

formations of merchant shipping could avoid the patrol lines of German submarines established to pick up their movement and course. In this particular case, decoding of enigma transmissions had picked up a heavy concentration of German submarines to the north of the Azores. Thus, a major convoy of aviation gasoline tankers from the refineries at Trinidad to the Mediterranean was rerouted to the south of the Azores. Unfortunately, because his escorts needed refueling and the weather was better to the north of the islands, the convoy commander disregarded his instructions, sailed to the north of the Azores, and ran smack into the U-boats. Only two of the tankers reached port. What made the episode even more surprising was the fact that the convoy commander had just come from a term of duty in the Admiralty's convoy and routing section, where he surely must have had some awareness as to the Admiralty's reasons for rerouting convoys.¹¹

If Ultra information was misused at times, it is clear that such instances were the exception rather than the rule. However, it is difficult to assess Ultra's full impact on the war. At times (particularly early in the war), no matter how much Ultra tipped the British off to German intentions, the overwhelming superiority of the Wehrmacht made any successful use of the information virtually impossible. For example, enigma decodes in the spring of 1941 forewarned the British about German intentions against the Balkan states, first against Greece and then, after the anti-German coup in Yugoslavia, against that country as well. Such intelligence was, of course, practically useless, due to the overwhelming power that the Reich was able to deploy in the region at that time.¹² On the other hand, from the intercepts and decodes during the summers of 1941 and 1942, the British government (particularly Churchill) was able to obtain an accurate picture of Rommel's tank strength and to determine that the British army had considerable superiority in numbers against the Afrika Korps in the North African theater.¹³ What quantitative re-

turns could not indicate were such factors as the technological superiority of some German tanks and particularly the qualitative superiority of German doctrine and training. The intercepts do help in explaining why Churchill kept such considerable pressure on Eighth Army commanders to attack Rommel.

IN war, so many factors besides good intelligence impinge on the conduct of operations that it is difficult to single out any single battle or period in which Ultra was of decisive importance by itself.¹⁴ Yet there is one instance where one can say that the intelligence achieved through the breaking of the German codes by itself played a decisive role in mitigating enemy capabilities. By the first half of 1941, as more and more submarines were coming on line, the German U-boat force was beginning to have a shattering impact on the trade routes on which the survival of Great Britain depended. The curve of sinkings of British, Allied, and neutral shipping was climbing upward ominously.¹⁵

	Number of ships sunk	Tonnage sunk
November 1940	12	146,613
December 1940	37	212,590
January 1941	21	126,782
February 1941	39	196,783
March 1941	41	243,020
April 1941	43	249,375
May 1941	58	325,492

Through the spring of 1941, the British had had virtually no luck in solving the German navy's codes. In mid-May 1941, however, the British captured not only a German weather trawler with considerable material detailing the settings for the naval codes but also a German submarine, the U-110, with its cipher machine and *all* accompanying material.¹⁶ With these two captures, the British held the settings for the next two months for the German navy's enigma machines. Thus, the British were able to break into the U-boat traffic by the end of May. Also, because German U-boats were con-

trolled closely from shore and a massive amount of signaling went back and forth to coordinate the movement of the wolf packs, the British gained invaluable information, ranging from the number of U-boats available to tactical dispositions and patrol lines. Moreover, once they had a full two months' experience inside the German U-boat traffic, British cryptologists were able to continue breaking the submarine message traffic for the next five months.¹⁷ The impact that this intelligence had on the Battle of the Atlantic was almost immediate.¹⁸

	Number of ships sunk	Tonnage sunk
June 1941	61	310,143
July 1941	22	94,209
August 1941	23	80,310
September 1941	53	202,820
October 1941	32	156,534
November 1941	13	62,196

The dramatic decline in sinkings (compared with those that had occurred during the first five months of the year) has no explanation other than that Ultra information enabled the British to gain a decisive edge over their under-sea opponent. There was no introduction of new technology, no significant increase in the number of escorts available, and no extension of air coverage. Ultra alone made the difference.

Unfortunately for the Anglo-American powers, within two months of U.S. entrance into the war, the Germans introduced an entirely new cipher, Triton, which closed off the flow of Ultra decrypts for the remainder of 1942. Thus, at the very time that the vulnerable eastern and southern coasts of the United States opened up to German submarine operations, Ultra information on German intentions and operations ceased. Direction-finding intelligence was available, of course, but it remained of limited assistance.

When the Germans turned their full attention back to the Atlantic in early 1943, enormous convoy battles occurred with increasing frequency. German Admiral Karl Dönitz had available to him in the North Atlantic nearly

one hundred submarines. In opposition, the Allies possessed far greater numbers of escort vessels, including escort carriers whose aircraft made U-boat shadowing of convoys almost impossible. Moreover, long-range aircraft from Newfoundland, Iceland, and Northern Ireland were reaching farther and farther into the Atlantic.

At the beginning of 1943, the Allied naval commanders enjoyed one further great advantage. Bletchley Park had succeeded once again in breaking the German naval ciphers.¹⁹ That intelligence proved somewhat less useful than the Ultra intelligence in 1941 that had allowed the British to steer convoys around U-boat threats. The Allies were able to carry out similar evasive operations at times, but the large numbers of German submarines at sea at any given time made such maneuvers increasingly difficult and oftentimes impossible. Initially during the great three-month battle from March to May 1943, the Allies were badly battered. In May, however, the Allies smashed the U-boat threat so decisively that Dönitz was forced to end the battle. Ultra intelligence played a major role in the turnaround. However, because of additions to Allied escort strength and increases in long-range aircraft patrols, one must hesitate in identifying the Ultra contribution as decisive by itself. Yet, the leading German expert on the Battle of the Atlantic does note:

I am sure that without the work of many unknown experts at Bletchley Park . . . the turning point of the Battle of the Atlantic would not have come as it did in May 1943, but months, perhaps many months, later. In that case the Allied invasion of Normandy would not have been possible in June 1944, and there would have ensued a chain of developments very different from the one which we have experienced.²⁰

Meanwhile, Ultra affected the air war on both the tactical and on the strategic levels. British decoding capabilities were not sufficient during the Battle of Britain to provide major help to Fighter Command to defeat the German air threat.²¹ Similarly, for the first

three years of Bomber Command's war over the continent, Ultra could provide little useful intelligence. On the other hand, throughout 1942 and 1943, Ultra information provided valuable insights into what the Germans and Italians were doing in the Mediterranean and supplied Allied naval and air commanders with detailed, specific knowledge of the movement of Axis convoys from the Italian mainland to the North African shores. By March 1943, Anglo-American air forces operating in the Mediterranean had virtually shut down seaborne convoys to the Tunisian bridgehead. Allied information was so good, in fact, that the German air corps located in Tunisia reported to its higher headquarters (in a message ironically intercepted and decoded):

... the enemy activity today in the air and on the sea must in [the] view of Fliegerkorps Tunis, lead to the conclusion that the course envisaged for convoy D and C was betrayed to the enemy. At 0845 hours a comparatively strong four-engine aircraft formation was north of Bizerte. Also a warship formation consisting of light cruisers and destroyers lay north of Bizerte, although no enemy warships had been sighted in the sea area for weeks.²²

As was to be the case throughout the war, the Germans drew the conclusion that traitors either in their High Command or elsewhere (in this case, in the *Commando Supremo*, the Italian High Command) had betrayed the course of the convoys.

In the battles with German fighters for control of the air over Sicily, Ultra proved equally beneficial to Allied air commanders. It enabled them to take advantage of German fuel and ammunition shortages and to spot Axis dispositions on the airfields of Sicily and southern Italy.²³ However, in regard to U.S. strategic bombing, Ultra may well have exerted a counterproductive influence in 1943. Intercepts from the Luftwaffe's message traffic indicated quite correctly how seriously Allied attacks in the air were affecting German air units, but these intercepts may have persuaded General Ira Eaker,

Commander, Eighth Air Force in 1943, and his subordinate commanders to go to the well once too often. The second great attack on Schweinfurt in October 1943, as well as the other great raids of that month, proved to be disastrous for the Eighth Air Force crews who flew the missions. (Sixty bombers were lost in the Schweinfurt run.)²⁴

Moreover, U.S.A.A.F. theories about the vulnerability of the German economy to precision bombing proved somewhat unrealistic. While bomber attacks did inflict heavy damage on the German aircraft industry, the industry was in no sense destroyed. Likewise, the attacks on ball-bearing plants failed to have a decisive impact. True, damage to Schweinfurt caused the Germans some difficulties, but the batterings that Eighth's bombers took in the August and October attacks were such that despite intelligence information that the Germans would be back in business quickly, the Eighth could not repeat the mission again.²⁵

In 1944, however, the nature of Eighth's capabilities and target selection changed. Most important, the Eighth Air Force received the long-range fighter support to make deep penetration raids possible.²⁶ The initial emphasis in the strategic bombing attacks in late winter and early spring of 1944 was in hitting the German aircraft industry and then in preparing the way for the invasion of the European continent. In May 1944, however, General Carl Spaatz persuaded Eisenhower that he possessed sufficient bomber strength to support both the invasion and a major new offensive aimed at taking out Germany's oil industry. In attacking that industry, Spaatz, in fact, would hit the Germans at their most vulnerable economic point. Not only would attacks on the oil industry have an immediate impact on the mobility of the Wehrmacht's ground forces, but increasing fuel shortages would prevent the Germans from training a new generation of pilots to replace those lost in the terrible attrition battles of the spring.

On 12 May 1944, 935 B-17s and B-24s at-

tacked synthetic oil plants throughout Germany. Almost immediately, Eighth's commanders received confirmation through Ultra that these attacks threatened Germany's strategic position severely. On 16 May, Bletchley Park forwarded a message to Eighth canceling a general staff order that *Luftflotten 1 and 6* (Air Fleets 1 and 6) surrender five heavy and four light or medium flak batteries each to *Luftflotte 3* (assigned the task of defending France). Those flak batteries were to move instead to protect the hydrogenation plant at Troglitz, a crucial facility in Germany's synthetic fuel industry. In addition, four heavy flak batteries from Oschersleben, four from Wiener Neustadt, and two from Leipzig-Erla (defending aircraft factories) were ordered to move to defend other synthetic fuel plants.²⁷ This major reallocation of air defense resources were clear indications of German worries about Allied attacks on their oil industry. On 21 May, another Ultra decrypt (originating headquarters not identified) noted:

Consumption of mineral oil in every form . . . [must] be substantially reduced . . . in view of effects of Allied action in Rumania and on German hydrogenation plants; extensive failures in mineral oil production and a considerable reduction in the June allocation of fuel, oil, etc., were to be expected.²⁸

On 28 and 29 May 1944, Eighth returned to the skies over Germany to attack the oil industry again. These two attacks, combined with the raids that Fifteenth Air Force (in Italy) had launched against Ploesti, reduced German fuel production by 50 percent.²⁹ On 6 June, Bletchley Park passed along the following decrypt:

Following according to *OKL* [German Air Force High Command] on Fifth. As a result of renewed interferences with production of aircraft fuel by Allied actions, most essential requirements for training and carrying out production plans can scarcely be covered by quantities of aircraft fuel available. Baker four allocations only possible to air officers for bombers, fighters and ground attack, and director general of supply. No other quota holders can be considered in June. To as-

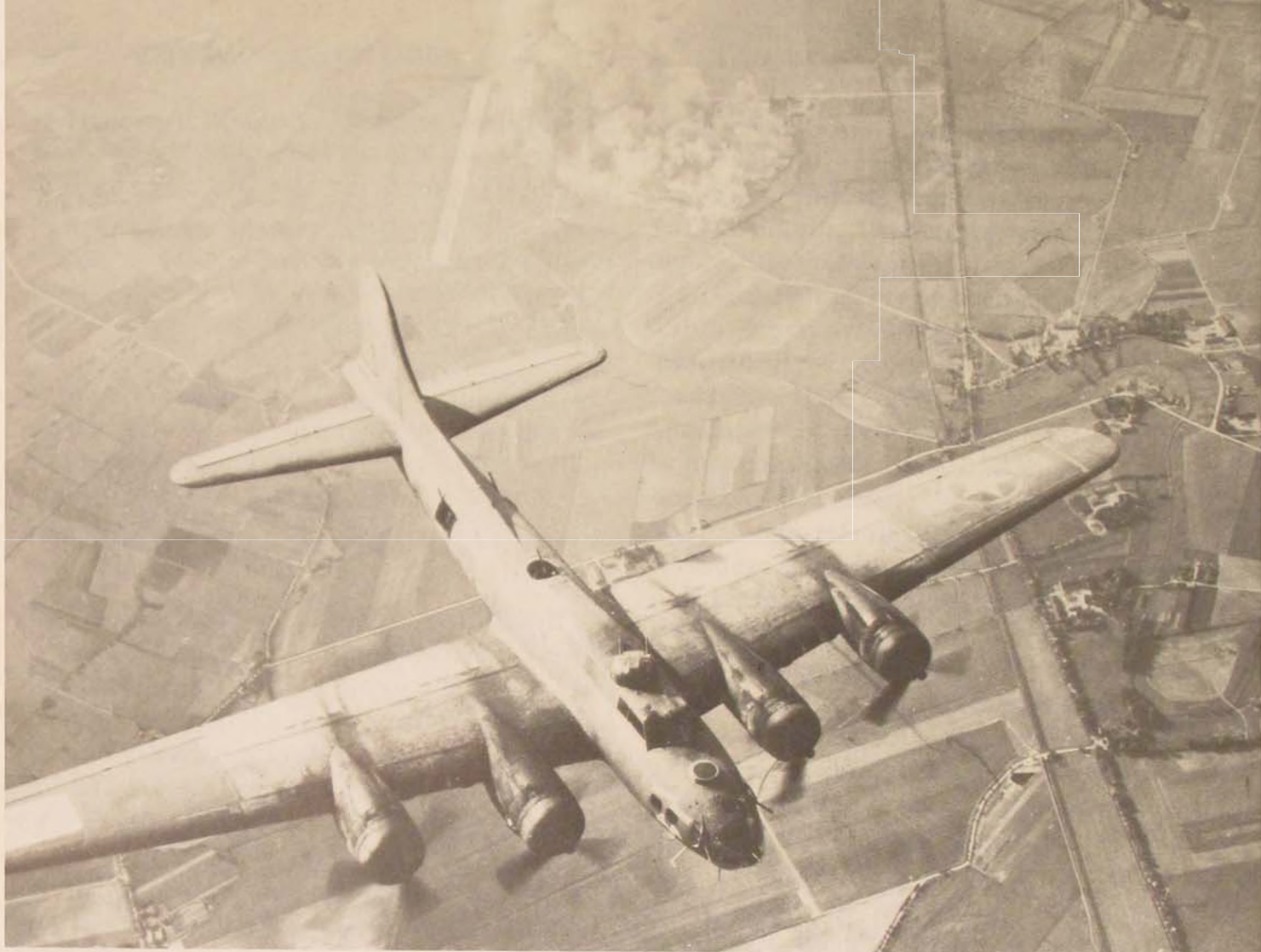
sure defense of *Reich* and to prevent gradual collapse of German air force in east, it has been necessary to break into *OKW* [German Armed Forces High Command] reserves. Extending, therefore, existing regulations ordered that all units to arrange operations so as to manage at least until the beginning of July with present stocks or small allocation which may be possible. Date of arrival and quantities of July quota still undecided. Only very small quantities available for adjustments, provided Allied situation remains unchanged. In no circumstances can greater allocations be made. Attention again drawn to existing orders for most extreme economy measures and strict supervision of consumption, especially for transport, personal and communications flights.³⁰

Throughout the summer, Albert Speer's engineers and construction gangs scrambled to put Germany's oil plants back together. As fast as they succeeded, however, Allied bombers returned to undo their reconstruction efforts. Throughout the remainder of the year, Allied eyes, particularly of American bomber commanders, remained fixed on Germany's oil industry. The punishing, sustained bombing attacks prevented the Germans from ever making a lasting recovery in their production of synthetic fuel.

Clearly, Ultra played a major role in keeping the focus of the bombing effort on those fuel plants. Speer had warned Hitler after the first attack in May 1944:

The enemy has struck us at one of our weakest points. If they persist at it this time, we will no longer have any fuel production worth mentioning. Our one hope is that the other side has an air force general staff as scatterbrained as ours!³¹

Speer's hopes were not realized, largely because Ultra intelligence relayed to Allied air commanders both the size and successes of German reconstruction efforts, as well as the enormous damage and dislocations to Germany's military forces that the bombing of the plants was causing. The intelligence officer who handled Ultra messages at Eighth Air Force headquarters reported after the war that the intercepts and decrypts of enigma transmissions had in-



In May 1944, Ultra intelligence indicated that destruction of the German oil industry could prove potentially disastrous to the Luftwaffe. Eighth Air Force bombers responded by striking synthetic oil plants throughout the Reich.

indicated that shortages were general and not local. This fact, he indicated, convinced “all concerned that the air offensive had uncovered a weak spot in the German economy and led to [the] exploitation of this weakness to the fullest extent.”³²

On the level of tactical intelligence during the preparation and execution of Overlord, Ultra also was able to provide immensely useful information. Intercepts revealed a clear picture of German efforts and successes in attempting to repair damage that the Allied air campaign was causing to the railroad system of northern

France.³³ A mid-May staff appreciation by Field Marshal Gerd von Rundstedt (Commander in Chief, Panzer Group West) warned that the Allies were aiming at the systematic destruction of the railway system and that the attacks had already hampered supply and troop movements.³⁴ Ultra intelligence made clear to Allied “tactical” air commanders how effective the attacks on the bridge network throughout the invasion area were and the difficulties that German motorized and mechanized units were having in picking their way past broken bridges at night.³⁵

Ultra intercepts also gave Western intelligence a glimpse of the location and strength of German fighter units, as well as the effectiveness of attacks carried out by Allied tactical air on German air bases.³⁶ Furthermore, these intercepts indicated when the Germans had com-

pleted repairs on damaged fields or whether they had decided to abandon operations permanently at particular locations.³⁷ Armed with this information, the Allies pursued an intensive, well-orchestrated campaign that destroyed the German's base structure near the English Channel and invasion beaches. These attacks forced the Germans to abandon efforts to prepare bases close to the Channel and to select airfields far to the southeast, thereby disrupting German plans to reinforce *Luftflotte 3* in response to the cross-channel invasion.³⁸

When the Germans did begin a postinvasion buildup of *Luftflotte 3*, the destruction of forward operating bases forced them to select new and inadequately prepared sites for reinforcements arriving from the Reich. Ultra intercepts picked up information on a substantial portion of the move and indicated bases and arrival times for many of the reinforcing aircraft.³⁹

Another substantial contribution of Ultra to Allied success was its use in conjunction with air-to-ground attacks. Ultra intercepts on 9 and 10 June gave Allied intelligence the exact location of Geyr von Schweppenburg's Panzer Group West headquarters. Obliging, the Germans left their vehicles and radio equipment in the open.⁴⁰ The attack not only destroyed most of Panzer Group West's communications equipment but also killed seventeen officers, including the chief of staff.⁴¹ The strike effectively removed Panzer Group West as an operating headquarters and robbed the Germans of the only army organization in the west capable of handling large numbers of mobile divisions.

IT is worth examining the reasons why the British were able to break some of the most important German codes with such great regularity and with such an important impact on the course of the war. The Germans seem to have realized midway through the war that the Allies were receiving highly accurate intelligence about their intentions and moves. Nevertheless, like postwar German historians,⁴² the



Despite compromises in their security, the Germans surprised the Allies in their Ardennes offensive in December 1944. To restrict the flow of German supplies to front-line units, the Allies launched a heavy bombing campaign against German railways and bridges. This bomb-damaged railyard lay on the main line from Berlin and Hanover into Holland. Allied air attacks on such facilities severely inhibited Germany's ability to sustain the offensive . . . Allied intelligence estimates indicated that destruction of the ball-bearing plants at Schweinfurt would have a significant impact on German war-making capability. However, despite bombing attacks on Schweinfurt like that shown below, Germany's ball-bearing industry was never wholly shut down. Ultra intelligence proved more valuable in other campaigns.



German military looked everywhere but at their own signals. Enthralled with the technological expertise that had gone into the construction of the enigma machine, the Germans excluded the possibility that the British could decrypt their signals.

After the sinking of the *Bismarck* and the rapid clearance from the high seas of the supply ships that the Germans had sent out ahead of her, the German navy did order an inquiry. Headed by a signal man (obviously with a vested interest in the results), the board of inquiry determined that the British could not possibly have compromised the enigma system. Rather, the board chose to blame the disaster on the machinations of the fiendishly clever British Secret Services.⁴³ By 1943, the success of British antisubmarine measures in the Battle of the Atlantic again aroused German suspicions that their ciphers had been compromised. In fact, the commander of U-boats suggested to German naval intelligence that the British Admiralty had broken the codes.

B.d.U. [the commander of U-boats] was invariably informed [in reply] that the ciphers were absolutely secure. Decrypting, if possible at all, could only be achieved with such an expenditure of effort and after so long a period of time that the results would be valueless.⁴⁴

One British officer serving at Bletchley Park records that German "cryptographic experts were asked to take a fresh look at the impregnability of the Enigma. I heard that the result of this 'fresh look' appeared in our decodes, and that it was an emphatic reassertion of impregnability."⁴⁵

The Germans made a bad situation worse by failing to take even the most basic security measures to protect their ciphers. Indeed, a significant portion of Bletchley Park's success was due to silly, procedural mistakes that the Germans made in governing their message traffic. Among other basic errors, the Germans in midwar started to reuse the discriminate and key sheets from previous months rather than

generate new random selection tables.⁴⁶ If that carelessness were not enough, the Germans (particularly the Luftwaffe) provided a constant source of cribs to enable the British to determine the enigma settings for codes that had been broken. These cribs turned up in numerous, lengthy, and stereotyped official headings, usually in routine reports and orders all sent at a regular time of day.⁴⁷ Gordon Welchman, who served at Bletchley Park for most of the war, reports that "we developed a very friendly feeling for a German officer who sat in the Qattara Depression in North Africa for quite a long time reporting every day with the utmost regularity that he had nothing to report."⁴⁸

The German navy proved no less susceptible to critical mistakes. Dönitz's close control of the U-boat war in the Atlantic rested on an enormous volume of radio traffic. The volume itself was of inestimable help to the cryptanalysts at Bletchley Park.⁴⁹ Although the Germans introduced a fourth rotor into the enigma machine in March 1943, thereby threatening once again to impose a blackout on their North Atlantic operations, the new machines employed only a small fraction of their technical possibilities. Unfortunately for the U-boats also, there was considerable overlapping between old and new machines. As a result of these and other technical errors, the British were back into the North Atlantic U-boat radio transmissions within ten days of the change-over.⁵⁰ Furthermore, at about the same time, Bletchley Park decrypted a signal to U-boat headquarters indicating that the Germans were breaking the Allied merchant code.⁵¹

One final incident should serve to underline the costliness of German carelessness where security discipline was concerned. The great German battleship *Bismarck* had broken out into the central Atlantic in May 1941 on a raiding expedition. After sinking the battle cruiser *Hood*, the *Bismarck* managed to slip away from shadowing British cruisers. The pursuing British admiral decided at 1810 hours on 25

May that the German battle ship was making for Brest. Within an hour, the Admiralty had confirmation through air force signals. Luftwaffe authorities had used their wireless transmissions to inform their chief of staff (then visiting Athens during the Crete operation) that the *Bismarck* was heading for Brest.⁵²

OBVIOUSLY, there are important lessons that we in the West can learn from these German errors. To begin with, Patrick Beesly, who worked closely with the naval Ultra throughout the war, notes that "while each nation accepted the fact that its own cryptanalysts could read at least some of their enemy's ciphers, they were curiously blind to the fact that they themselves were being subjected to exactly the same form of eavesdropping."⁵³ Above all, the Germans seem to have been overly impressed with their presumed superiority in technology. Thus, not only did they make elemental mistakes in their communications discipline, but they arrogantly refused to believe that their enemies might have technological and intelligence ca-

pabilities comparable to their own.

In recent years, there has been considerable interest in German operational and tactical competence on the field of battle.⁵⁴ There is an important subheading to that competence: while historians and military analysts tell us that the Germans were extraordinarily good in the operational and tactical spheres, we should also recognize that the Germans were sloppy and careless in the fields of intelligence, communications, and logistics, consistently (and ironically) holding their opponents in contempt in those fields. Thus, we would be wise to examine the German example closely in all aspects of World War II. We can learn from the Germans' high level of competence in the tactical and operational fields; equally, we have much to learn from their failures in other areas. Above all, the German defeat in World War II suggests that to underestimate the capabilities and intelligence of one's opponents can have only very dangerous and damaging consequences for one's own forces.

Ohio State University, Columbus

Notes

1. There are, of course, a host of major works that have appeared in recent years that have discussed the breaking and reading of the German enigma encoding and decoding system. The intelligence based on Allied decrypts of that message traffic was called Ultra. Some of the more useful and accurate books on the value of this intelligence contribution are: F. H. Hinsley et al., *British Intelligence in the Second World War*, Vols. I and II (London, 1979 and 1982); Gordon Welchman, *The Hut Six Story: Breaking the Enigma Codes* (New York, 1982); Patrick Beesly, *Very Special Intelligence* (Garden City, 1978); R. V. Jones, *The Wizard War* (New York, 1978); Ronald Lewin, *Ultra Goes to War* (New York, 1978); Ralph Bennett, *Ultra in the West: The Normandy Campaign 1944-45* (New York, 1979); and for the best German viewpoint available in English, Jürgen Rohwer, "Ultra and the Battle of the Atlantic: The German View," in *Changing Interpretations and New Sources in Naval History*, edited by Robert William Love, Jr. (New York, 1980).

2. Lewin, p. 39; Welchman's *The Hut Six Story* is particularly useful on how the enigma machines worked.

3. Lewin, p. 60.

4. Rohwer, pp. 441-42.

5. Public Record Office (PRO), DEFE 3/127/XL 9188, 5,9.44., 1152Z.

6. *Ibid.*, DEFE 3/128/XL 9245,6,9.44., 0103Z.

7. The most egregious of these legends was the story in Anthony Cave-Brown's *Bodyguard of Lies* (New York, 1976), pp. 32-44, that Churchill and the British government had known of the great

German bombing attack on the city of Coventry on 11 November but deliberately refused to take any special measures for fear of compromising Ultra. There is, however, no basis in fact for such a story. Readers who wish to know what happened at Coventry should consult Jones, pp. 146-52, and N. E. Evans, "Air Intelligence and the Coventry Raid," *Journal of the Royal United Services Institute* (September 1976).

8. In particular, Lewin, pp. 357-58.

9. Including unprecedented security measures; see Chester Wilmot, *The Struggle for Europe* (New York, 1952).

10. See Bennett, pp. 191-204. Bennett's book is particularly important, since it ties Ultra directly into the conduct of military operations in the West.

11. Kenneth A. Knowles, "Ultra and the Battle of the Atlantic: The American View," in *Changing Interpretations and New Sources in Naval History*, edited by Robert William Love, Jr. (New York, 1980), p. 442.

12. In particular, Hinsley et al., *British Intelligence in the Second World War*, Vol. I, Chapter 11.

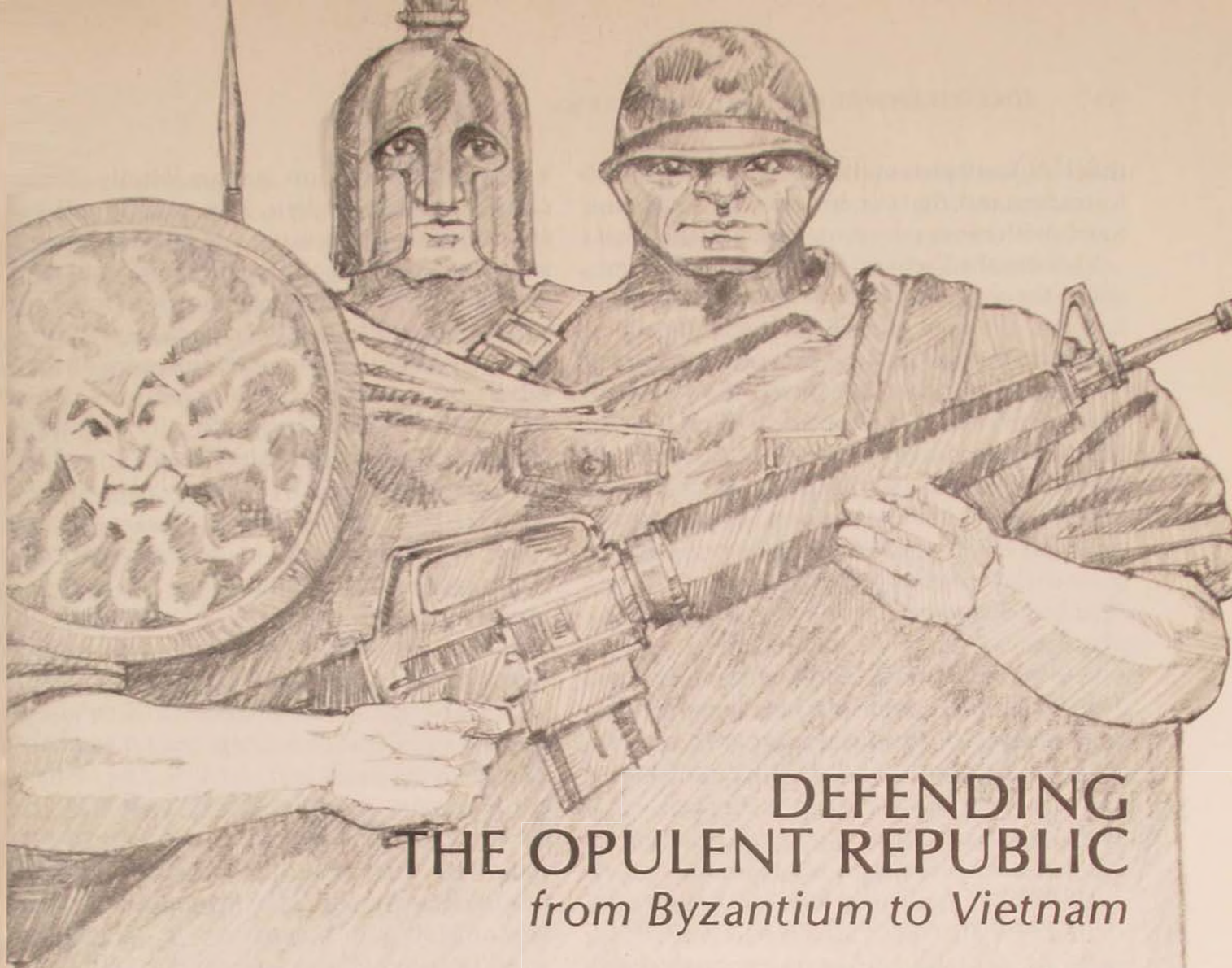
13. See Hinsley et al., *British Intelligence in the Second World War*, Vol. II, Chapter 21.

14. I attended a lecture given by a leading historian from the Federal Republic of Germany who argued that never by itself was Ultra of decisive importance.

15. Captain Steven Roskill, *The War at Sea*, Vol. I (London, 1954), p. 616.

16. Beesly, pp. 73-75.

17. *Ibid.*, p. 99; and Rohwer, p. 421.
18. Roskill, p. 616. The explanation for why June's figures remained so high is that it took the British more than a month to integrate the Ultra breakthrough gained by the U-110 coup into their convoy strategy. The rise that occurred in September and October resulted from the fact that U-boats were attacking Gibraltar convoys well within the range of long-range German reconnaissance aircraft. This aerial surveillance made it much more difficult for the Admiralty to hide their convoys. See Beesly, pp. 100-01.
19. Hinsley et al., *British Intelligence in the Second World War*, Vol. II, pp. 556-57.
20. Rohwer, pp. 442-43.
21. There is some dispute here. The British official historians argue that Ultra provided little direct support (see Hinsley et al., *British Intelligence in the Second World War*, Vol. I, pp. 176-77), while Harold Deutsch argues the opposite in "Ultra and the Air War in Europe and Africa," *Air Power and Warfare, Proceedings of the Eighth Military History Symposium*, USAF Academy, edited by Colonel Alfred F. Hurley and Major Robert C. Ehrhart (Washington, 1979), pp. 165-66.
22. U.S. Army Air Force, *Ultra: History of U.S. Strategic Air Forces in Europe vs. German Air Force* (Frederick, Maryland, 1980), p. 26. This is a reprint of a study completed at the end of the European conflict by Ultra intelligence officers assigned to U.S. Army Air Forces in Europe.
23. *Ibid.*
24. For a discussion of the air battle of attrition in 1943, see Williamson Murray, *Strategy for Defeat: The Luftwaffe 1933-1944* (Montgomery, Alabama, 1983), Chapters V and VI.
25. For the best study of the Schweinfurt raid, see Friedhelm Golücke, *Schweinfurt und der strategische Luftkrieg 1943* (Paderborn, 1980). For information on the vulnerability of the ball-bearing industry, see United States Strategic Bombing Survey Report, "The German Anti-Friction Bearings Industry," January 1947.
26. For a discussion of the fortuitous development of the long-range fighter escort, see Bernard Boylan, "The Development of the Long-Range Escort Fighter," unpublished manuscript, USAF Historical Research Center, Maxwell AFB, Alabama.
27. PRO DEFE 3/156, KV 4021, 16.5.44., 0558Z.
28. PRO DEFE 3/159, KV 4762, 21.5.44., 2054Z.
29. Albert Speer, *Inside the Third Reich* (New York, 1970), p. 348.
30. PRO DEFE 3/166, KV 6673, 6.6.44., 2356Z.
31. Speer, pp. 346-47.
32. PRO 31/20/16, "The Handling of Ultra Information at Headquarters Eighth Air Force," Ansel E. M. Talbert, Major, U.S. Army Air Force. For Ultra messages further confirming German fuel difficulties, see *Ultra: History of U.S. Strategic Air Forces in Europe vs. German Air Force*, pp. 217, 224-25, and 234.
33. Among many other messages, see PRO DEFE 3/47, KV 3015, 6.5.44., 1316Z; DEFE 3/153, KV 3300, 9.5.44., 2301Z and KV 3292, 9.5.44., 1659Z; DEFE 3/155, KV 3763, 14.5.44., 0412Z; DEFE 3/158, KV 4690, 21.5.44., 0534Z; DEFE 3/161, KV 5445, 27.5.44., 2131Z; DEFE 3/163, KV 5825, 31.5.44., 0039Z; DEFE 3/163, KV 5999, 1.6.44., 1516Z.
34. PRO DEFE 3/155, 14.5.44., 0412Z.
35. Among many others, see PRO DEFE 3/58, XL2299, 16.7.44.; DEFE 3/171, KV 7998, 14.6.44., 0753Z; DEFE 3/179, KV 9976, 28.6.44., 2135Z.
36. Among many messages, see PRO DEFE 3/154, KV 3/154, KV 3524, 11.5.44., 2032Z; DEFE 3/153, KV 3417, 10.5.44., 2033Z; DEFE 3/153, KV 3327, 9.5.44., 0845Z; DEFE 3/160, KV 5141, 25.5.44., 1020Z; DEFE 3/159, KV 4944, 23.5.44., 2054Z; and DEFE 3/168, KV 7135, 9.6.44., 1648Z.
37. Among others, see PRO DEFE 3/155, KV 3863, 14.5.44., 2020Z; and DEFE 3/153, KV 3430, 10.5.44., 2129Z.
38. PRO DEFE 3/163, KV 5762, 3.5.44., 1440Z.
39. Among others, see PRO DEFE 3/166, KV 6675, KV 6699, KV 6694, KV 6749, and KV 6735; see also *Ultra: History of U.S. Strategic Air Forces in Europe vs. German Air Force*, p. 196.
40. Bennett, p. 68. The messages on the location of Panzer Group West are in PRO DEFE 3/168, KV 7171, 9.6.44., 2040Z; and KV 7225, 10.6.44., 0439Z.
41. Major L. F. Ellis, *Victory in the West*, Vol. I, *The Battle of Normandy* (London, 1962), p. 258.
42. Paul Carell, *Scorched Earth: The Russian-German War, 1943-1944* (New York, 1971), pp. 93-116. In this unremarkable and thoroughly unreliable work, Carell suggests that Germany's troubles were entirely the result of vicious traitors in the Führer's headquarters. As an example of the unintended irony that so often appears in Carell's work, the following passage ranks high, "General Laux [in the Demyansk salient during winter 1942/1943] spoke to Sixteenth Army over the directional radio link and put his anxieties to the Commander in Chief. This useful and secure [my emphasis] wireless link had been set up by 1st Luftwaffe signals regiment in May 1942. It was an excellent link and, above all, saved the many casualties which used to be incurred . . . in repairing the long distance cables And the new link, moreover, was free from interference." (*Ibid.*, pp. 299-300) The irony of course is that the laid cables were secure (from interception and decryption); the radio messages were not.
43. Beesly, p. 94.
44. Quoted in *ibid.*, p. 169.
45. Welchman, p. 133.
46. *Ibid.*, p. 130.
47. *Ibid.*, p. 131.
48. *Ibid.*, p. 132.
49. Knowles, p. 448.
50. Rohwer, p. 441.
51. *Ibid.*
52. Hinsley, *British Intelligence in the Second World War*, Vol. I, p. 345. See also Beesly, p. 88, who speculates that this signal was occasioned because a high-ranking Luftwaffe officer had a close relative aboard the *Bismarck*.
53. Beesly, p. 69.
54. In particular, see Timothy T. Lupfer, *The Dynamics of Doctrine: The Changes in German Doctrine during the First World War* (Leavenworth, 1981).



DEFENDING THE OPULENT REPUBLIC *from Byzantium to Vietnam*

DR. NICHOLAS J. PAPPAS

THE Vietnam War was the chance for many rare birds to come out of their academic cages. For several years thereafter, Americans were treated to the spectacle of some anguished moaning over the sins of the Republic. The Vietnam War was the archetype of war, one which surpassed all others in ferocity and cruelty. Only recently has a more dispassionate analysis begun to emerge. Guenther Lewy's *America in Vietnam* dispelled the mythology about unprecedented American violence.¹ Norman Podhoretz in *Why We Were*

in Vietnam attacked the revisionist argument that U.S. involvement in Southeast Asia was inherently immoral.² And Colonel Harry G. Summers's analytical work *On Strategy: A Critical Analysis of the Vietnam War* destroyed the false impression that Vietnam was won by "insurgents,"³ explaining how the guerrillas were a diversionary sideshow for the North Vietnamese Army that finally steamrolled the Republic of Vietnam forces in a conventional attack using four army corps. Summers's more profound conclusion, though, is



that U.S. strategists and their critics *both* failed to understand the war because they had lost touch with the fundamentals of strategy itself.

Viewing the Vietnam War from the perspective of the classical principles of *strategy* makes it a less than an end-of-the-world event. In much the same way, the American regime and its foreign policy are susceptible to analysis in terms of the classical notions of *political science*. The fundamental question of political science is presented in Books VIII and IX of Plato's *Republic* and takes the form of the query: "What is the nature of the regime?" *Regime* refers to the ordering (arrangement and filling) of public offices and the character of the men who rule.

Yet if we accept the Clausewitzian assertion that "war is the continuation of politics by other means," we cannot separate the analysis of war easily from that of politics. As Clausewitz himself writes:

... if we reflect that war has its roots in a political object, then naturally this original motive which called it into existence should also continue the first and highest consideration in its conduct.⁴

The prudent strategist or statesman thus will consider the nature of the means at his disposal but always with the primacy of policy in mind. "Policy therefore is interwoven with the whole action of war and must exercise a continuous influence upon it, as far as the nature of the forces liberated by it will permit."⁵

The implication of this interweaving for the strategist is profound. For him, *the* question of strategy turns out to be *the* question of political science: What kind of regime are we defending? A regime saver must be a regime knower.

To grapple with the nature of the U.S. regime is like wrestling with that mythological river-god who kept changing his shape and form. Its size, diversity, and newness remind us that the "human mind invents things more easily than words. . . . Hence a form of government has been found which is neither precisely national nor federal [and] the new word to express this new thing does not yet exist."⁶

This political creation, neither wholly classical nor entirely modern, is revealed in all its enormity and ambiguity by a trip on the interstate system. Along the highway lie small and large farms, husbanded by industrious lovers of thrift and wealth. Small shops and sprawling factories hide the labors and dreams of deft mechanics and energetic entrepreneurs. Periodically, the spires of a metropolis signal the restless desires of the multitudes in a feverish city where every type of character can be found, from the lotus-eater to the steel maker.

Let us simply call this kaleidoscope of occupations, aspirations, and desires an *extended opulent republic*. The task of strategy is to defend it. The problem in one sense is not new; it was present at the founding of the nation.

The Founding Fathers' first answer to the security problems of the new nation was provided by geography and fortuity. The vast expanse of the Atlantic Ocean separated the American continent from the rivalries of Europe. The immensity of the American wilderness made a foreign invasion and occupation very unlikely events. Furthermore, Britain's interest in keeping European power politics out of the New World served America's purpose as well as Britain's during much of the nineteenth century.

With security guaranteed by distance, trackless wastes, and intra-European squabbles, America focused her energy on the debate over the organization and operation of the nation's government. What came out of the formative years was a regime characterized by the division of power, checks and balances, and frequent elections. Such a republic, it was argued, would be inherently peaceful because it emphasized commerce and domestic affairs. There would be little need for international intrigue, standing armies, and menacing fleets. The art and science of strategy could thus be ignored or at least relegated to the obscure province of a few military men.

For a long time, it went unnoticed that the argument over the nature of the regime and its

security dilemma was "solved" by a form of geographical isolation rather than by philosophy. War and peace, or strategy and diplomacy, became separate categories of thought in the minds of the Americans.

After a century of attacking trees, wild beasts, and bottomlands, Americans found themselves thrown by technology and fortune into what Raymond Aron has called the worldwide "unity of the diplomatic field."⁷ The high-water mark of this involvement may have been World War II and its immediate aftermath. For our purpose, what is interesting about this era is the *kind* of Americans who planned and implemented U.S. foreign policy. The type is portrayed dramatically in the final pages of William Manchester's *Goodbye, Darkness*⁸ and seems to be a combination of the democratic (freedom-loving) and timocratic (honor-loving) men found in Books VIII and IX of Plato's *Republic*. A paradoxical man emerges: the American who loves freedom, license, even anarchy, yet has a powerful sense of honor, duty, and patriotism. His natural spiritedness, indignation, and righteous anger had been turned into a creative energy that upheld the safety and the principles of the regime.⁹

Many of our friends who returned from the Vietnam War remarked that something *fundamental* about the American regime had changed, something unlike the rapid changes in transportation, manufacturing, and housing that all generations of Americans had witnessed. Instead, the change seemed to involve the character of citizens themselves. It was as if the democratic tendency in American life had finally broken through its wall of coexistence with the parallel republican (or timocratic) tendency and overwhelmed its companion.

If this change is real—as real as the regime change in the 1830s, for example—the strategist in the 1980s is faced with this problem: How does one defend an opulent nation inhabited primarily by democratic men who favor self-gratification over the public good?

Human nature is unchanging in its essence

but takes on many shapes and colors, like snowshoe hares or stoats. Might we not profit by examining men as they appear in other regimes in history? While history herself is a mute oracle, philosophy must encounter men as they appear against her scenery. Edward Luttwak has performed a similar task in *Grand Strategy of the Roman Empire*,¹⁰ which looks at the empire from the perspective of defense systems and subsystems. This study illuminates U.S. foreign policy by viewing it from a different angle; the same sort of activity might shed light on the problems of an opulent regime.

Look at the Romans. "Destined for war, and regarding it as the only art, the Romans put their whole spirit and all their thoughts into perfecting it," wrote Montesquieu.¹¹ Does this picture of Roman manhood during the days of the Republic provide us with a paradigm for today's America? Probably not, since the formative centuries of the two regimes are so different. The Romans, "always exposed to the most frightful acts of vengeance,"¹² developed the "virtues of constancy and valor,"¹³ and, in order "that they could handle heavier arms than other men, had to make themselves more than men."¹⁴ As Montesquieu dryly observed, "In short, no nation ever prepared for war with so much prudence or waged it with so much audacity."¹⁵ This sanguinary baptism of a nation suggests the image of a wrestler, "who has been thrown off balance by the sudden yielding of a taxing counterforce"¹⁶ but who rebounds to a fighting position, for "a body politic that has overcome a mortal threat will rush forward to regain its lost equilibrium—within an enlarged habitat."¹⁷ Frightful and continual wars, plus a certain genius for organization, strategy, and tactics, made the Romans into a people suited to the task of defending a republic and building an empire.

The first formative century of the United States suggests another image. One might use the "metaphor of the advancing current," which gets its impetus from secondary streams

of immigrants who "effortlessly flatten minor natural obstacles."¹⁸ The resulting national character was precisely that which most of the Founding Fathers envisioned, and the regime became focused on liberty, commerce, and, especially, domestic affairs, while remaining unsuited to the patient and demanding work of perpetual defense in a world characterized by the Hobbesian phrase "state of warre." This unsuitability, in turn, was doubled by opulence, for, as Machiavelli wrote "it is of the greatest advantage in a republic to have laws that keep its citizens poor," as long as poverty is never allowed "to stand in the way of the achievement of any rank or honor."¹⁹ Montesquieu's writing supports this conclusion in his comments on the Punic Wars: "Carthage, which made war against Roman poverty with its opulence, was at a disadvantage by that very fact. Gold and silver are exhausted, but virtue, constancy, strength and poverty never are."²⁰

Our look at the Roman Republic causes us to reflect on our own republic. What things are similar? What different? Our thinking must now be directed toward another regime, one so different from the virtuous Roman Republic as to seem inhabited by a different species of beings.

For approximately a thousand years after the Roman state at last became opulent, corrupt, and vulnerable to foreign invaders, the Byzantine empire in the East survived in one form or another. From the transfer of the capital of Rome to Byzantium in A.D. 330 to the defeat of Byzantine arms by the Turks in 1071 at Manzikert, the Byzantine empire stood the shocks and blows of numerically superior enemies. And even after this stupendous defeat, Byzantium lived on in diminished power and wealth until the final Turkish conquest in 1461.²¹

This empire sounds magnificent; its reality seems to have been sordid. "The history of the Greek empire," wrote Montesquieu, "is nothing more than a tissue of revolts, seditions, and perfidies."²² Divided into factions, devoid of justice, wracked with superstition, ruled by

fools for the most part, the empire was characterized by continuous internal troubles. "Once small-mindedness succeeded in forming the nation's character, wisdom took leave of its enterprises, and disorders without cause, as well as revolutions without motive, appeared."²³ And still, as we have seen, the empire continued to stand for almost a millenium, opulent almost to the end.

Behind the political convolutions and mystical incantations of the empire stood the Byzantine army, "in its day the most efficient military body in the world."²⁴ What was the secret of Byzantine military prowess in a society whose name is a "synonym for effete incapacity alike in peace and war?"²⁵

The answers are contained in the military doctrine of the Byzantines and the records of such great captains as Belisarius and Narses. Raising the art of war to the level of the psychological and, as B. H. Liddell Hart suggests, the *indirect*,²⁶ "the *Strategicon* of the Emperor Maurice and the *Tactica* of Leo . . . [provided a] structure . . . strong enough to withstand many-sided barbarian pressure, and even the tidal wave of Mohammedan conquest which submerged the Persian Empire."²⁷

As masters of the art of war, Byzantine military leaders stressed expertness in the employment of weapons and tactics, exact knowledge of the enemy, psychological preparation for battle, ruses and stratagems, and the relationship of war to the political end of saving the empire.²⁸

But these are more symptoms than cause of Byzantine military greatness. There are two revealing passages in Sir Charles Oman's classic *The Art of War in the Middle Ages* about the armies of the Greek empire. The first is a summary of the military treatises of the day and concerns the ranks: "Unless the general is incompetent or the surrounding circumstances are unusually adverse, the authors always assume that victory will follow the banner of the empire. The troops can be trusted, like Wellington's Peninsular veterans, 'to go anywhere

and do anything.'"²⁹ The second portrays the military spirit of certain families who provided the army its officer corps:

A true military spirit existed among the noble families of the eastern empire; houses like those of Skleros and Phocas of Byrennius, Kerkauas, and Comnenus are found furnishing generation after generation of officers to the national army. *The patrician left luxury and intrigue behind him when he passed through the gates of Constantinople, and became in the field a keen professional soldier.*³⁰

Taken together, these pictures of the Byzantine army present the spectacle of a society within a society, a small band dedicated to the military virtues, the art of war, and the defense of an opulent regime. This is the ultimate source of the victories of Byzantine arms and the security of the Byzantine state.

THIS brief study of two regimes should cause us to reflect on our own opulent

republic. It seems clear that the defense of the republic and its liberal ethos ultimately will rest on the shoulders of men who must reject opulence and that ethos for the classical virtues. To make the armed forces of the republic the mirror image of that republic means the end of physical security *and* the values that make the American regime unique among the nations of the world.

Our visit to the Roman Republic revealed a republic in which citizen participation reached a level approaching the ideal. Barring unforeseen shocks and blows, it is unlikely that the American regime will ever again enjoy the energy and vigor of such participation. But our voyage to Byzantium uncovered a military establishment that protected its opulent society by rejecting the values of that society. Instead, the Byzantine army chose to retain the values that are always pure gold: fortitude, expertness, and loyalty to duty, honor, and country.

Radford University, Virginia

Notes

1. Guenther Lewy, *America in Vietnam* (New York: Oxford, 1978).

2. Norman Podhoretz, *Why We Were in Vietnam* (New York: Simon and Schuster, 1982).

3. Harry G. Summers, *On Strategy: A Critical Analysis of the Vietnam War* (Novato, California: Presidio, 1982).

4. Carl von Clausewitz, *On War*, Vol. I, translated by Colonel J. J. Graham (New York: Barnes and Noble, 1956), pp. 22-23.

5. *Ibid.*, p. 23.

6. Alexis de Tocqueville, *Democracy in America*, Vol. I, translated by George Lawrence, edited by J. P. Mayer (New York: Doubleday, 1969), p. 157.

7. Raymond Aron, *On War* (New York: Norton, 1968), p. 57.

8. William Manchester, *Goodbye, Darkness* (New York: Dell, 1982).

9. This idea comes from a review of James Webb's *Fields of Fire*, and *A Sense of Honor* by Mackubin T. Ownes, Jr., "Soldiers and Statesmen," *This World*, Spring/Summer 1983, p. 163.

10. Edward N. Luttwak, *Grand Strategy of the Roman Empire* (Baltimore: Johns Hopkins, 1976).

11. Montesquieu, *The Greatness of the Romans and Their Decline*, translated by David Lowenthal (Ithaca, New York: Cornell University Press, 1968), p. 33.

12. *Ibid.*, p. 28.

13. *Ibid.*

14. *Ibid.*, p. 33.

15. *Ibid.*, p. 37.

16. George Liska, *Career of Empire: America and Imperial Expansion over Land and Sea* (Baltimore: Johns Hopkins, 1978), p. 8.

17. *Ibid.*

18. *Ibid.*, p. 110.

19. Nicholo Machiavelli, *The Discourses*, in *The Prince and The Discourses* (New York: Modern Library, 1951), p. 486.

20. Montesquieu, p. 45.

21. R. Ernest Dupuy and Trevor N. Dupuy, *The Encyclopedia of Military History: From 3500 B.C. to the Present* (New York: Harper and Row, 1970), p. 437.

22. Montesquieu, p. 196.

23. *Ibid.*, p. 203.

24. C. W. Oman, *The Art of War in the Middle Ages* (Ithaca, New York: Cornell University Press, 1953, 1968), p. 31.

25. *Ibid.*, p. 32.

26. B. H. Liddell Hart, *Strategy* (New York: Praeger, 1967), p. 72.

27. *Ibid.*, p. 73.

28. Oman, Chapter III, *passim*.

29. *Ibid.*, p. 32.

30. *Ibid.*, p. 51. Emphasis added.

R

air
force
review



ORIGINS OF THE ORDER OF DAEDALIANS

LIEUTENANT GENERAL HAROLD L. GEORGE,
USAF (RET)

I HAVE participated in many of the key events in U.S. Air Force history, including the bombing tests that led to the sinking of the German battleship *Ostfriesland* by Army Air Service bombers on 21 July 1921. These tests were designed to settle a debate between the U.S. Navy and the nation's fledgling air arm over whether an aircraft could sink battleships.

The feat was accomplished under the leadership of General William "Billy" Mitchell. To carry out the test, Mitchell created the First Provisional Air Brigade at Langley Field, Vir-

ginia. I was one of the 125 officers (most of them first lieutenants) in this unit, which brought together at Langley the entire bombardment strength of the Air Service: two Handley Page and eighteen Martin bombers. Many of us in the brigade had earned our wings during World War I and had flown in that war.

Naturally, we were all elated at our success in sinking the *Ostfriesland*. So was General Mitchell; and before leaving for Washington the next day, he congratulated us for the wonderful job we had done and stated that he was proud of us.

Then he said we must follow the example of the officers of the Continental Army who (six years after they had defeated General Cornwallis at Yorktown) assembled in New York and created the Society of the Cincinnati. This organization took its name from the legendary Roman farmer Cincinnatus who left his plow when Rome was in danger, armed himself, and fought bravely in defense of his country until Rome defeated her enemy; then he returned to his plow. The Society of the Cincinnati elected General George Washington as its first president. Today, the Society of the Cincinnati is the most exclusive military organization in our country. General Mitchell said that we who were the first Americans to fly our country's airplanes in time of war should create a similar organization that would cause our achievements to be remembered forever.

During the next week, we all returned to our various stations. We tried to establish a system of communications but doing so was difficult. We exchanged letters, but there was no location to serve as a focal point about which an organization might coalesce. Then, in 1931, the Air Corps Tactical School was moved from Langley to Maxwell Field, Alabama, and the number of students in the school was increased significantly. Many of the students who passed through the school during the 1930s had been commissioned pilots during World War I.

In the fall of 1933, eleven of us World War I veterans organized an ad hoc committee at Maxwell and pledged that we would draw up a constitution and establish a framework for the kind of organization we had been dreaming of since Billy Mitchell had mentioned the Society of the Cincinnati in 1921. This ad hoc committee held eleven meetings in my quarters because I was the senior instructor in air tactics and strategy, while the other ten were students.

One of our problems was to select a suitable name. One member of the committee had an uncle who was an instructor of history at a large eastern college. He called him via phone and told him of our efforts to select a name for

our organization. We thought that somewhere in history there would be a legend about flying that would suggest an appropriate name. His uncle considered the matter a challenge and said that he would discuss it with his colleagues. A week later he called back and described the ancient Greek legend of Daedalus who supposedly was the first man to fly. He and his colleagues suggested the "Order of Daedalians." The name satisfied the ad hoc committee completely. In the meantime, we had drafted the preamble and almost completed the constitution for the organization.

There was no problem in determining the basic requirement for membership. It was "those officers who first flew their country's airplanes in time of war." However, when had World War I ended? With the armistice of 11 November 1918? With the signing of the peace treaty? Or with the ratification of the treaty by the Senate?

There was only one date when World War I ended insofar as the ad hoc committee was concerned, and that was when the shooting ceased—the eleventh hour of the eleventh day of the eleventh month in 1918. Four years had elapsed between the armistice and the ratification of the peace treaty by the U.S. Senate. During those four years, many officers had transferred into the Air Service from other branches of the Army. And many ground officers who had been assigned to the Air Service during the war were given pilot training after the armistice. None of these officers had flown their country's airplanes in time of war. After much discussion, the armistice date was accepted as part of the criteria for membership in the organization we were creating.

Thus, the ad hoc committee unanimously agreed on the name, the Order of Daedalians; that the war had ended on Armistice Day, 1918; and that eligibility for membership required a rating of heavier-than-air pilot and a commission in the regular Army not later than 11 November 1918. Having decided on these precepts, the ad hoc committee voted to invite all



The thirty-year military career of Lieutenant General Harold George spanned both World Wars I and II. Between the wars, as an Army Air Corps captain, he helped organize the Order of Daedalians and served as its first commander.

officers at Maxwell Field who met the eligibility requirements to gather in the forum of the Air Corps Tactical School to finalize plans for an Order of Daedalians.

The meeting took place at 7:00 in the evening on 26 March 1934. Thirty-five officers were present, including the ad hoc committee members. As the chairman of the ad hoc committee and the Director of the Department of Tactics and Strategy, I chaired the meeting.

I began by reviewing the eleven meetings that had been held at my quarters. I also re-

called for them the sinking of the *Ostfriesland* and told of General Mitchell's strong recommendation that we create an organization of fliers patterned after the Society of the Cincinnati. Then I told them how we had chosen the name "Order of Daedalians" and most particularly what we had decided with regard to the end of World War I.

I went over everything in detail so that all thirty-five of us present would understand what we were trying to do. I then said: "If anyone here in this room does not wish to

become a Daedalian, he is privileged to leave." I waited a full minute but no one left.

Then Lieutenant Roland Birnn, the secretary of the ad hoc committee, said: "Captain George, hold up your right hand." He then had me recite the promise of a Daedalian. Then I asked the remaining thirty-four officers to stand and raise their right hand, and I administered the promise of a Daedalian to them en masse. This ceremony was followed by the election of officers. They were: Captain Harold L. George (Wing Commander), Captain Odas Moon (Vice Wing Commander), Captain Charles Y. Banfill (Secretary), and Captain Charles T. Skow (Treasurer).

Thus, the Order of Daedalians was formally organized at that meeting at Maxwell Field in the spring of 1934. It had been thirteen years since General Mitchell had earnestly recommended that we follow the example of the officers of the Continental Army and organize a society of those officers who "first flew their country's airplanes in time of war." The criteria established for membership made the Daedalians a very exclusive organization, for at the time of its creation there were only 346 heavier-than-air pilots who had received their pilot rating not later than the Armistice of 1918. Two years after the founding of the order, all

except two of these pilots had become members.

That was the situation until after the end of World War II when General Ira C. Eaker, General Claude A. Duncan, and I were named to make recommendations concerning changes in the constitution that would prevent the order from becoming a last-member organization. We recommended that eligibility for membership be changed so as to open the Daedalian society to anyone with a commission in any of the military forces of the United States who held a rating of heavier-than-air pilot. Further, membership was opened to those officers who had received their commissions and pilot ratings before the World War I armistice but who had never become officers in the regular Army.

While these new membership criteria modified the original concept of the order, they made possible an increase in the membership from less than 400 to its present size of 14,000. Thus we now have a national fraternity of commissioned military pilots.

Laguna Hills, California

This memoir is based on my own recollection, information obtained from the Report of Chief of Air Service for 1921, certain documents and other reports relating to the bombing exercises furnished by the Chief of Staff, USAF, and the minutes of the Order of Daedalians.

H.L.G.

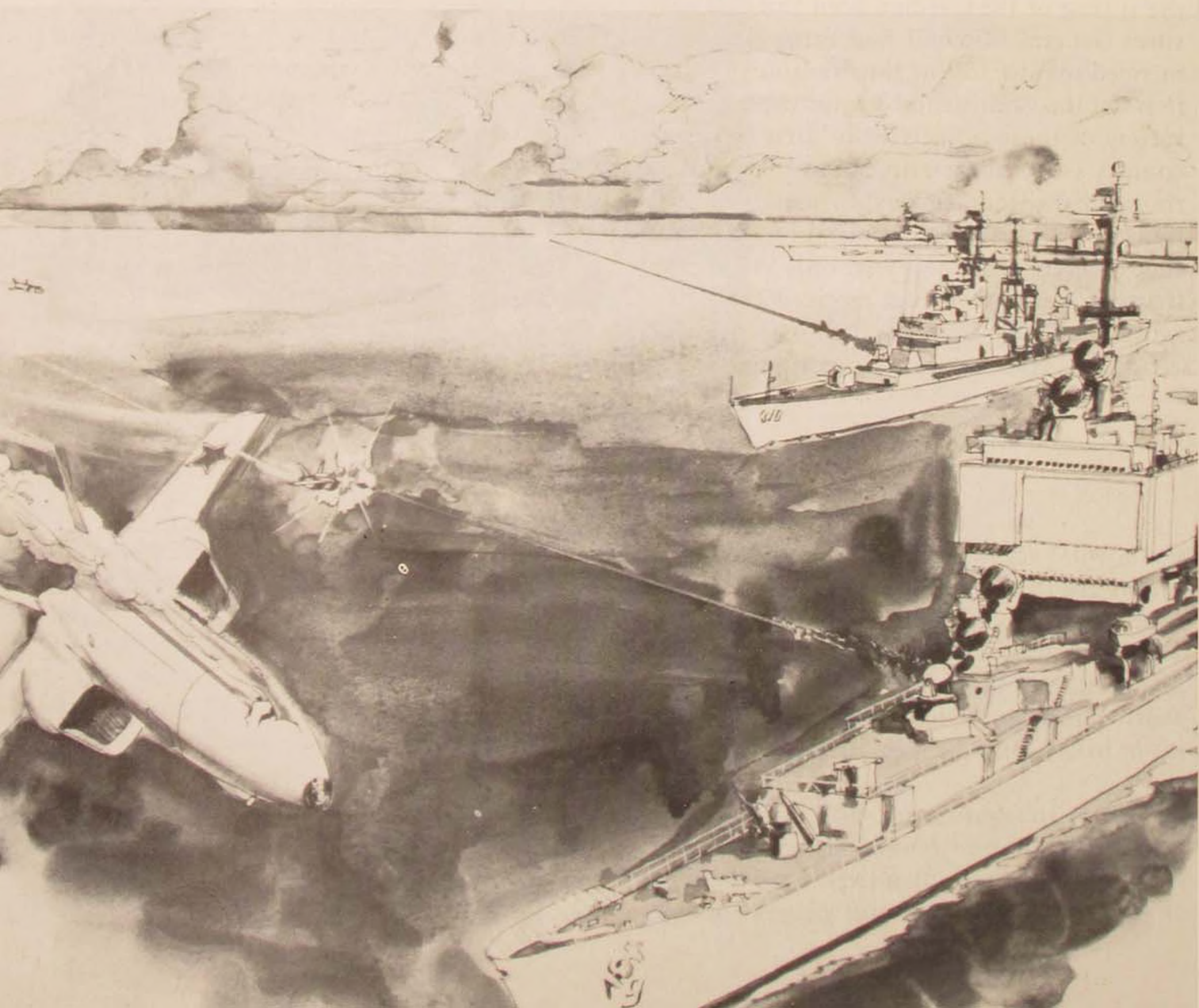
R science and technology perspectives

INTRODUCING THE PARTICLE-BEAM WEAPON

DR. RICHARD M. ROBERDS

It is not that the generals and admirals are incompetent, but that the task has passed beyond their competence. Their limitations are due not to a congenital stupidity—as a disillusioned public is so apt to assume—but to the growth of science.

Captain B. H. Liddell Hart, speaking
on weapon-development decisions, 1935



CONSIDERABLE debate has been stirred by President Reagan's recent suggestion that the United States embark on a program that would use advanced-technology weaponry to produce an effective defense against Soviet ICBMs. On the one hand, critics argue that the idea of a defensive system that would neutralize the ICBM threat is naïve and, at best, would require large expenditures in the development of a very "high-risk" technology. Furthermore, they suggest, even if such a system could be developed, it would be too costly and would also be vulnerable to simple and cheap countermeasures. On the other hand, others argue that we *must* continue to explore such high-technology options until they have been either proved scientifically unachievable or developed into effective systems. If it were possible to build and effectively deploy such weapons, the payoff in terms of national security would be tremendous. And certainly, if this weaponry is achievable, it must be the United States, not the Soviet Union, that first develops it.

The advanced technology that has raised the possibility of defeating an ICBM attack is referred to collectively as directed-energy weapons, which gain their unprecedented lethality from several fundamental characteristics. Among their more important features are their ability to fire their "bullets" at or near the speed of light (186,000 miles a second), which would effectively freeze even high-speed targets in their motion; their ability to redirect their fire toward multiple targets very rapidly; their very long range (thousands of kilometers in space); and their ability to transmit lethal doses of energy in seconds or even a fraction of a second. No conventional ammunition is required; only fuel for the power generator is needed.

There are three principal forms of directed-energy weapons: the directed microwave-energy weapon, the high-energy laser, and the particle-beam. Only the last two types have received substantial government support.

Much has been written on the high-energy

laser (HEL), and this category of directed-energy weapon appears to be well understood by members of the defense community. Laser weapons have been under active development for twenty years and easily constitute the most advanced of the directed-energy devices.

In contrast, the particle-beam weapon (PBW) has been the "sleeper" among directed-energy weapons until very recently. Enshrouded in secrecy, it began as a project sponsored by the Advanced Research Projects Agency (now called Defense Advanced Research Projects Agency, better known as DARPA) as early as 1958, two years before the first scientific laser demonstration in 1960. Code-named Seesaw, the project was designed to study the possible use of particle beams for ballistic missile defense. Today, while its development lags that of the high-energy laser, the particle-beam weapon is viewed by some military technicians as the follow-on weapon to the laser, because of its higher potential lethality.

The successful development of a particle-beam weapon would require significant technology gains across several difficult areas. But even though the technical understanding to support the full-scale development of a PBW will not be available for several years, the technology issues that pace its development are not difficult to understand. The purpose of this article is to provide a basis for understanding the fundamental technology connected with a particle-beam weapon, with the hope of assisting DOD leaders and other members of the defense community in making sound decisions about the development and possible deployment of PBWs in the days ahead.

What Is a Particle-Beam Weapon?

The characteristic that distinguishes the particle-beam weapon from other directed-energy weapons is the form of energy it propagates. While there are several operating concepts for particle-beam weapons, all such devices generate their destructive power by accel-

erating sufficient quantities of subatomic particles or atoms to velocities near the speed of light and focusing these particles into a very high-energy beam. The total energy within the beam is the aggregate energy of the rapidly moving particles, each particle having kinetic energy due to its own mass and motion.

Currently, the particles being used to form the beam are electrons, protons, or hydrogen atoms. Each of these particles can be illustrated through a schematic of the hydrogen atom, the smallest and simplest of all atoms. (See Figure 1.) The nucleus of the hydrogen atom is a proton, which weighs some 2000 times as much as the electron that orbits the single-proton nucleus. Each proton has an electric charge of a positive one, while each electron carries a charge of a negative one. In the case of hydrogen, the single electron and proton combine to form a neutrally charged atom.

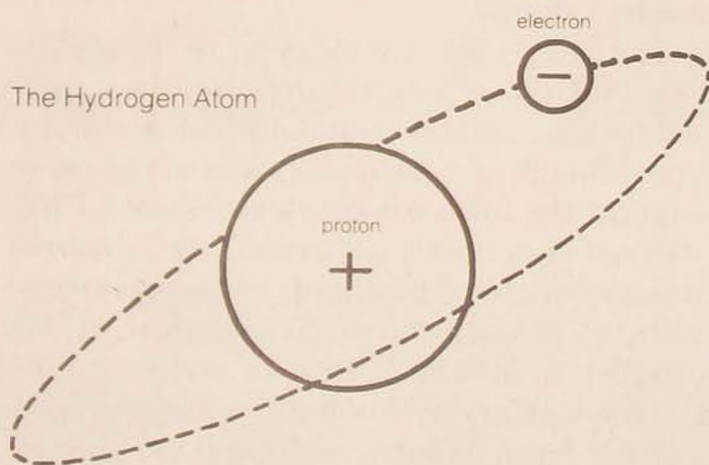


Figure 1. The hydrogen atom consists of a proton or positive charge, orbited by an electron of equal but opposite (negative) charge. Together, they form a neutrally charged atom, which can serve as the "bullet" of a particle-beam weapon in space. Also, the proton and the electron themselves are both viable candidates as the ammunition for an endoatmospheric weapon.

The particle beam itself is analogous to a natural phenomenon with which we are all familiar—the lightning bolt. The analogy is so close that particle-beam pulses are referred to as "bolts." The particles in a lightning bolt are

electrons (an electric current) flowing from a negatively charged cloud to a positively charged cloud or section of the earth. While the electric field in lightning that accelerates the electrons is typically 500,000 volts per meter, these electron velocities are still less than that desired in a particle-beam weapon. But the number of electrons (electric current) in the lightning bolt is nominally much greater. In any case, the phenomenon and its destructive results are very much the same.

Neither the proton nor the electron show any conclusive advantage over the other in their use as the appropriate "ammunition" of a PBW. The determining factor of whether to use electrons or protons so far has been simply the specific particle *accelerator* concept planned for use in a beam weapon. Some accelerating schemes call for the acceleration of electrons, while others use protons.

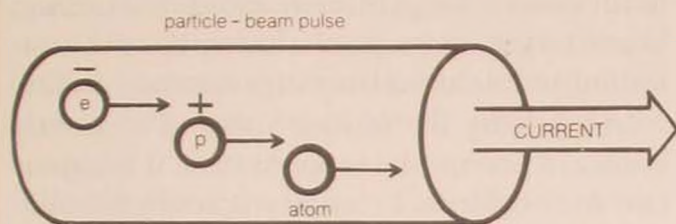
The use of a hydrogen-atom beam, however, is not based on the choice of a particular acceleration scheme. Because it is neutrally charged, the hydrogen atom has been selected specifically as the likely particle to be used in the initial space weapon. Neutral atoms would not be susceptible to bending by the earth's magnetic field as would a charged-particle beam. Neither would the beam tend to spread due to the mutually repulsive force between particles of like-charge in the beam. (In the atmosphere, a charged-particle beam will neutralize itself by colliding with air molecules, effectively creating enough ions of the opposite charge to neutralize the beam.)

The mechanism by which a particle beam destroys a target is a depositing of beam energy into the material of the target, which might be any material object. As the particles of the beam collide with the atoms, protons, and electrons of the material composing the target, the energy of the particles in the beam is passed on to the atoms of the target much like a cue ball breaks apart a racked group of billiard balls. The result is that the target is heated rapidly to very high temperatures—which is exactly the

effect that one observes in an explosion. Thus, a particle beam of sufficient energy can destroy a target by exploding it (although that is not the only means of destruction).

In describing a particle beam, it is conventional to speak of the energy of the beam (in electron-volts), the beam current (in amperes), and the power of the beam (in watts). (See Figure 2.) The specific meaning of these terms as they pertain to a particle beam is derived from the close analogy between a particle beam and an electric current.

Particle Beam Descriptors



particle energy = E (electron volts)
 current = I (amperes)
 power = $E \times I$ (watts)

Figure 2. A particle beam consists of a stream of electrons, protons, or neutral atoms flowing with a real or imagined electric current. The particle energies are expressed in electron-volts, while the current is stated in amperes. The product of the two yields the power of the beam in watts.

The electron-volt is a unit of measure for energy. It is the kinetic energy of an electron that has been accelerated by one volt of electric potential. Nominally, all the particles in a beam will have been accelerated to the same velocity, or energy, so it is possible to characterize the energy of a particle beam in terms of the energy of a typical particle of the beam, usually millions of electron-volts (MeV). Hence, a 20-MeV particle beam would be a beam of particles, each with a nominal energy of 20 million electron-volts.

A measure of the number of particles in the beam (beam intensity) may be made from the magnitude of the electric current (amperes) in the beam. To be able to assign a current to the beam, it is necessary to assume that each particle has an amount of electric charge equivalent

to an electron (even if it is a neutral atom). This assumption enables an electric current to be ascribed to the particle beam, and an indication of the number of particles in the beam is inferred by the current magnitude expressed in amperes.

The power of a particle beam is the rate at which it transports its energy, which is also an indication of the rate at which it can deposit energy into a target. Again, the analogy with an electric circuit serves us well. The power developed in an electric circuit is the mathematical product of the voltage (E) and the current (I); its unit of measure is the watt. Since the unit of energy for a particle in a beam is the electron-volt (E), and the beam has an electric current (I) ascribed to it, the power of the particle beam in watts is simply the energy in electron-volts multiplied by the beam current in amperes.

Types of Particle-Beam Weapons

There are two broad types of particle-beam weapons: the charged-particle beam weapon and the neutral-particle beam weapon. The charged-particle variety would be developed for use within the atmosphere (endoatmospheric) and has a set of technological characteristics that are entirely different from the neutral-particle beam weapon that would be used in space (exoatmospheric). Primarily, the extremely high power and precisely defined beam characteristics required for a particle beam to propagate through the atmosphere distinguish an endoatmospheric device from a beam weapon designed to operate in space. The development of a power supply and particle accelerator with sufficient power and appropriately shaped pulses for endoatmospheric weapons depends on very "high-risk" technology and is likely years away.¹

The technological problems associated with exoatmospheric weapons are considerable also, but they are not as difficult as those associated with endoatmospheric weapons. Here, the great-

est challenge is in the area of directing the beam: the weapon must be able to focus its energy to strike a target that may be thousands of kilometers away. There are two aspects to this challenge. First, the weapon must create a high-intensity, neutral beam with negligible divergence as it leaves the accelerator. Second, the weapon must have a system for aiming its beam at the target. This system must be able to detect pointing errors in a beam (which is itself very difficult to detect because of its lack of an electric charge) and, when necessary, redirect a missed "shot" toward the target.

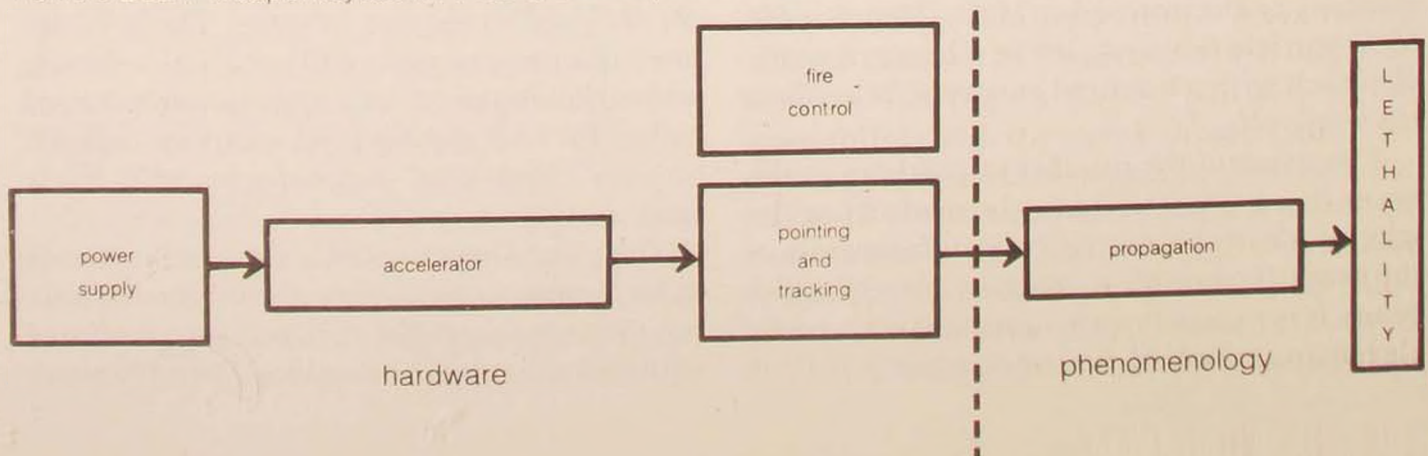
Because of these two different sets of demands, the endo- and exoatmospheric devices represent two different types of weapon systems in appearance and operation. Nevertheless, there are certain fundamental areas of development that are common to both types of PBWs.

Development Areas for PBWs

The realization of an effective particle-beam weapon depends upon technology developments in five areas. Three of these concern hardware developments, while two others are related to advances in the understanding of beam weapon phenomena. (See Figure 3.)

Figure 3. Any particle-beam weapon system may be broken into five major areas. Three of these areas are hardware-related, and two concern the understanding of the associated phenomena. The current DOD particle-beam program aims to develop each area sufficiently to determine the feasibility of a particle-beam weapon.

Particle-Beam Weapon System: Areas of Development



lethality

One of the phenomenological aspects under study is lethality. Lethality refers to the general effectiveness of a weapon in engaging and destroying a target. There is no doubt that a particle beam is capable of destroying a military target. However, a knowledge is needed of the precise effect that a particle beam would have when it impinges upon various-type targets composed of different materials and components. The problem is made more difficult from the fact that the particle beam can vary according to particle type, particle energy, and beam power. To gain such an understanding, beam/target interaction is the subject of continuing technological investigations and studies.

In assessing the unique value of a particle beam as a potential weapon system, it is important to consider six characteristics that would give the beam weapon a high degree of lethality.

Beam velocity. The particles "fired" by a PBW will travel at nearly the speed of light (186,000 miles per second). The advantage of such a high-velocity beam is that computing the aim point for a moving target is greatly simplified. The effect of this extremely high velocity is essentially to fix a target, even if the target attempts evasive action. For example, if

the weapon were required to shoot at a reentry vehicle (RV) some 50 kilometers distant and traveling at the high speed of 20,000 feet per second, the RV would travel only about 5 feet from the time the weapon fired until it was struck by the beam. It is this aspect of PBWs that makes feasible the task of "shooting a bullet with a bullet," as the ABM targeting problem is sometimes characterized.

Beam dwell time. Beam dwell time refers to the time that a beam remains fixed on a target. In an endoatmospheric weapon, the power of the beam would be sufficient to destroy the target instantaneously (in millionths of a second) upon impact, and no beam dwell time would be required. In space, where the required power of the beam is considerably less, some very short beam dwell time may be necessary.²

Rapid-aim capability. The particle beam may be redirected very rapidly from one target to another by means of a magnetic field. This field would itself be generated by an electric current. Varying the current would change the magnetic field intensity, which would deflect the charged particles in the desired direction. Within certain limits, no physical motion of the weapon would be required as it engages enemy targets. This capability to very rapidly aim and redirect the beam would enhance significantly the weapon's capability to engage multiple targets.

Beam penetration. The subatomic particles that constitute a beam have great penetrating power. Thus, interaction with the target is not restricted to surface effects, as it is with a laser. When impinging upon a target, a laser creates a blow-off of target material that tends to enshroud the target and shield it from the laser beam. Such beam/target interaction problems would not exist for the particle beam with its penetrating nature. Particle beams would be quite effective in damaging internal components or might even explode a target by transferring a massive amount of energy into it (the catastrophic kill mechanism). Furthermore,

there would be no realistic means of defending a target against the beam; target hardening through shielding or materials selection would be impractical or ineffective.

Ancillary kill mechanisms. In addition to the direct kill mechanism of the beam, ancillary kill mechanisms would be available. Within the atmosphere, a secondary cone of radiation, symmetrical about the beam, would be created by the beam particles as they collide with the atoms of the air. This cone would be comprised of practically every type of ionizing radiation known (i.e., x-rays, neutrons, alpha and beta particles, and so on). A tertiary effect from the beam would be the generation of an electromagnetic pulse (EMP) by the electric current pulse of the beam. This EMP would be very disruptive to any electronic components of a target. Thus, even if the main beam missed, the radiation cone and accompanying EMP could kill a target. While the EMP and the radiation cone would not be present in an exoatmospheric use of the weapon, there are other possible options in space that are not available in the atmosphere. Many intriguing possibilities come to mind. For example, using lower levels of beam power, the particle beam could expose photographic film in any satellite carrying photographic equipment, or it could damage sensitive electronic components in a satellite.

All-weather capability. Another advantage of a particle beam over the high-energy laser in an endoatmospheric application would be an all-weather capability. While a laser can be thwarted completely by such weather effects as clouds, fog, and rain, these atmospheric phenomena would have little effect on the penetrating power of a particle-beam weapon.

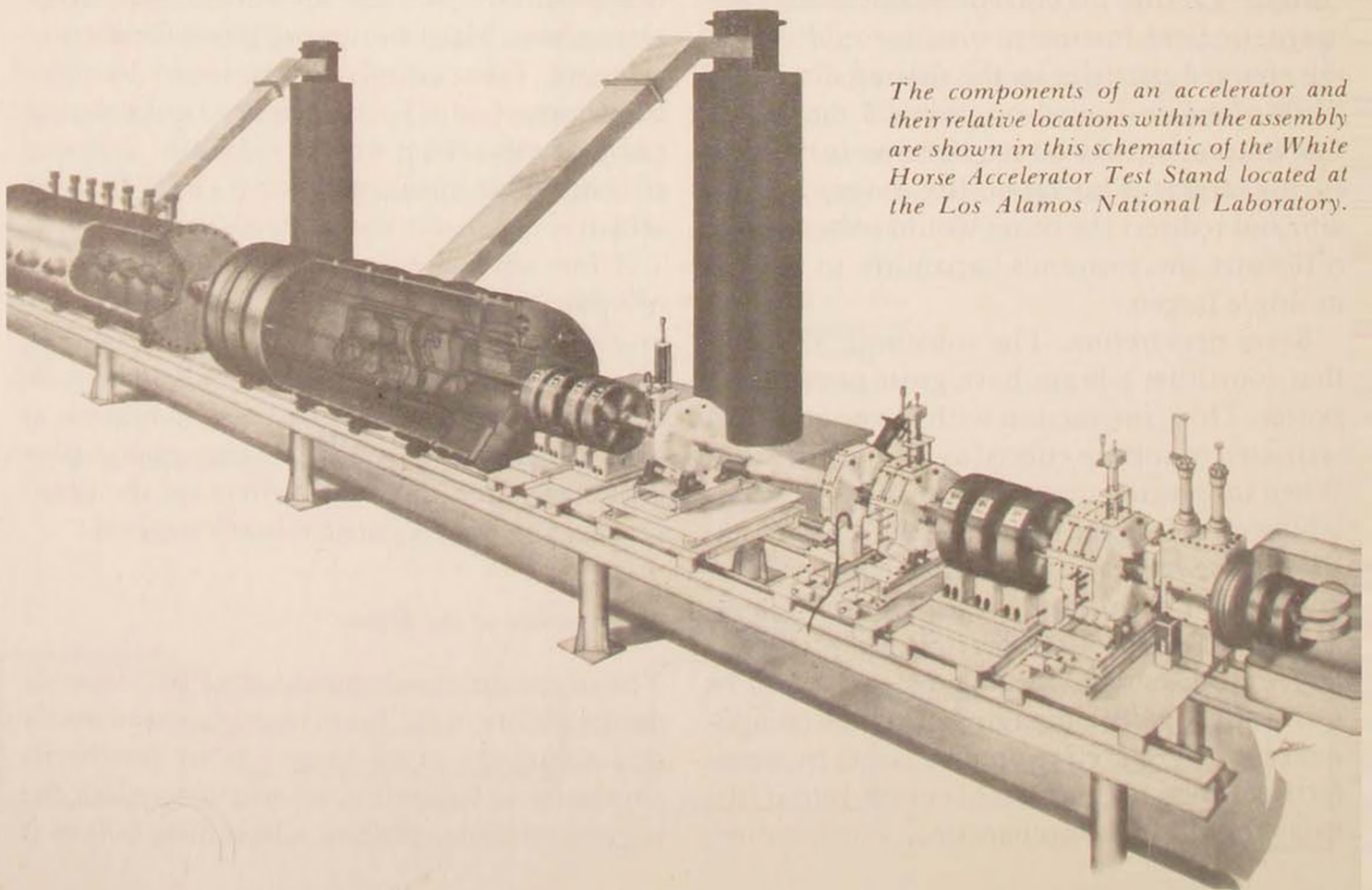
propagation of the beam

The successful development of a PBW depends on the ability of the beam to propagate directly and accurately to the target. As we ponder its similarity to lightning, we might consider the jagged, irregular path of a lightning bolt as it

darts unpredictably through the sky. Such indeterminacy would never do for the particle beam of a weapon, which must have an extremely precise path of propagation as it traverses the kilometers to the enemy vehicle. This aspect, in fact, may be the Achilles' heel of the endoatmospheric weapon. However, the space weapon, which at this time is envisaged to be a neutral stream of hydrogen atoms, would not suffer from the beam instability problems that may possibly plague a beam of charged particles traveling through the air.

Another problem of propagation is possible beam spreading. An increase in beam diameter would result in a decrease of the energy density (intensity) of the beam as it travels toward the target. Over short ranges, a slight beam divergence can be tolerated, but the very long ranges that would be required of the space weapon place a tremendous restriction on the amount of beam divergence that is acceptable.

Use of a neutral beam in space would ensure that the beam would not spread due to mutual repulsion of the beam particles. Divergence would come strictly from that imparted by the accelerator. In the atmosphere, however, even if the beam particles were neutral, air molecules would strip the surrounding electrons quickly from the beam's neutral atoms, turning the beam into a charged-particle beam. The charged particles within the beam would then tend to repel one another, producing undesirable beam divergence. But as the beam propagates through the air, it would also strip electrons from the surrounding air molecules, creating a region of charged particles (ions) intermingling with the beam. The result of this phenomenon is to neutralize the overall charge of the beam, thereby reducing the undesired effect of mutual repulsion among the charged particles in the beam that is a cause of beam spreading. Another force that tends to prevent



The components of an accelerator and their relative locations within the assembly are shown in this schematic of the White Horse Accelerator Test Stand located at the Los Alamos National Laboratory.

beam spreading is a surrounding magnetic field, created by the current of the charged-particle beam. This field wraps itself around the beam and produces a conduit that inhibits beam divergence. (See Figure 4.)

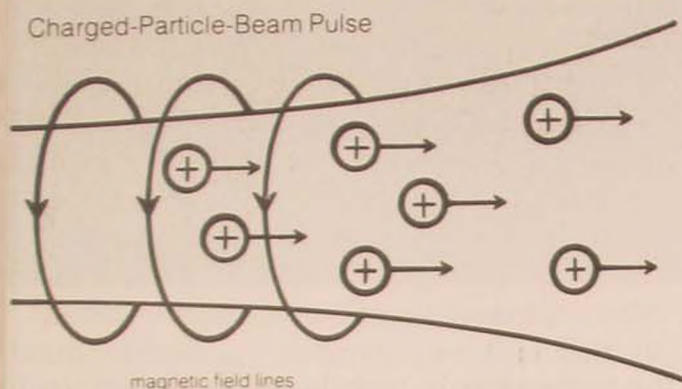


Figure 4. A charged-particle beam will tend naturally to spread apart, due to the mutually repulsive forces between the like-charged particles constituting the beam. The electric current created by the moving charges will generate a surrounding magnetic field, which will tend to bind the beam together. However, unless there is some neutralization of the charge, the mutually repulsive force will always be the stronger force and the beam will blow itself apart.

The propagation of a charged-particle beam through the atmosphere is, in fact, the pacing issue for the endoatmospheric weapon. It has been theoretically calculated that specific threshold values of the beam parameters (beam current, particle energy, beam pulse length, etc.) are required for a beam to propagate through air with reliability. While the values of these parameters are classified, no particle-beam accelerator is currently capable of creating a beam with the required parameters.

Two crucially important experimental programs are exploring the phenomena of atmospheric beam propagation. The first program, under way at the Lawrence Livermore National Laboratory, involves experiments with an accelerator called the Advanced Test Accelerator (ATA), the construction of which was completed in the fall of 1982. The second program, a joint Air Force/Sandia National Laboratories program, similarly is aimed at investigating

beam propagation through the use of a radial-pulse-line accelerator (RADLAC). Continuation of the U.S. program to explore the development of an endoatmospheric weapon will depend on a positive prognosis from these two experimental studies of atmospheric beam propagation.

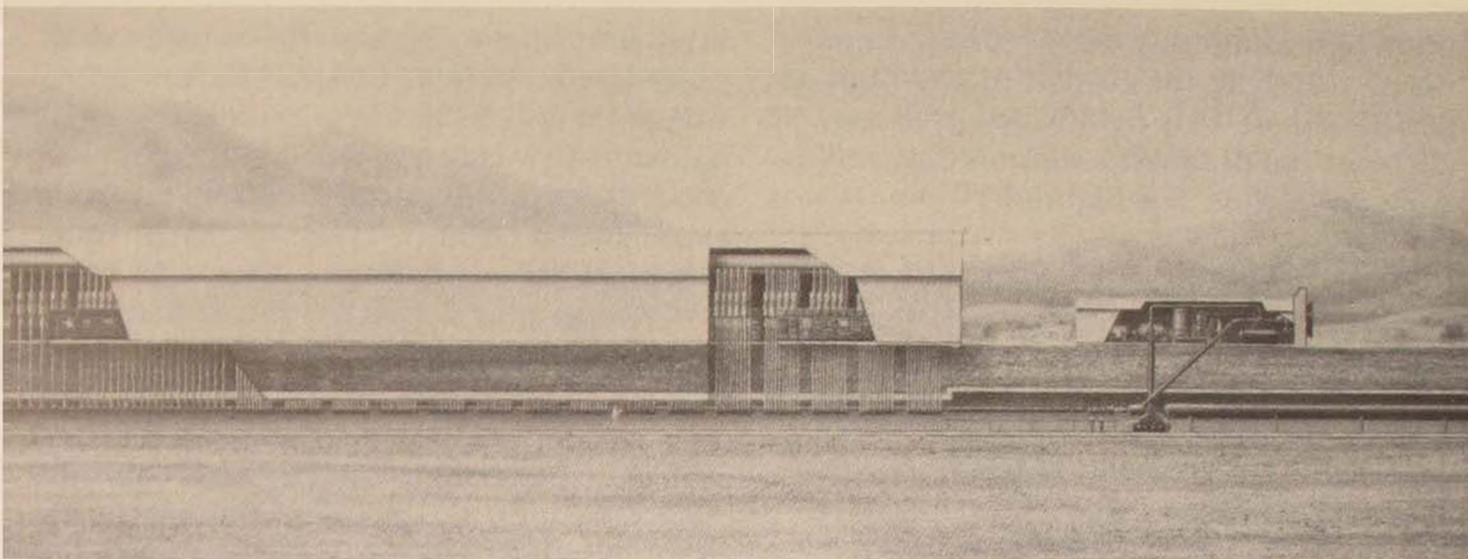
fire-control/pointing-and-tracking technology

The fire-control/pointing-and-tracking system of a PBW must acquire and track the target, point the weapon at the target, fire the beam at the proper time, and assess target damage. If the beam misses the target, the system must sense the error, repoint the weapon, and fire again. Much of the technology for this part of the weapon is not unique to a PBW, and its development has benefited considerably from the HEL weapon program, which has involved study of this problem for several years. Moreover, recent advances in radar technology and electro-optics, combined with projected developments in next-generation computers, portend a heretofore unimagined capability in this area of technology.

This is not to say that serious development problems do not remain in the area of the fire-control system. Many of the pointing and tracking problems will be entirely unique to a particle-beam weapon and cannot be solved by a transfer of technology from the laser program. Nevertheless, none of these problems are such that they will demand exploration of basic issues in physics and the advancement of the state of the art, as will some other aspects of the beam weapon's development.

accelerator technology

The accelerator is the part of the weapon system that creates the high-energy particle beam. It is composed of a source of ions (electrons, protons, or charged atoms), a device for injecting the particles into the accelerating section, and the accelerating section itself. The acceler-



Advanced Test Accelerator (schematic)

ating section of all conventional linear accelerators is made up of a series of segments (modules) that sequentially apply an accelerating electric field to the charged particles. While the voltage in each segment may be relatively low, the repeated application of an accelerating voltage by the large number of modules ultimately produces very high particle energies.

The first subatomic particle accelerators were constructed in the 1930s for scientific investigations in the field of elementary-particle physics. The accelerators used for the first-generation PBW system will be embellished variations of the present-day, linear accelerators (linacs), such as the two-mile-long Stanford Linear Accelerator Center (SLAC), which is a state-of-the-art device capable of producing electrons with an energy of 30 GeV (30 billion electron-volts).

The SLAC represents a class of accelerators known as radio frequency (rf) linear accelerators. The great majority of linacs in operation today are rf linacs. Although such devices can accelerate particles to energies high enough for use as a weapon, they are limited severely in their current-carrying capability and would not be candidates for the endoatmospheric weapon system, since beam power is a product of current and voltage.

The space weapon, however, does not call for

the tremendously high beam power required for the endoatmospheric weapon. Its accelerator could be based on the design of a state-of-the-art rf linac.³ The major demand for a space weapon is to create a high-intensity (high "brightness") beam of neutral atoms with very precise collimation as it exits the accelerator. It is in this area of divergence that the greatest technical problems exist. If the beam were to diverge from a pencil point to only the diameter of a penny after twelve miles of travel, this would represent a divergence of one part in a million (one meter for each 1000 kilometers traveled). A divergence much greater than this would not be acceptable for a space weapon that is to have a range of thousands of kilometers.

A second type of linear accelerator is called the induction linac. The world's first induction linac, the Astron I accelerator, was built at the Lawrence Livermore Laboratory in 1963. It was designed to produce high electron-beam currents that could be used in a magnetic-confinement scheme for controlled thermonuclear fusion. The Advanced Test Accelerator is an induction linac that grew out of this early accelerator technology. The ATA is designed to generate a 50-MeV beam with 10,000 amperes of current in pulses of 50 nanosecond (50 billionths of a second) duration.⁴

The fundamental principle of operation (applying successively high voltage across a series of accelerating segments) is the same for both the rf and induction linacs. However, the mechanism for generating the electric voltage within the segments of the two types of linacs is quite different. Compared to the rf linac, the induction linac does not impart as much instability to the beam when a modest current limit is exceeded. Therefore, of the two types of accelerators, the induction linac is the more likely candidate for an endoatmospheric beam weapon (which will require very high beam currents).

In examining the Air Force charged-particle-beam technology program, we find that its main thrust is the exploration of nonconventional acceleration techniques (neither rf nor induction linacs), with two main purposes in mind. The first is to develop a means of producing a particle beam with parameters closely resembling those that would be required for successful propagation through the atmosphere, so that beam propagation can be studied in depth and propagation theory refined. To date, a RADLAC I accelerator that has been developed has produced a 10-MeV beam of electrons with a 30,000-ampere current.⁵ A more powerful RADLAC II is under construction.

The second purpose is to develop an accelerator with higher accelerating fields that would permit the building of a shorter device. The nominal accelerating gradient in conventional accelerators is about 5 to 10 MeV per meter of accelerator length. Thus, to produce a 1-GeV beam, a linear accelerator would need to be 100 to 500 meters in length—far too long and cumbersome, particularly if the device were to be carried aboard an aircraft. The Air Force hopes to build a device eventually that will generate a very powerful particle beam with an accelerator of more reasonable length.

power supply technology

Possibly the most difficult technical problem in developing an atmospheric particle-beam

weapon is the development of its electrical power supply. To operate an endoatmospheric PBW requires that a tremendous amount of electrical energy be supplied over very short periods of time. Since power is energy divided by time, large amounts of energy over short spans of time translate into extremely high power levels. Building a power supply to produce high power in short bursts involves a very advanced field of technology known as pulsed-power technology.

Basically, a pulsed-power device can be divided into three component areas: the primary power source that provides electrical energy over the full operating time of the weapon (prime power source), the intermediate storage of the electrical energy as it is generated (energy storage), and the "conditioning" of the electrical power bursts or pulses of suitable intensity and duration (pulse-forming network) to fire the weapon. Each of these three areas represents a technological challenge.

Any electricity-producing device, such as a battery or generator, is a primary power source. The requirement of the particle-beam weapon, however, is for a prime power source that can produce millions to billions of watts of electrical power, yet be as lightweight and compact as possible. A conventional power station could provide the needed power levels, but it would be neither small nor lightweight. There is also a need for mobility in many of the envisaged applications; a power station would not meet this requirement. Some typical prime-power candidates are advanced-technology batteries, turbine-powered generators, or an advanced magnetohydrodynamic (MHD) generator using superconducting circuitry. Whatever the primary source might be, a sizable advance in the present power-generating state of the art will be required, particularly for the endoatmospheric weapon.

Once electrical energy is generated for the weapon, it will likely have to be stored in some fashion. A typical storage method involves charging a series of large capacitors (often

called a capacitor bank). Other more exotic methods are possible, e.g., spinning a huge mechanical flywheel or simply storing the energy in the form of a high-energy explosive that is released in a contained explosion. Actually, there are numerous schemes for storing and releasing the required energy; their advantages and disadvantages depend on their particular application (i.e., the type of accelerator that is used and whether the weapon is endo- or exoatmospheric).

The pulse-forming network would be designed to release the stored energy in the desired form. In the atmospheric weapon, a single shot or "bolt" would most likely be comprised of a very short-duration pulse, repeated thousands of times per second. Hopefully, the prime power source would be able to generate energy at least at the same rate as energy was dispatched. If not, the weapon would be required to remain quiescent while its generator rebuilt a charge for another series of bolts.

THE development of a particle-beam weapon by the United States is a logical follow-on to the current high-energy laser development program. The weapon's potential lethality against high-speed, multiple targets, coupled with its capacity for selective destruction, would make the PBW particularly suitable for the space defense role. While some of the technological and operational issues to be resolved appear formidable at this time, it is far too early to discount the eventual operational

effectiveness of such a weapon. Several scientists have argued that the PBW cannot be built or effectively deployed, creating or exacerbating doubts in other individuals. Yet those so concerned might do well to recall that in 1949, Vannevar Bush—a highly respected national leader with a Ph.D. in electrical engineering who had served as head of the U.S. Office of Scientific Research and Development during World War II—argued that technical problems made the development of an effective ICBM virtually impossible without astronomical costs.⁶ Nine years later, in 1958, the United States had its first operational ICBM, the Atlas.

The PBW offers a possibility for defending effectively against a launched ICBM, and even a glimmer of hope toward this end is worthy of pursuit. Should the United States terminate its exploration of particle-beam technology, we would be opening the door for the Soviets to proceed at their own pace toward building such a weapon. We can ill afford technological surprise in an area as crucial as beam weapons.

The current pace of the U.S. program in PBW development is both logical and orderly. Funding levels remain relatively low, as DARPA and the three services continue to focus on the pacing technologies that must be understood if such a weapon is to be built. Since the potential payoff of such activity is tremendous, it seems imperative that the United States continue to pursue the development of PBWs at least at the present level of funding.

*Department of Engineering Technology
Clemson University, South Carolina*

Notes

1. The major technological problems of the endoatmospheric weapon are twofold: to understand and demonstrate the propagation of the particle beam through the air and to create an electrical pulsed-power source capable of generating billions of watts of power in extremely short, repetitive pulses.

2. For a different reason, all high-energy lasers (with the exception of the envisioned x-ray laser) require beam dwell time also. A laser needs such time to burn through the surface of the target.

3. The question of how a beam of neutral atoms might be accelerated in a conventional rf linac may arise in the mind of the perceptive reader. A present approach is to attach an extra electron to a hydrogen atom, accelerate the charged atom in conventional fash-

ion, and then strip off the extra electron by passing the beam through a tenuous gas as it exits the accelerator. This stripping causes the beam to spread slightly and must be controlled if the divergence specifications of a space weapon are to be met.

4. B. M. Schwarzschild, "ATA: 10-kA Pulses of 50 MeV Electrons," *Physics Today*, February 1982, p. 20.

5. Private communication, Lieutenant Colonel James H. Head, High-Energy Physics Technology Program Manager, Air Force Weapons Laboratory, 6 February 1984.

6. Vannevar Bush, *Modern Arms and Free Men: A Discussion of the Role of Science in Preserving Democracy* (New York, 1949), pp. 84-87.

R commentary

To encourage reflection and debate on articles appearing in the *Review*, the Editor welcomes replies offering timely, cogent comment to be presented in this department from time to time. Although content will tend to affect length and format of responses, they should be kept as brief as possible, ideally within a maximum 500 words. The *Review* reserves the prerogative to edit or reject all submissions and to extend to the author the opportunity to respond.

SEEKING A FORUM FOR THE MITCHELLS

MAJOR DENNY R. NELSON

AS I READ the quotations in last issue's "The Review Invites Comments," I was reminded of Lieutenant Colonel Timothy E. Kline's article titled "Where Have All the Mitchells Gone?" in the May-June 1982 *Air University Review* and was prompted to reread it. The article induced sadness—and frustration approaching despair—because Colonel Kline felt it necessary to implore our service to seek self-criticism and visionary thinking from within its own ranks. Regrettably, the informed and constructive dissent that created U.S. air power is rarely tolerated today. Obviously, disagreements can create problems and produce discord; but, as Kline alludes, without the great dissenters ("Billy" Mitchell, "Hap" Arnold, Ira Eaker, "Tooe" Spaatz, and others), there well might not be an independent Air Force today.

What possessed these men to dissent and to adhere to their convictions? And what allowed them to "get away with it"? They were possessed by a vision of air power and its potential, and they were frustrated by those who did not share their vision. Most of all, they were willing to risk their careers for what they believed.

Not all of them "got away with it" free of

hassles and ordeals. Mitchell was court-martialed. Only later was he placed on a pedestal as one who was willing to sacrifice his career for what he believed. Fortunately, Arnold, Spaatz, and Eaker survived in military service despite their testimonies on Mitchell's behalf. Others manifested dissent in other ways. Frank Andrews, "Hal" George, and "Possum" Hansell placed their careers on the line as they developed and taught a doctrine contrary to U.S. Army policy at the old Air Corps Tactical School. These men too hold honored positions in our history. Without their visions and their willingness to speak out for what they believed, air power might not have turned the skies of World War II into a medium for the enemy's destruction. At the very least, America's progress in air power would have been greatly delayed.

When Kline asks where all the Mitchells have gone, he is actually querying, "Where are the men who are willing to speak out on controversial issues?" He answers his own question when he indicates that they will not speak out today because they learned the wrong lesson from the Mitchell saga: the lesson of court-

martial or damaged career. Thus, a great many potential “Mitchells” in today’s Air Force are silenced by fear of retribution. Others are mute in anticipation of frustration and failure. New or controversial ideas about policy, strategies, tactics, or weapons are rarely welcomed; more often, they are stonewalled or ignored.

Why should a service that reveres leaders who openly defied the establishment of their time stifle such “defiance” (i.e., innovative thinking) today? Have we forgotten that without contrary thought, many of the great advances in military art and science would not have come to fruition? Does one not shiver ever so slightly to think that the armored warfare ideas of Fuller and Liddell Hart, the air power theories of Mitchell and the other Air Corps rebels, and Rickover’s concept of a nuclear Navy could all have ended up in the dustbin of history? Has today’s Air Force bureaucracy replaced the “villainous” Army of Mitchell’s era in seeking to eliminate controversy? I think not—not knowingly, anyway.

But perhaps we have unknowingly allowed ourselves to bank slightly in the direction of unwarranted censorship. And if so, why?

One reason for reluctance to examine ourselves critically and to suggest corrective approaches and innovative actions may be the impact that the media have on our psyche in the contemporary world. Have we fallen into the “Ozzie and Harriet” syndrome, where family relations are mostly peaches and cream? Heated arguments can present untidy scenes to our public. Such scenes might require both explanation and resolution, which require time, a commodity in short supply on senior

staffs. Unfortunately, the tyranny of the “in basket” leaves little time for reflection, study, and debate. Hence, an article that could stir up debate tends to prompt publication denial, and the new idea that might demand time for examination and analysis (or even for a sound rebuttal) tends to invite quick rejection.

This criticism is not meant to castigate the system but to serve simply as a reminder. Had controversial ideas, concepts, tactics, doctrine, and policies been swept under the carpet in the past, not only might we not now have a United States Air Force, we might not have a United States to serve. George Washington, Thomas Jefferson, Patrick Henry, Benjamin Franklin, and Samuel Adams were all classified as revolutionaries, radicals, and even traitors by one source or another. Have we forgotten our proud history?

We cannot deny our heritage—we dare not suppress informed debate, lest we place both the Air Force and the nation in jeopardy some day in the future. Restriction on informed public debate should never be exercised lightly or without genuine cause. We must keep in mind that bureaucratic malaise in the Air Force could become the sharpest arrow that our nation’s future enemies find in their quiver. To Colonel Kline, I would say that the “Mitchells” are still here—they lack only a free forum for their ideas.

*Center for Aerospace Doctrine,
Research, and Education
Maxwell Air Force Base, Alabama*

Major Nelson is a Research Fellow at the Center for Aerospace Doctrine, Research, and Education, Air University.

ANOTHER PERSPECTIVE ON AIR POWER AT THE LOW END OF THE CONFLICT SPECTRUM

Lieutenant Colonel David C. Schlachter

COLONEL Kenneth Alnwick in his article in the March-April 1984 issue pointedly showed the difference between the conceptual and the actual.* He noted a shift in Air Force emphasis away from "classic special operations . . . toward a special operations force with a much more narrow focus" but came to a wrong conclusion when he implied that this "evolution" lessens the Air Force's war-fighting capability within the spectrum of conflict. As I see it, the historical examples used to support the article's premise really demonstrate that "classic" air power applied in support of past special operations was no more or less than it is today (or should be in the future)—i.e., *adaptable* to the needs of the employing commander.

In developing his premise that the future Air Force, unless restructured, might not be able to execute successfully "time-honored" missions in low-level conflict, Colonel Alnwick overlooked a simple but essential point. The Air Force as a military department and service provides forces for assignment to unified commands. It does not field forces or develop capabilities in isolation. Theater commands are responsible for identifying requirements; the respective services subsequently establish the priority and fund-supporting initiatives. In basic terms, the Air Force "gives them what they want."

The Air Force recently developed its first Air Force Special Operations Forces (AFSOF) Master Plan to chart the course for increasing USAF capability to conduct and support future special operations. The plan, unlike some others, is a significant document because it pro-

vides the Air Force with a fiscally responsible, time-phased plan to increase and then maintain the quality and quantity of special operations forces through the end of the century.

The concept of operations in the master plan is derived from projected strategies of the unified commands. Simply stated, unified commanders want Air Force combat capability to conduct "quick" or limited engagement military special operations in hostile or denied areas. Most air missions would involve undetected, long-range, low-level penetration into hostile airspace to reach target areas. Therefore, aircraft and aircrews tasked for special operations must have unique capabilities. For survivability and operational security, they must be able to operate at low altitudes under conditions of darkness or adverse weather, while navigating precisely either around or through known air defense threat areas to arrive at obscure drop zones, landing zones, infiltration points, or targets. These, then, are the outside parameters of needed Air Force special operations air support.

The degree of technological sophistication necessary to execute successfully special operations air missions moves the Air Force away from aircraft that are comparable to those in the Third World's air forces. Today's special operations aircraft are typically modified with terrain following/terrain avoidance radar, have defensive electronic countermeasures, have internal/external night vision capability, and are air refuelable. Future Air Force special operations aircraft like the JVX may need even more capable equipment. (Because of the JVX's fixed-wing and vertical-lift properties, the Air Force will no longer need long-range special operations helicopters when it is fielded.) Air Force aircraft available to foreign air forces for

*Colonel Kenneth J. Alnwick, "Perspectives on Air Power at the Low End of the Conflict Spectrum," *Air University Review*, March-April 1984, pp. 17-28.

security assistance are tactical fighters, for the most part, such as the F-5, F-15 or F-16, and unmodified C-130 tactical transports—forces that are not significantly tasked for U.S. special operations support. While the corporate Air Force must maintain a capability to field mobile training teams to support military assistance advisory groups and liaison officers, Air Force special operations forces are not the prime players they were during the 1960s and early 1970s, nor can they be because of the equipment they fly.

The point that Colonel Alnwick missed is that air power in a special operations environment must be developed and refined to provide what it has always provided—flexible strategic and tactical capability against the war-fighting potential of a hostile force in line with unified command strategy. In this context, special op-

erations forces are no different from other Air Force forces. Such combat capability can be focused for support of *either* U.S. unilateral or host-nation combat operations. Colonel Alnwick correctly called the shift away from Vietnam era special operations support, but the shift is part of the evolutionary process to keep air support responsive to the stated military requirements of unified commanders who fight the force—i.e., toward enhanced air support that is not hindered by threat, weather, terrain, target distance, employment location, or payload. Fortunately, the old commando motto “Any Time, Any Place” is just as applicable now as it ever was—maybe more so, and the Air Force must actively keep it that way.

Washington, D.C.

Colonel Schlachter is assigned to Headquarters USAF/XOXP.

ON MODERN WARFARE: PARADIGM CRISIS?

Colonel William R. O'Rourke, Jr.

I ENJOYED your editorial about a paradigm crisis (March-April 1984) and would like to offer a few other thoughts on the matter.

To begin with, there is so little new in human phenomena. What appears new is really a better understanding of what has always been. Professor Daniel J. Boorstin, Librarian of Congress and a leading American historian, outlined it beautifully when he pointed out that each new discovery discloses hitherto unimagined realms of ignorance. He goes on to make the point that the great obstacle to progress is not ignorance but the illusion of knowledge.

Our increasing reverence for a world view with the United States as the centroid leads us

to unwarranted illusions of knowledge. As a result, we tend to undervalue the strength of lesser enemies, and therefore it is not difficult for them to surprise us. Iran and Lebanon are but recent examples of our myopia.

I would suggest that many of our recent military tragedies have been mainly the result of an irrational atmosphere brought on by heightened tensions. How else can one explain the *Mayaguez* incident? The “enemy” in these encounters with the United States is astonished with our preponderance but encouraged by our lack of direction. That's why our elephants are always stepping on thorns!

We must also not ignore the fact that mass political, ethnic, or spiritual movements breed

fanaticism, fervor, and hatred. As such, they produce irrational people who tend to do irrational (from our point of view) things. It is very difficult to defend against a saboteur who plans to give up life to carry out an attack. In this kind of atmosphere, each enemy soldier becomes a personification of our best precision munition. Our unsophisticated enemy becomes sophisticated by an act of will. This is not a new phenomenon. However, it is one the American paradigm was not previously willing to accept. It must be remembered that all paradigms leave out a great deal in the interest of neatness, so we should not be too critical of

this error. After all, when one is contemplating the consequences of nuclear war, it is hard to keep the full continuum of conflict in focus.

Sad to say, I don't see us getting smarter and don't know that we can. There is a certain vulnerability that comes with world power roles. Unfortunately, the more powerless we feel, the more we tend to question our processes. Our best course is to keep the faith and sustain an open attitude of inquiry.

Hickam AFB, Hawaii

Colonel O'Rourke is Director of Programs, DCS Plans, Headquarters Pacific Air Forces.

In war the moral is to the material as three is to one.

NAPOLEON BONAPARTE (1769-1821)

History provides the strongest proof of the importance of moral factors and their often incredible effect: this is the noblest and most solid nourishment that the mind of a general may draw from a study of the past.

CARL VON CLAUSEWITZ, *On War*,
Book III, Chapter 3

The combat value of a unit is determined in great measure by the soldierly qualities of its leaders and members and its will to fight. Outward marks of this combat value will be found in the set up and appearance of the men, in equipment and in the readiness of the unit for action. Superior combat value will offset numerical inferiority. Superior leadership combined with superior combat value of troops constitutes a reliable basis for success in battle.

U.S. Army Field Manual 100-5, 1941 edition,
quoted in MARTIN VAN CREVELD, *Fighting
Power: German Military Performance,
1914-1945*, p. 35

R

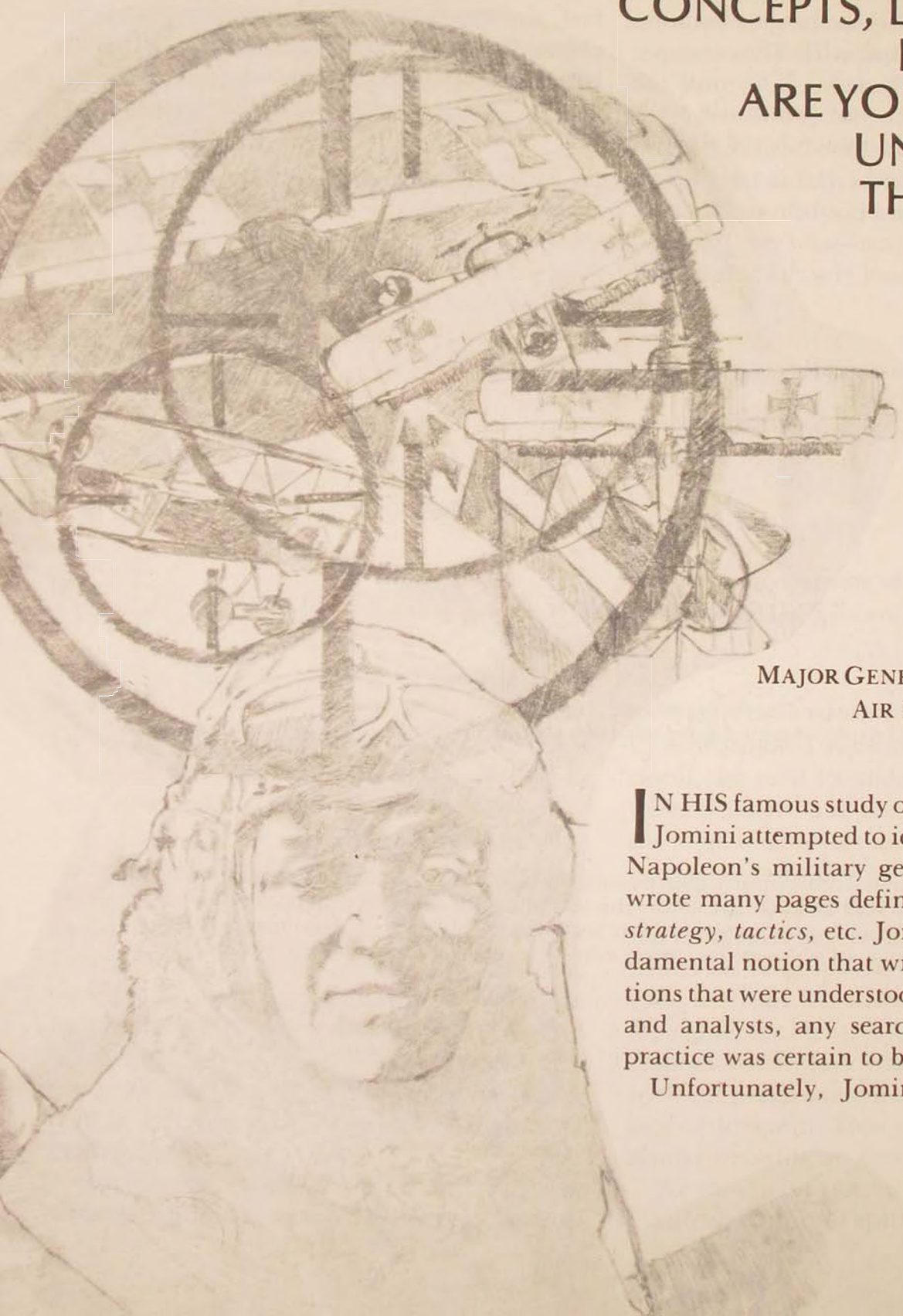
books,
images, and
ideas

CONCEPTS, DOCTRINES, PRINCIPLES: ARE YOU SURE YOU UNDERSTAND THESE TERMS?

MAJOR GENERAL I. B. HOLLEY, JR.
AIR FORCE RESERVE (RET)

IN HIS famous study on the art of war, Baron Jomini attempted to identify the essentials of Napoleon's military genius. In so doing, he wrote many pages defining such key terms as *strategy*, *tactics*, etc. Jomini grasped the fundamental notion that without uniform definitions that were understood clearly by all readers and analysts, any search for sound military practice was certain to be flawed seriously.¹

Unfortunately, Jomini's good advice has



been ignored all too frequently in recent years by military writers. Thus, some articles today equate doctrine with "the philosophy of war," while others refer to doctrine as "concepts and principles"—as if all three terms were interchangeable. This confusion extends to even such official promulgations as JCS Pub. 1, *Dictionary of U.S. Military Terms for Joint Usage*, which has, at one time or another, identified doctrine as "a combination of principles and policies" or as "fundamental principles."² At the very least, such definitions are confusing, if not downright erroneous. Much might be gained from a concerted effort to achieve precision and uniformity in employing key military terminology.

WHAT is a concept? To conceive an idea is to formulate it in words in the mind. In the mind, it is notional; it exists only as a theory, an idea yet unproved. To conceptualize is to devise a mental construct, a picture in the brain that can be expressed in words eventually. Whether it resides in the mind or is revealed verbally, it is speculative, tentative, and usually malleable.

To illustrate the notion of a concept, let us look back to World War I. In the earliest days of that war, pilots from opposing sides mostly ignored one another on chance encounters in the air. Later, they armed their airplanes with machine guns, but soon they discovered that it was very difficult to hit a high-speed target from a moving platform. We can readily visualize one of the more creative individuals among them reflecting on the problem: "If I were to attack from dead astern, the enemy pilot would be far less liable to see me approach and there would be no deflection, no relative motion of the target in my sights, so it ought to be easier to make a kill with fewer shots." This mental image or concept in the reflective pilot's mind is a hypothesis—a conjectural conception to be proved true or false by trial and error.

In contrast to a concept, what is doctrine? Doctrine is what is being taught, i.e., rules or procedures drawn by competent authority. Doctrines are precepts, guides to action, and suggested methods for solving problems or attaining desired results.

Clearly, there is a marked difference between concepts and doctrines. Concepts spring from creative imagination. A perceptive observer draws an inference from one or more observed facts. An individual observes the springiness in a bent bough and infers that the thrust might be capable of projecting a missile; eventually, this initial conception, this tentative idea, leads to the bow and arrow—a major advance in the weaponry of mankind. So, too, the World War I pilot who first thought of attacking from dead astern came up with an innovative idea, a hypothesis. In each instance, the concept or hypothesis had to be tried in practice to confirm or confute the inference drawn by the reflective observer.

Doctrine, on the other hand, is an officially approved teaching based on accumulated experience. Numerous recorded instances have led to a generalization. To generalize is to infer inductively a common pattern from repeated experiences that have produced the same or similar results. In World War I, as more and more pilots tried attacking from above, astern, and out of the sun, they found the probability of making a kill tended to rise rapidly. On the basis of such experiences, reinforced by repetition, those who instructed neophyte pilots generalized this common pattern of attack into informal doctrine. Eventually, this informal doctrine appeared in manuals bearing the official imprimatur as formal doctrine.

Whereas a concept is a hypothesis or an inference which suggests that a proposed pattern of behavior *may possibly* lead to a desired result, a doctrine is a generalization based on sufficient evidence to suggest that a given pattern of behavior *will probably* lead to the desired result. While a concept is tentative and speculative, a doctrine is more assured. Doc-

	Concept	Doctrine	Principle
Definition	Hypothesis; an innovative idea; a tentative conceptualization; a debatable proposal	Precept; an authoritative rule; a method officially taught; a maxim for action	Axiom; an epitome or essence
Colloquial Definition	Trial and error	Tried and true	Self-evident truth
Derivation	By inference from individual observation	By generalization through study of recorded accumulated experience	By abstraction through heuristic analysis of individual instances
End Sought	To propose an innovation or to modify existing practice	To establish procedures for optimum performance	To inform for better understanding (never directive, only illuminating)
Authorship	Any perceptive observer who formulates and publishes his conceptualization	Designated staff officers at the behest of command	Military scholars
Authority	Unofficial; on individual initiative; informal	Official; by the weight of the evidence systematically studied; authenticated by fiat and imprimatur	Validated only by long use and widespread acceptance
Style	Argumentative, persuasive	Prescriptive, didactic, affirmative	Declaratory, expositive
Characteristic Format	Journal article or staff study	Regulation or manual	Word or phrase
Measure of Effectiveness	Extent to which it stimulates thought	Extent to which promulgated doctrine is applied with success in actual practice	Extent to which it facilitates and illuminates the decision-making process

trines are akin to rules, precepts or maxims, or a set of operations or moves reduced to more or less uniform procedures for meeting specific types of problems. Of course, in actual military practice, no hard and fast rules or maxims can be followed slavishly and mechanically in every instance with complete assurance that the anticipated and desired result will ineluctably follow. Because there are so many variables and imponderables in any military situation, doctrines must never be regarded as absolutes. Perhaps the best definition holds doctrine as that mode of approach which repeated experience has shown *usually* works best.

Just as concepts are not to be confused with doctrines, so, too, doctrines must be distin-

guished from principles. Principles, as Aristotle pointed out long ago, are truths that are evident and general. One can lay down a rule somewhat arbitrarily, based on observed experience: "When attacking, come out of the sun." On the other hand, one cannot lay down a principle arbitrarily; one can only declare it. Rules, and hence doctrines, are within the power of properly constituted military authority; principles are not.

Whereas doctrines are derived by generalization (taking many cases and finding the common pattern), principles are derived by abstraction. Abstraction involves taking a single instance and distilling out its essence. The essence or epitome is that part which typically

represents the whole. For this reason, principles are commonly expressed as axioms. Axioms are universally accepted self-evident truths.

The principles of war, or more accurately, the principles of battle, rest on close study of individual engagements. The process of abstraction has been carried to the point where such single words or brief phrases as *surprise*, *concentration*, *initiative*, or *economy of force* epitomize the principles discerned in the mass of detail. With doctrine, the thrust is on "how to do it." With principle, on the other hand, the thrust is to explain the underlying idea.

What, one may ask, is the principle of battle involved in the doctrinal injunction to attack from high astern and out of the sun? From astern, one's approach not only avoids a deflection shot but is less likely to be observed because of the limitations that human anatomy imposes on the craning neck of a pilot scanning the sky for potential enemies. Approaching from out of the sun further reduces the

probability of being detected. By approaching from high above, the attacker acquires added acceleration from his dive, giving a margin of advantage by shortening the time of closing. But all of these factors are but means to an end. The essential principle involved is surprise. The attacker seeks to catch his prey unawares. Modern electronic means may alter the doctrine and suggest new patterns of attack, but the principle will remain unchanged. More than one principle could be involved in any single situation, but for purposes of illustration we need consider here only the principle of surprise.

BECAUSE *concepts*, *doctrines*, and *principles* are very different terms, they should not be used interchangeably. To simplify the task of mastering these words, the ideas explicated are presented in synoptic fashion in the chart.

Duke University
Durham, North Carolina

Notes

1. Brigadier General J. D. Hittle, USMC, *Jomini and His Summary of the Art of War* (Harrisburg, Pennsylvania: Military Service

Publishing Company, 1958), p. 10.
2. Editions of 1949 and 1979.

PROBLEMS OF THE THINKING MAN IN UNIFORM

DR. RUSSELL F. WEIGLEY

APPROACHING the task of reviewing I. B. Holley's fine biography of Brigadier General John M. Palmer, I first contemplated tying my reflections to the general's association with a future Air Force chief of staff. (Thomas D. White, then a lieutenant of infantry, was Palmer's aide for a time in the 1920s.) Later, I

considered emphasizing the Air Force credentials of the author of the biography (I. B. Holley, Jr., retired from the Air Force Reserve in 1981 as a major general, in addition to having earned distinction as a military historian at Duke University). The reason for my groping in search of a theme lay in the difficulty of

finding current relevance in General Palmer's main ideas, together with my reluctance to inject even a hint of negative note about the biography of so admirable a soldier as Palmer, written by so able a historian as Holley.†

General Palmer graduated from West Point in 1892, served in China and the Philippines, gradually became involved in the pre-World War I movement to reform the Army, served on General John J. Pershing's staff and as a brigade commander in combat in World War I, and then emerged between the world wars as the leading advocate of universal military training to provide the foundation for a democratic army of citizen-soldiers. He was a principal architect of the National Defense Act of 1920; and recalled from retirement by Chief of Staff General George C. Marshall in World War II, he wrote War Department Circular 347, the basic statement of the 1940s campaign for universal military training. And in all these activities and achievements, Palmer was an admirable soldier in every way—in dedication, energy, concern for the welfare of those who served under him, concern for the improvement of the Army, and loyalty to his country and its ideals.

In his principal role as a reform-minded military intellectual, Palmer well merited Professor Holley's judgment that he was "more profound and more important than Emory Upton, though less visible than Alfred Thayer Mahan." (p. 721) Palmer's military thought began with the proposition that the army of a democracy must be an army imbued with democratic values. With that principle in mind, Palmer became the inveterate military opponent of Emory Upton's contentions that democracy and effective mobilization of military power are incompatible, and that, accordingly, democracy must be diluted in whatever measure is necessary to generate adequate military power.

(Unhappily, however profound and important Palmer's basic convictions and principal ideas may have been, his ideas seem attuned and proper for his own time, but not for ours.)

Palmer's method of forming the army of a democracy was to start with universal military training. He emphasized the word *training*, not service. All young men (except those obviously physically or mentally unfit) were to receive military training; but in peacetime, they were not to serve in the military forces, where they might become indoctrinated into the attitudes and values of Uptonian military professionals. Instead, the trainees were to remain civilian citizens. By implication, therefore, as many as possible of those who administered the training were also to be nonprofessionals, i.e., part-time soldiers who remained essentially citizens. In fact, Palmer insisted that advancement to the highest ranks in the military services was to be open to any citizen of appropriate ability who was willing to devote whatever extra time was required for the study and experience necessary for such advancement—always, however, remaining essentially citizens rather than soldiers. If the armed forces, even to their highest ranks, were filled mainly by citizens, Palmer believed, the dividing line between the civilian and the military would blur and fade. Thus, problems of civil-military relations would fade also and the armed forces would reflect the true character of our nation. The army of a democracy should be almost completely an army of citizen-soldiers.

The trouble with this plan, as Palmer's astute citizen-soldier biographer recognizes, is that it did not pay much attention to the growing complexity of twentieth-century military activities and especially of modern, increasingly sophisticated military technology. Palmer

†I. B. Holley, Jr., *General John M. Palmer, Citizen Soldiers, and the Army of a Democracy* (Westport, Connecticut, and London, England: Greenwood Press, 1982, \$35.00), 726 pages.

flew in an airplane across enemy lines while visiting the Italian front in World War I, yet his military thought included no attention to developing and maintaining aviators' skills. That neglect might be partially excused if we remember that he was a ground soldier—but he paid no attention to the tank either. All through World War II and all through his post-World War II leadership in advocating universal military training, Palmer's conception of the Army remained that of the World War I Army. He thought in terms of a force composed primarily of infantry that did not change over time. Sadly, his unwillingness and inability to adapt to changes undermined his credibility eventually, despite his admirable personal qualities and his admirable dedication to democratic values.

It was characteristic of General Palmer that although he found the model for his citizen-soldier system in Switzerland, his preoccupation with general principles (rather than practical details) was such that he never visited Switzerland to observe its army firsthand. If he had, said Colonel Henri Le Comte, a Swiss officer who attended West Point with him, he would have been less enthusiastic about his model.

However, the value of Holley's biography does not depend on the practicality of Palmer's ideas. The book is a life-and-times kind of biography, and it offers much about the larger history of the Army during Palmer's long service. Holley's account of Palmer's campaign for a single promotion list throughout the Army, one of his early reform efforts, offers insights into military politics and military conservatism that are still pertinent today.

Another major issue of controversy that Holley explores (beyond Palmer's plan for a citizens' army) is that of the responsibilities of an officer who dissents from the official policies of his military and civilian superiors. How can such an officer appropriately express what his conscience demands while still adhering to the essentials of both military discipline and civil-

ian control? Palmer had to face this latter issue most pointedly during the debates over post-World War I military legislation that led eventually to the Defense Act of 1920. Chief of Staff General Peyton C. March expected his subordinates to adhere rigidly to the plan that he himself was proposing to Congress. Supported by the Secretary of War, March favored an Uptonian scheme for an expansible regular army large enough in peacetime that its cadres could absorb and dominate any wartime expansion through conscription. In March's view, any system of peacetime training must be wholly under the control of the professionals. Having spent at least a decade thinking about the problems of an army in a democracy, Palmer was set against General March's plan for a variety of reasons. These ranged from matters simply of expediency (e.g., Congress was altogether unlikely to approve a peacetime army large enough to form the complete skeleton of a war army) to matters of fundamental principle (i.e., Palmer's conviction that in a democracy the division between citizen and soldier must be erased, and that accordingly, professional soldiers must never monopolize command and control either of citizen trainees or of the nation's military policy).

Awareness that General Palmer's convictions differed from those of General March seeped out of the private circle of Palmer's friends into the halls of Congress. This awareness soon made it inevitable that congressmen dissatisfied with March's Uptonian ideas would call Palmer to testify before Congress on the military issues of the day. When the summons from Congress came, what was Palmer to do? Should he refuse to state his dissent publicly? Should he resign his commission rather than suppress his own convictions (the most frequently recommended course of action when similar issues arose during the Vietnam War)? If he did not resign but nevertheless gave voice to his dissent, what were the implications for military discipline? For civilian control (since the War Department supported March)? For Palmer's

own career? Palmer considered all the aspects of his problem carefully before he decided that his duty lay in public dissent. Biographer Holley considers the difficulties carefully also. Any conscientious officer will profit from pondering Palmer's thoughts and example.

In addition to carrying his convictions to Congress, Palmer decided to campaign for his idea of a democratic army also in writings addressed to both soldiers and the public, particularly through a series of books that remain his principal monument. These books include *Washington, Lincoln, Wilson: Three War Statesmen* (1930), *General Von Steuben* (1937), and most notably, *America in Arms: The Experience of the United States with Military Organization* (1941). In addition, Palmer hoped to complete an autobiography that would be, in large part, yet another call for a citizens' army. The first twenty-four chapters of Holley's biography (relating Palmer's story through his arrival in Paris in 1917 as a member of General Pershing's staff) are essentially Palmer's own work—the completed portion of the autobiography—although Holley had to rework all but the first ten chapters to some extent. When it became apparent that he might not finish his memoirs, Palmer arranged for his literary executor to transfer the manuscript and working materials to an appropriate writer who would complete his life's story. Holley became that writer.

Holley has been skillful in knitting the different parts of the book together. Palmer's chapters retain the clear, direct, if somewhat

old-fashioned, prose style that made his polemical works persuasive. Holley's chapters are documented (while Palmer's reminiscences are not) and are also critically analytical, yet somehow they maintain much of the tone of the early chapters, continuing to reflect Palmer's personality much as the general himself had expressed it. If the details of Palmer's efforts to influence legislation sometimes grow tedious in Holley's recounting, the personal notes provide a lighter touch and hasten the narrative along. Thus, we glimpse Palmer as a flesh-and-blood man in his move during retirement to an old New Hampshire farm, his incorrigibly inept struggles to improve his personal finances, his minor and playful evasions of his wife's ban on alcoholic beverages, and other aspects of his life.

THIS BOOK is important to those concerned with the history of the Army and U.S. military policy, yet it is also a pleasure to read. Modern-day disillusionment with the practicability of Palmer's citizen-army ideas should not obscure the book's importance. As Holley concludes: "Gen. John McAuley Palmer's great contribution was a challenge to posterity. However much the particulars might change over time, he knew that one constant would remain: if the nation wished to stay free, it must contrive military institutions suited to the genius of a democratic people." (p. 721)

Temple University
Philadelphia



JOHNNY REB AND BILLY YANK: CULTURE AND TACTICS IN THE CIVIL WAR

DR. JOHN F. GUILMARTIN

TECHNICAL SERGEANT KLAUS J. SCHIFFLER, USAFR

THE American Civil War has been played and replayed many times during the nearly 120 years since its final battles were fought. Biographies of Civil War generals, accounts of the battles, and analyses of causes and effects would fill many a bookshelf, offering military historians much food for thought.

Nor has scholarly interest in the Civil War waned in recent years. *Attack and Die*, by Grady McWhiney and Perry D. Jamieson, is a recent and noteworthy example.† An innovative thesis, coupled with the authors' remarkably comprehensive research effort, marks *Attack and Die* as an important work worth reading. The thesis—that the tactics of the Confederate armies in the American Civil War were self-defeating, sacrificial in nature, and linked

to the South's Celtic cultural heritage—will be (indeed, is being) hotly disputed. Many Southern historians will question the soundness of the authors' cultural arguments, contending instead that the presumed link between Scottish and Irish culture and that of the antebellum South is far from proved and, in fact, of dubious significance. Many military historians, these reviewers included, will take issue with the authors' unflattering assessment of Confederate tactics. Nevertheless, *Attack and Die* is a searching and penetrating historical analyses of military tactics. Regardless of their opinions about the authors' conclusions, thoughtful military historians must concede that in taking a fresh approach to a number of issues that lie at the heart of the study of mili-

†Grady McWhiney and Perry D. Jamieson, *Attack and Die: Civil War Military Tactics and the Southern Heritage* (Tuscaloosa: University of Alabama Press, 1982, \$17.95), 209 pages.

tary history, McWhiney and Jamieson force the rethinking of many standard assumptions.

Attack and Die consists of three interconnected parts. First, and of great value in its own right, is an impressive analysis of Civil War tactical theory and practice—so thorough, in fact, that it is unlikely to be supplanted for many years to come. Making extensive use of letters and other contemporary memoir material as well as published sources, the authors delineate the doctrinal background clearly and explain the relationship between tactics and the weapons and human resources called on to execute them. They argue convincingly for the importance of the Mexican War experience in shaping the tactical ideas of key leaders on both the Northern and Southern sides. Covering contemporary tactical literature exhaustively, McWhiney and Jamieson offer a supporting bibliography for this section that is worth the price of the book in itself.

In the second section, the authors use an extensive, battle-by-battle, statistical analysis to buttress their argument that the South's tactics were self-defeating. Here, their case is less firm. While the exhaustive tabular breakdown of losses by side, commander, and battle is valuable in its own right, the conclusion that the proportionately higher Confederate losses are indicative of serious tactical deficiencies seems debatable at best. McWhiney and Jamieson contend, in sum, that the casualty imbalance was the product of a Confederate predisposition to bayonet charges given the slightest excuse: the book's title is a neat encapsulation of the argument.

While not questioning the innate aggressiveness of most Confederate units, one could argue, with considerable factual support, that the imbalance was primarily an unavoidable consequence of being outnumbered. Since Confederate armies ordinarily fought at a numerical disadvantage, a higher proportion of Confederate troops tended to come into contact with the enemy. This was partly the result of deliberate Southern calculation but was also

due to the simple geometry and arithmetic of the thing. Weapons on the two sides were more or less equal, and the outnumbered Southern troops *had* to fight more often and in more places.

Close analysis of the Chancellorsville campaign—as described in John Bigelow's *The Campaign of Chancellorsville* (New Haven, 1910) and Vincent Esposito's *The West Point Atlas of the American Wars* (New York, 1959)—confirms this hypothesis for at least one pivotal battle. Robert E. Lee, whose Army of Northern Virginia was outnumbered more than two to one by Joseph Hooker's Army of the Potomac, was consistently successful in bringing a higher proportion of his force into contact than his Union opponent. As Jackson's counterattack on Hooker's right flank struck home—the crucial point of the battle—no less than 84 percent of Lee's army was in contact, as opposed to only 53 percent of the Union force. The resultant Confederate numerical superiority at the decisive time and place decided the battle and the campaign. Hooker was never able to bring more than some 67 percent of his force into contact, at which time the Confederate figure was 77 percent.

Viewed from this perspective, proportionately higher Confederate losses were an unavoidable by-product of the tactical skill and aggressiveness needed to fight outnumbered and win. At Chancellorsville as elsewhere, the alternative of waiting passively for the Union forces to deploy their full strength was plainly unacceptable. To endure strategically, the South had to be victorious tactically; to triumph tactically against a more numerous and better supplied opponent, the Confederate forces had to be tactically aggressive. Lee's victory at Chancellorsville bought the Confederacy precious time; the fact that he lost 18.7 percent of his force while Hooker lost 11.7 percent tells us little about Confederate generalship or tactics.

The South's manpower pool was eventually bled white, and the persistent aggressiveness of Confederate soldiers no doubt played a role in

the bleeding. However, the South ultimately lost the war due at least as much to logistical inadequacies as to the exhaustion of its fighting manpower.

The final section of *Attack and Die* is an analysis of the presumed cultural determinants of Southern tactics. In many ways, it is the most provocative and least satisfying of the three parts. It is provocative because common sense and the historical record suggest that there is an important kernel of truth in the authors' thesis, which, if fully developed and tested, might tell us something of value about troop morale and motivation under fire. It is unsatisfying because the thesis is not fully developed.

AS REVIEWERS, we are not competent to assess the adequacy of the evidence that McWhiney and Jamieson muster to support their claim of cultural continuity between the Celtic nations of Europe and the Old South. However, it does seem apparent that the mechanics of primary military group morale and motivation in the Confederate forces had a distinctive style. That style, whatever its cultural origins, was quite different from that of the Union forces and, at least in general terms, fits McWhiney and Jamieson's typology.

Indeed, in tracing the difference between Union and Confederate attitudes in this area, one finds a pattern that has repeated itself in other times and places. The Southerner possessed a code of military honor that emphasized individual daring; his battle cry was a high yipping sound; and his military music was light and often humorous—typically a solo tenor voice with musical accompaniment. In contrast, the Northerner's code emphasized steadiness and loyalty to the group; his battle cry was a low

grumbling sound that rose, not so much from individual throats, as from whole companies and regiments; and his music was baritone, serious, and choral. The contrast between "The Battle Hymn of the Republic" and "John Brown's Body," on the one hand, and "Dixie" and "The Yellow Rose of Texas," on the other, makes the point. The Confederate soldier drank whiskey as the military beverage of preference; the Union soldier drank beer.

In this, there is an idea that should be pursued. Though the point could be easily pushed too far, it is intriguing to observe similar patterns elsewhere. The whiskey-drinking Scottish Highlander, for instance, fits the former pattern with surprising accuracy; so does the tequila-drinking soldiery of the Mexican Revolution, right down to the humorous, self-deprecating content of the music. German soldiers of whatever period, from the sixteenth-century Landsknecht to the troops of today's Bundeswehr, would seem to fit the latter pattern; so would the Welsh regiments of the British Army and the French Foreign Legion.

Comparative exercises of this sort can produce interesting hypotheses, yet our current knowledge of the culture-specific mechanisms of primary military group cohesion is simply too scant and too disorganized to support them. Further study is indeed warranted. It is clear, however, that the mechanisms in question are culture-specific and that they are a crucial determinant of effectiveness in battle. Whether or not we agree with the thesis of *Attack and Die* in whole or in part, we are indebted to McWhiney and Jamieson for focusing our attention on the issues in question.

Rice University
Houston, Texas
and
Salt Lake City, Utah

POTPOURRI

Caveat: Realism, Reagan, and Foreign Policy by Alexander M. Haig, Jr. New York: Macmillan, 1984, 367 pages, \$17.95.

"As Secretary of State, I was mortally handicapped by lack of access to President Reagan." So concludes Alexander Haig's fascinating chronicle of his eighteen-month quest as Secretary of State to centralize the formulation and execution of Reagan administration foreign policy under his leadership. It is difficult to read this book, or to have met Mr. Haig, and not come away impressed with the man. He was, after all, one of the few foreign policy professionals to populate the top ranks of the Reagan foreign policy and national security policy apparatus. Not a man known for his humility, Haig nevertheless had a well-deserved reputation based on experience and service in foreign affairs and as a military commander. Even his detractors acknowledged Haig's capacity.

The acidic, junior senator from Massachusetts, Paul E. Tsongas, told the retired general at his confirmation hearings: "You will dominate this administration." Haig did not dominate the administration, nor did he get the centralization of foreign policy which, he argues, the President promised him. Haig says that although he had a "compact" with Reagan even before the administration took office, it was sabotaged by Reagan's troika of powerful White House aides (none of whom had foreign policy experience): Edwin Meese, then Counselor to the President; James Baker, White House Chief of Staff; and Baker's deputy and media manipulator, Michael Deaver. It went so far, in Haig's words, that "Ed Meese and his colleagues perceived their rank in the administration as being superior to that of any member of the cabinet."

Of course, there were (and continue to be) serious substantive disagreements on foreign policy within the Reagan administration. In these debates, Haig was one of many competing voices, with President Reagan usually taking a "wait and see" attitude as the debates rolled back and forth. For example, Haig wanted a very hard line on Cuban and Soviet activities in Central America. However, Secretary of Defense Caspar Weinberger was more dovish, wanting first to arrest the overall deterioration in U.S. defenses that he believed had resulted from the Carter years. In regard to U.S. policy toward China, Haig wanted a strategic consensus with the PRC. But Reagan was more sympathetic to Taiwan—a country with less than 2 percent of the mainland's population. Writes Haig: "The President was slow if not unable to see merit in my views More than any other thing that happened in the eighteen months that I was Secretary of State, the China question convinced me that Reagan's world view was different from my own, and that I could not serve him and my convictions at the same time." Other issues and disagreements are detailed: the AWACs sale to Saudi Arabia, the squabbles within NATO over the trans-Siberian pipeline, and others. However, the most compelling chapter covers the Falk-

lands/Malvinas War and Haig's gruelling shuttle between London and Buenos Aires—a difficult challenge that ultimately would prove politically fatal for Haig. At the onset, Haig predicted to his wife that if his mission failed, his enemies in the administration would make him the scapegoat. He believes that they succeeded.

Finally, despite Mr. Haig's repeated and effusive praise for President Reagan, *Caveat* is a clear indictment of Reagan's decision-making style and his inexperience in foreign affairs. Open to our view is an absorbing account of a President who would not manage his own foreign policy, of aggressive White House aides who filled the vacuum, and of a Secretary of State who lost his struggle to recreate in the Reagan administration something comparable to the disciplined and elitist Nixon-Kissinger foreign policy structure. Haig's final verdict on Reagan is both kind and revealing of his disappointment: "All Presidents learn as they serve; the office itself, unique and mysterious, is the only possible teacher Like all good Presidents, [Reagan] has learned much, and he has learned it before it is too late to apply the lessons." But, concludes Haig, "especially in the conduct of foreign policy, President Reagan has accepted flawed results. This did not have to be."

Dr. Lawrence E. Grinter
Air Command and Staff College
Maxwell AFB, Alabama

Dead Ends: American Foreign Policy in the New Cold War by Stanley Hoffmann. Cambridge, Massachusetts: Ballinger, 1983, 312 pages, \$24.50.

Stanley Hoffmann's latest book on the contemporary international political system and U.S. foreign policy reconfirms his reputation as one of America's leading political analysts. This lucid and well-written collection of essays offers an especially trenchant critique of our foreign policy during the Nixon, Carter, and Reagan administrations (curiously omitting the Ford administration).

Harvard scholar Hoffmann sees a mounting crisis developing from current U.S. foreign policies. He attacks Reaganism as reflecting a simplistic fundamentalism, out of step with the new complexities of international relations. In a world dominated by nationalism, revolution, unlimited Soviet-American competition, and brutal actions by self-interested states, Reagan's stress on military power ignores its limited utility in international politics and discounts America's great economic and technical powers and diplomatic possibilities. Excessive fear of communism nails the United States to the status quo in a changing world.

While acknowledging a relentless Soviet attempt at achieving equality with the United States, Hoffmann also astutely perceives Soviet weaknesses in control of Eastern Europe, lack of permanent control over distant clients, and

serious internal political and economic rigidities. He stresses the Soviets' fear of encirclement and their lack of a master plan for political action. He calls for a complex, mixed strategy of competition in the military arena accompanied by cooperation in arms control, trade, and definition of the rules of the game in various areas of the contest.

Dead Ends does suffer from some serious faults. Consisting of a series of essays on current topics written over a period of four years, the book lacks an integrated core and tends to repeat certain themes incessantly. There is a dated quality to essays that speak of the excessive power of OPEC or wonder what Reagan will do when he becomes President. One yearns for Hoffmann to have used these essays as a basis for an entirely new book.

Also, Hoffmann is stronger on analysis than prescription. His idealist remedies and strong praise for the Carter administration sound like a call for "Carterism" without Carter. His proposals for a redistribution of resources from North to South, elimination of land-based ICBMs, an informal Western directorate, dissociation from repressive regimes, and a mental revolution in U.S. foreign policy thinking sound dated and unrealistic in the current climate of international relations.

Furthermore, his eclectic idealism is matched by obsessions about both Henry Kissinger and Israel (at one point, he even links the two). Why are two whole chapters necessary on the Kissinger era, and more than fifty references to Israel (more than for NATO)? Why this endless berating of Kissinger, who, after all, did have some strong foreign policy accomplishments (SALT I, opening to China, leading Egypt out of the Soviet camp), and Israel, which still remains America's strongest ally in the Middle East?

Overall, though, the virtues of this work far outweigh its idiosyncratic failings. *Dead Ends* is highly recommended.

Dr. Jonathan R. Adelman
University of Denver, Colorado

The Future of Conflict in the 1980s edited by William J. Taylor, Jr., and Steven A. Maaranen. Lexington, Massachusetts: Lexington Books, 1982, 504 pages, \$39.95.

Conflict in this decade will consist of low-intensity, limited struggles in the Third World—all of which will affect U.S. interests, and most of which will involve U.S.-Soviet competition. Or so the editors and the twenty-seven contributors to this rather breathtaking collection of articles conclude. As David Abshire points out in the Foreword, the rationale for *The Future of Conflict* is the assumption that through the recognition of problems facing the United States in this decade, solutions may be formulated. Disregarding the fact that not all policy analysts would agree that such optimism is warranted, such an enterprise is a worthy one that hopefully will stretch the perspectives of policymakers and defense professionals sufficiently so that planning might begin for the forecasts and scenarios the authors provide.

The book grew out of the 1981 Future of Conflict Conference held by Georgetown University's Center for Stra-

tegic and International Studies. It consists of four parts, twenty-one chapters, ten related scenarios, and a conclusion by the editors. In Part I, James R. Schlesinger and Robert W. Komer suggest the broad security and organizational challenges that lie ahead for U.S. policymakers. Part II addresses issues likely to exacerbate conflict, and Part III considers various forms of military operations used in low-intensity struggles. These three parts are uneven, with only some of the contributors providing reasonably complete and imaginative assessments. Among the better chapters is Michael Moodie's excellent piece on arms transfers, which not only recognizes the complexity that policymakers face in deciding on arms sales but also offers them several guidelines for determining U.S. policy. Equally worthwhile are Rodney W. Jones's chapter on nuclear-weapons proliferation and Michael C. Ryan's imaginative effort to distill lessons from failed U.S. rescue operations in the 1970s.

In Part IV (clearly the best part of the book), six chapters survey regional trends in the developing world and the prospects for conflict. After M. Thomas Davis reviews developments and forecasts tensions in the Middle East, three separate chapters focus on Asia: Jones considers Southwest Asia, W. Scott Thompson addresses Southeast Asia, and Gerrit W. Gong contemplates Northeast Asia. Robert S. Leiken and Jack Child look at Central America, and Bruce S. Arlinghaus and David S. Albright discuss Africa.

In the final chapter, editors Taylor and Maaranen conclude that small, special-purpose forces are of greater utility to contend with low-intensity conflict than existing general-purpose forces. They also recommend developing a corps of political-military technicians with language skills and area expertise to assist these forces in their missions. The authors propose three strategies for employing such forces: deterrence, preemption, and reaction. Deterrence through propaganda and threats to proxy states is preferred. Preemption includes psychological operations, economic and military assistance, and, finally, commitment of U.S. forces. The least preferred strategy is reaction to proxy- or indigenous-force initiatives.

The scenarios accompanying many of the assessments in Parts III and IV vary widely in breadth and quality. Some are very specific, such as psychological operations used by NATO forces to deceive Soviet forces that have attacked through the Fulda Gap. Others, such as the scenarios covering Caribbean Basin conflicts and the Nordic states during the 1980s, include developments in entire regions over a period of several years. Still others include space mines, magic beams, and bombs that squeak. As much as one might wish to dismiss some of these scenarios as outlandish, developments in the postwar world seem at least as bizarre—particularly if one could look at these developments through the eyes of even a sophisticated American in the 1930s.

The realists who contributed to this book share a conviction that Soviet involvements in the less-developed regions of the world have promoted, exacerbated, and, in some cases, created regional instability. Furthermore, these realists see conflict everywhere, as perhaps well they should. Their pessimism reflects the continued inability of political and policy scientists to forecast the prospects for conflict or cooperation in international affairs. However much

one might wish for a companion piece titled "The Future of Cooperation in the 1980s," forecasting from the extended list of small wars and conflicts in the last two decades would make such a volume a slim one indeed.

Lieutenant Colonel Wallace Earl Walker, USA
United States Military Academy
West Point, New York

The New High Ground: Strategies and Weapons of Space-Age War by Thomas Karas. New York: Simon and Schuster, 1983, 224 pages, \$14.95.

In *The New High Ground*, Dr. Thomas Karas examines existing military efforts in space, describes emerging space systems, and attempts to assess what he sees as an extension of the arms race and military conflict into the medium of space. Specifically, it is his thesis that "although it is indeed time that we recognize the military usefulness of space technology, we need also to understand that space power is not going to provide us with a military superiority that will solve all of our problems—any more than airpower did before it."

Background material is provided in the introduction and the first two chapters. Karas describes the view of numerous Air Force officers about space (prompting him to classify the officers as "spacemen"), explains how the Air Force is organized for its role in space, and assesses the involvement of the aerospace industry in existing and projected space efforts. The first serious shortcoming of the book begins in this section, as Karas presents a Rockwell International proposal for a U.S. national space policy that potentially could give "the United States military superiority over the Soviet Union." Later, Karas attacks this straw man as if it were already U.S. governmental policy.

In the central chapters of the book, Karas nicely brings together most of the space systems used for reconnaissance and surveillance, C³, navigation, and weather forecasting. The systems descriptions and the explanations of system functions provided present the reader with a comprehensive overview of these important space systems. This section, however, is marred by Karas's unproven assertions that improvements in secure C³, warning sensors, and other systems make conflict more, rather than less, likely. Gross distortions also are evident. For example, the author's description of 1955 disarmament negotiations (pp. 92-98) is considerably at odds with other generally accepted accounts (see, for comparison, Glenn T. Seaborg, *Kennedy, Khrushchev, and the Test Ban*, pp. 5-6).

In the final chapters, Karas outlines the risks associated with increased military involvement in space and makes persuasive arguments for arms control. But after providing us with good descriptions of U.S. and Soviet antisatellite (ASAT) systems, Karas laments their existence by arguing that "there is not much point in building up our own anti-satellite forces unless we are planning to strike first. The reason is that most or all of the earth-based men and equipment we would need to carry out anti-satellite weapon attacks will be lost to enemy nuclear missile attacks in the first fifteen minutes or half hour of the war." So much

for his understanding of war and military strategy! By applying his thinking to an earlier time, one would conclude that the British were stupid to build radars and Spitfires because of the widely accepted belief that "the bombers will get through."

Perhaps the greatest strength of the book is that it cautions us about the extent to which the United States relies on new technology for space systems. The issue is important for two reasons. First, all too often military officers function under the illusion that technology and military strategy are simply reverse sides of the same coin—a misconception that is far from the truth. Second, the new space systems would be added to an already vast array of combat supporting systems that have not been tested in actual conflict, and thus combat reliability would remain a matter of speculation. Given their potential war-fighting role, however, one needs to ask at what point we should undertake a comprehensive reassessment of our technological reliance on space systems.

In the epilogue, Karas offers several theses that he believes should form the basis for a national debate on U.S. space policy. His theses raise tremendously important issues that require our serious attention, but it is unfortunate that he did not offer persuasive arguments to support them.

Dr. Thomas A. Fabyanic
University of South Florida, Tampa

Waiting For an Army to Die: The Tragedy of Agent Orange by Fred A. Wilcox. New York: Random House, 1983, 222 pages, \$6.95 paper.

A growing body of current literature probes the problems faced by Vietnam veterans who were exposed to Agent Orange and other herbicides. Former antiwar activist Fred A. Wilcox presents a compelling and disturbing account of the long-term side effects caused by these chemicals and the lack of adequate government response. Wilcox calls attention to serious problems and raises legitimate concerns, but his scholarship is questionable.

Between 1965 and 1971, the Air Force's Operation Ranch Hand sprayed 12 million gallons of Agent Orange over approximately 4.5 million acres of South Vietnam. An undetermined number of U.S. military personnel were exposed to the chemical. Although the manufacturers assured the government that the herbicide was safe, it was actually highly contaminated with dioxin, an extremely toxic compound that can be stored in the body's fatty tissue. Wilcox charges that many of the men who came into contact with Agent Orange have developed serious physical complications from their exposure. Their symptoms include depression, severe gastritis, acute liver disease, skin rashes, headaches, memory loss, and high rates of bladder and testicular cancer. Their wives experience frequent miscarriages, and many of their children suffer multiple birth defects. Yet the Veterans Administration has denigrated these problems or labeled them psychosomatic, rejected disability claims, and failed (despite congressional mandate) to initiate necessary research.

Wilcox supports his allegations by interviewing: (1) a select group of U.S. and Australian veterans; (2) Victor Yannaconne, the lawyer representing veterans in a class action suit against the suppliers of the controversial herbicides; (3) Dr. Ronald A. Codario, a physician who has worked extensively with veterans exposed to herbicides; and (4) Dr. Wilbur McNulty, an expert on the effects of dioxin on rhesus monkeys. On the surface, *Waiting For an Army to Die* makes a damning argument; but the reader must remember that much of the evidence is anecdotal. Only seldom does Wilcox provide medical substantiation for his conclusions.

The author rejects the preliminary results of an Air Force study of 1269 former Ranch Hand personnel, which found no long-term effects from the exposure. Wilcox argues that the study was invalid because Ranch Hand personnel, no matter how much herbicide they contacted daily, washed thoroughly at the end of the day. Troops in the field, in contrast, were unable to wash during long-term exposure, and often they ingested contaminated food and water.

This is a moving book. No one can fail to be touched by the plight of the men Wilcox interviewed. But the exacting scientific research needed to substantiate his claims is just beginning. While his indictment of unresponsive bureaucratic inertia appears to be justified, one must also acknowledge that Congress is beginning to recognize some of the most severe herbicide cases and to order compensation. *Waiting For an Army to Die* is worth reading, but the reader should approach it with caution.

Jeanette R. Dunn
Spartanburg, South Carolina

Crossroads of Modern Warfare by Drew Middleton. Garden City, New York: Doubleday & Company, 1983, 320 pages, \$17.95.

Evidently intended for the general reader, *Crossroads of Modern Warfare* provides sixteen essays about such often-discussed battles as Tsushima, Midway, and Dien Bien Phu. Despite the title, Drew Middleton does not really explain what accounts for decisiveness, what constitutes modernity, or even precisely what one means by *crossroads*. Middleton refers to these last as either "turning points . . . which thus altered the course of history" or battles that "introduced or exploited a new technology in warfare and, consequently, changed the nature of war." (p. v) Raising a straw man, he alleges that historians typically "consider a battle decisive because of the number of men involved," citing interest in Gettysburg as an example. Thus, Middleton seems to equate romantic curiosity about a battle and the possible mythic importance of the encounter with a presumption of the battle's specific significance for military art and science. Moreover, in using an alteration in the course of history in general (rather than military history in particular) as the test of "turning points," the author fails to clarify the comparative role of new technology and tactics versus enduring human factors, such as initiative.

In the various chapters, diverse meanings for *decisive* are suggested or implied. The treatment of Jutland suggests

that battle losses do not necessarily reveal the decision produced by an engagement and that tactical advantage gained can coexist with strategic defeat. Focused on the dawn of mechanization and motorization in ground warfare, the account of Cambrai reveals that a battle can have significant implications even when it lacks intrinsic importance in determining the outcome of a war. The decisiveness imputed to the Battle of Britain, on the other hand, rests on Hitler's indefinite suspension of plans to invade Britain, while its special distinctiveness lies in being "the first decisive battle of history to be fought in the air." (p. 84) The complexity of decisiveness makes the use of the term a somewhat evasive convenience.

Still, *Crossroads* is not without worth and usefulness. For the general reader, it offers readable, accessible, and potentially thought-provoking stories about some absorbing events. What thoughts are provoked will vary according to the reader's expertise on each subject. Middleton's ambivalent assessment of MacArthur in Korea may trouble the general's idolaters, while his dismissal of "Professor Knowitall from Whatzis Agricultural College" (p. 239) as a person with no authority to discuss the Tet offensive of 1968 slips somewhat below temperate treatment. Some essays remind the reader that the human dimensions of warfare remain crucial to all eras. French underestimation of the Vietminh before Dien Bien Phu, Hitler's overreaction to raids on Berlin during the Battle of Britain, and the tenacity of Stalingrad's defenders exemplify how aspects of character persist in affecting the outcome of battles. And Midway recalls the enduring role of dumb luck. That one or another of these facets may be overemphasized to simplify complex battles does not negate the essays' worth. Although they would not qualify as comprehensive summaries of the events described, they stand useful as introductory encounters.

Dr. Donald J. Mrozek
Center for Aerospace Doctrine, Research, and Education
Maxwell AFB, Alabama

NATO Arms Cooperation: A Study in Economics and Politics by Keith Hartley. Winchester, Massachusetts: George Allen & Unwin, 1983, 240 pages, \$35.00.

Substantial savings in defense budgets are possible through NATO standardization, but thorough standardization is not very probable, according to Keith Hartley in *NATO Arms Cooperation*.

Hartley is an economist of some standing. He has taught at a number of universities in the United States and the United Kingdom and is author of several other works. This study is divided into two parts: a detailed economic and political analysis of the standardization process, followed by a type of case study on the aerospace dimensions of the larger problem. It is written in an understandable style and amply supported by well-chosen graphs. The economic content of his analysis, of course, is very substantial.

In *NATO Arms Cooperation*, Hartley argues that money savings are theoretically possible through standardization, coproduction, and joint development. Up to a point, this

result could be achieved because of the advantages arising from the economies of scale and comparative advantage through specialization. Some real savings have already been attained through that coproduction and joint development which have proved possible. Still, argues Hartley, the potential benefits have sometimes been exaggerated and a simple economic analysis is not enough. Very often, decisions are made not for economic advantage but rather for hoped-for political outcomes. Although he is an economist, the author does not condemn this practice as an automatic evil. Sometimes those outcomes are legitimate objectives, notwithstanding the inefficiencies entailed.

The main thrust of Hartley's book is to analyze the economic and domestic political dimensions of NATO arms procurement. Hartley writes little about the strategic and tactical advantages that might be gained through greater standardization. In the end, Hartley gives a prescription for policy measures that would be advisable were true free trade in arms possible. However, he readily grants that nationalistic political and economic considerations make such free trade a very unlikely development. Accordingly, he also prescribes a set of policy recommendations that would gain some very limited advantages, given the nationalistic constraints under which the NATO allies operate.

NATO Arms Cooperation is a sensible and understandable book on a timely subject. However, the study is so specialized that only those officers who are involved in procurement work or the logistical side of the NATO alliance should place it on their required reading lists.

Dr. David R. Mets
Troy State University, Florida Region

Arms Transfers under Nixon: A Policy Analysis by Lewis Sorley. Lexington: University Press of Kentucky, 1983, 231 pages, \$22.00.

It is not easy to think usefully or to write instructively about arms transfer policy, but Lewis Sorley—scholar, soldier, and distinguished civil servant—does so in *Arms Transfers under Nixon*.

The essence of the Nixon (and Ford) administration's arms transfer policy is found in the Middle East. Arms transfers were the principal instrument for achieving a number of U.S. goals; chief among them were to attain Arab-Israeli balance, facilitate negotiations to peace, entice Egypt from the Soviet Union, establish Iran and Saudi Arabia as military powers, maintain access to oil, preempt any Soviet attempt to take advantage of the U.K. withdrawal, and avoid directly assuming the U.K. role. In its entirety, the Nixon arms transfer policy was undeniably effective, Sorley believes, demonstrating clearly that introducing sophisticated arms in large quantities can serve the cause of both peace and justice (paradoxical as that may seem).

While the major part of the book is concerned with the Middle East, Sorley gives proper attention to NATO, Latin America, Asia, Africa, and the Persian Gulf area also. Not afraid to voice judgments, he faults the Nixon administra-

tion for not devising means to assist European nations in maintaining shares in the arms export market; greater NATO standardization might have been possible by providing risk-free outlets for European defense material. With respect to the Persian Gulf, and especially Iran, Sorley gives high marks to Nixon; he calls Carter's failure to maintain the stabilizing influence of Iran "an irretrievable blunder of immense proportions" in both strategic and economic terms. (p. 125)

It may be, as Sorley suggests, that the arms transfer phenomenon has peaked because the initial demands of many new states in the 1900s have been satisfied, indigenous arms production facilities have proliferated, higher costs of new systems may discourage trade-ups, and nations' debt service costs continue to grow. At the same time, arms transfers satisfy important political interests of both buyers and sellers. Given the lack of unanimity in favor of restraint, arms transfers will continue to be a potent instrument of diplomacy. The issue for the United States is whether to impose on itself greater unilateral restraint.

Arms Transfers under Nixon offers a worthwhile analysis of U.S. arms transfer policy during the 1970s.

Dr. James H. Buck
University of Georgia, Athens

The Longest War: Israel in Lebanon by Jacobo Timerman.

New York: Vintage Books, 1982, 167 pages, \$2.95 paper.

Jacobo Timerman arrived in Israel shortly after denouncing in print the repressive and sadistic regime of his native Argentina in the late 1970s. *The Longest War* is his latest indictment, this time of Israel's 1982 incursion into Lebanon and of her alleged loss of innocence (indeed, her moral debasement) that he perceives followed. Labeling the action "Sharon's War," he condemns the general (Ariel Sharon, who was Defense Minister) and his boss, Menachem Begin (who was then Prime Minister), for launching an essentially unprovoked campaign in quest of a self-vindicating *Pax Hebraica*. Unfortunately, like much of the media coverage during the war, Timerman's diatribe is colored by personal bias and replete with misinformation and questionable judgment.

The author asserts that the Palestine Liberation Organization (PLO), hopelessly at a military disadvantage, constituted no viable threat to Israel's security. Israelis, having manufactured pretexts for Operation Peace for Galilee, waged the campaign mercilessly, their general disregard for civilian lives culminating, as he sees it, in the negligence and errors of judgment in the refugee camp massacres. Indeed, Timerman castigates Sharon as the personification of Israeli military élan gone bad and casts a pall over Israel's ethicality, which he regards as the most lamentable casualty of this needless war.

By now the counterarguments to such facile criticisms have been clearly articulated and can be summarized here. Though not formidable in the strictest military sense, the PLO was nonetheless an all-too-effective terrorist organization with an arsenal capable of claiming many more Israeli lives. The organization posed a serious threat to

Israeli security in the long run, not militarily but as a symbolic rallying-point for disenchanted Palestinians, especially for militant Arabs living within Israel's boundaries whose opposition tactics could assist Arafat in accomplishing from within the state what his guns could not achieve from without.

No one, after all, has heard the PLO renounce the clause in their covenant dedicated to the liquidation of Israel, and the Israelis had no cause for apology in launching a strike to eradicate this threat. In retrospect, they should have decisively indicated that this was their primary objective from the outset, rather than the establishment of a cordon sanitaire, but the legitimacy of the eventual campaign cannot be questioned.

Similarly, Israel's moral climate is much clearer and brighter than Timerman's jeremiad would have us believe. Few nations would have long tolerated the life-threatening situation confronting Israel; the demand that Israel act on a higher ethical plane under the circumstances is a fundamentally unfair double standard, particularly in light of the general worldwide silence that greeted years of PLO terrorist activities, including their taking hostage much of Lebanon throughout the late 1970s.

To be sure, the Sabra and Shatila killings were moral reverses for Israel. But the severe recommendations of Israel's official inquiry into the massacres restored her moral course by ensuring that no whitewash would cover up the stains left in Beirut.

Israel is not, as Timerman suggests, becoming the "Prussia of the Middle East." She eliminated a dangerous external threat and in the process created new opportunities for achieving a lasting peace in this troubled region.

Eric J. Vernon
Ottawa, Canada

The Arab-Israeli Wars: War and Peace in the Middle East from the War of Independence through Lebanon by Chaim Herzog. New York: Random House, 1982, 392 pages, \$20.00.

Israel's successful 1948 War of Independence elevated differences between Arabs and Jews to the forefront of Middle East issues. The resulting deluge of printed material on the subject made it especially difficult for military historians to understand these events without laboring through a multitude of books. Now, in a single volume, Chaim Herzog successfully presents the military side of the conflict from the creation of the Israeli state through the 1982 invasion of Lebanon.

Herzog's account reads like a *Reader's Digest* compendium of Israel's wars for national survival, even explaining the Yom Kippur War in a more efficient manner than in one of his earlier works on the same subject. Yet, by including cameos of various commanders in the early chapters of *The Arab-Israeli Wars*, Herzog resists the tendency to lapse into a mere account of who did what and when. The author makes no attempt to hide his pro-Israeli sentiments, but neither does he shrink from pointing out Israel's blunders and Arab military and political successes. Such objectivity

is conspicuously rare in many, if not most, pro-Israeli publications. Among the successes of Israel's adversaries that Herzog singles out are Arab tenacity in defensive operations, the oil weapon, Egypt's military reforms during the early seventies, and Sadat's success in tying superpower politics more closely to Middle Eastern affairs.

Scholars of Middle East studies will find little that is new in *The Arab-Israeli Wars*, except perhaps the chapter on "Operation Peace for Galilee," one of the first authoritative accounts of "Sharon's War" against the last significant Palestinian threat in the Levant. It is here, however, that Herzog leaves himself most vulnerable to criticism, jeopardizing the impartiality that he could claim for earlier sections of his book. Presented to the publisher before the smoke cleared, this section appears to be nothing more than an attempt to justify the most recent Israeli invasion of Lebanon. We are left not only with the judgment that the invasion was necessary for Israeli security but also with the impression that the expulsion of the PLO opens a new window in the search for a Middle East peace. It is interesting to note that Herzog offers no suggestions on what to do with the displaced guerrilla forces. I don't think he really cares. He feels that ultimately the Palestinian issue will be settled through accommodation with the more moderate leaders in the West Bank and Gaza.

Despite the author's obvious bias, *The Arab-Israeli Wars* will benefit the specialist and the curious alike. For the former, the book will serve both as a quick reference and as a refresher text. For the latter, the military history of the Israelis and the hottest campaigns of the modern Middle East can be at his fingertips in a single volume.

Captain Walter J. Cooner, Jr., USAF
Department of History
U.S. Air Force Academy, Colorado

The Autumn of Fury: The Assassination of Sadat by Mohamed Heikal. New York: Random House, 1983, 290 pages, \$17.95.

Anwar Sadat, "the peacemaker," died on 6 October 1981 during a ceremony celebrating war. In the West, the reaction was one of dismay, outrage, and great distress. In sharp contrast, in Egypt itself, there was little evidence of grief: forty-three million people went on with the celebration of *Id al-Adha*, the Feast of the Sacrifice, as if nothing had happened. This indifference of Egyptians toward the death of Sadat (i.e., no black banners, shop window portraits of the slain president, or public demonstrations of grief) was in sharp contrast to the emotional outpouring that Egyptians showed at the death of Nasser. Even on the day of Sadat's funeral, the streets of Cairo were unusually empty.

In this devastating account of Sadat, Egypt's influential journalist, Mohamed Heikal, offers his own answer as to why Egyptians seemed so apathetic toward Sadat's assassination. Heikal argues that the public reaction can be explained by perceptions of Sadat's infatuation with himself as a "superstar." By "superstar," Heikal means a politician adept at projecting a flattering public image through the modern mass media: "His measure of success or failure is

not the number of votes cast for him in an election, but the number of times his face is shown on the cover of *Time* or *Newsweek* magazine."

Heikal is hardly an unbiased critic. In 1981, Sadat had jailed him, along with 1500 other dissidents. Heikal is an astute polemicist and an exceedingly knowledgeable observer, however. For seventeen years, he was the editor of *Al Ahrām*, Egypt's leading newspaper. A Minister of Information under Nasser, Heikal served also as campaign manager for Sadat in 1970. After breaking with Sadat because of the president's 1977 journey to Jerusalem and subsequent peace treaty with Israel, Heikal wrote such increasingly strident criticism during Sadat's last years that it led to his imprisonment.

Accurately capturing the mood of frustration, despair, and discontent that grips much of the Middle East today, Heikal points to the policies long pursued by governments of that troubled region—policies that seem only to exacerbate this feeling of desperation. At times, however, Heikal exaggerates Sadat's responsibility for Egyptian and Arab problems. Assuredly in the aftermath of the 1973 war, Egypt and the Arab world seemed to have made an auspicious new beginning toward a just and viable reckoning of Palestinian and territorial problems, as well as a start toward economic, social, and political development. These hopes were dashed through a combination of many factors: policy mistakes, gambles, disagreements among the Arabs, superpower intervention and attempts at manipulation, and social upheavals and disparities. Yet above and beyond these factors, Heikal pinpoints the overriding *hubris* of Sadat as the chief cause for the tragic outcome of a decade that had promised so much and delivered so little: "Under Nasser the three circles of which he saw Egypt as the centre—Arab, Islamic, and African—had a reality; Sadat made Egypt the centre of nowhere. Worse than that, he divided Egypt against itself."

Heikal's classic portrayal of Sadat as a man who, step by step, alienated himself from his people, who became intoxicated with an overblown image of himself, and who sowed the seeds of his own destruction, is masterful. For an American public enthralled with the media image of Sadat as a superstatesman, this portrayal of Sadat as a god with feet of clay is a necessary counterweight.

Captain M. Payrow-Olia, USAF
 Captain Edna Tennenbaum, USAF
U.S. Air Force Academy, Colorado

The War Magician: How Jasper Maskelyne and His Magic Gang Altered the Course of World War II by David Fisher. New York: Coward, McCann & Geoghegan, 1983, 315 pages, \$16.95.

Camouflage and deception played a vital role in the conduct of the North African desert campaign in World War II. Both sides disguised armored vehicles, artillery, and supply locations to deceive their opponent regarding actual strengths and locations. It is fitting that the British camouflage effort fell into the deft hands of one of Europe's

best known stage magicians, who operated with his "Magic Gang" in a "magic valley" near Cairo.

In prewar Europe, the Maskelyne family name represented several generations of skillful magicians known for their innovation and flawless technical presentation. The Maskelynes are credited with originating several illusions now considered standard fare in a magician's repertoire. At the outbreak of World War II, however, Jasper Maskelyne was determined to turn his magical skills and knowledge of deception against the Axis powers. Even allowing for his age (late thirties), few military people were ready to take him seriously. Those who did had in mind an entertainer's billet rather than a combat role.

A combination of the threat of a German invasion plus Maskelyne's persistence resulted in his commissioning and assignment to a newly formed unit—the Royal Engineers Camouflage Training and Development Center. Maskelyne maintained that many stage magic techniques could be applied successfully to battlefield camouflage and took every opportunity to demonstrate his convictions in his classroom assignments. Many of the industrial and prime target camouflage efforts during the "pretend war" were designed under his supervision.

After graduation, Maskelyne headed a new unit, the Camouflage Experimental Section. Operating from a site on the outskirts of Cairo, dubbed the "magic valley," Maskelyne's unit (referred to as the Magic Gang) set about creating some of the most unique and effective battlefield illusions of the war. Some of the more notable contributions were developing a collapsible, lightweight frame for disguising a tank to look like a truck, and conversely, devising a lightweight tank shell to transform a truck into a tank; "moving" the city and harbor of Alexandria so that at night they appeared to be several miles from their actual location, confusing German bomber crews; hiding the Suez Canal behind a curtain of blinding lights; creating a dummy battleship and several dummy submarines to confuse German intelligence estimates; and developing a protective salve for aircrews to survive the flames of air crashes.

By far the most impressive and successful illusion was the major battle of the desert war at El Alamein (Operation Lightfoot). Maskelyne referred to the British plan as his "Grand Illusion," consisting of the concealment of 150,000 troops, thousands of tanks, artillery, and supplies right in front of the Germans. The British buildup occurred on two fronts simultaneously—one real and one obviously dummy (or so it seemed). At the last minute, the dummy force and real force were switched, with attacks begun on both fronts. German records attest to the effectiveness of the plan; it was three days into the battle before the Germans were sure on which front the actual attack was taking place.

Rather than a sterile history of Maskelyne and his Magic Gang, this book reads like a novel, embellished by characterizations yet retaining a historical perspective. Providing a mix of careful battlefield detail and personal insight into the major characters, *The War Magician* should satisfy either the technical or casual reader's interest in "magical" escape and evasion in a war zone.

Richard G. Narushoff
Monroeville, Pennsylvania

Rommel's Last Battle: The Desert Fox and the Normandy Campaign by Samuel W. Mitcham, Jr. Briarcliff Manor, New York: Stein and Day, 1983, 212 pages, \$18.95.

Having recently completed a book on Rommel's exploits in North Africa, Samuel Mitcham has now turned to Rommel's final campaign, the Normandy operation. In *Rommel's Last Battle*, Mitcham covers all the familiar aspects of the story, from Rommel's inspection and assumption of command of the critical Atlantic Wall sector to his forced suicide after having been linked with the assassination plot against Hitler. Nevertheless, a distorted picture of the great field captain emerges, for the all-seeing, all-knowing (though politically naïve) Rommel that Mitcham presents apparently possesses no blemishes—at least in the military sphere. Not only is he shown as the master tactician, he is always portrayed as the master strategist as well. According to the author, for example, little was done to build up the Atlantic Wall before Rommel arrived in late 1943. (In contrast, other accounts reveal that although Rommel was the driving force in accelerating the 1944 buildup, a great amount of planning and progress had been accomplished before that time.) In addition, Mitcham indicates, Rommel "knew" that the Allied invasion probably would come in Normandy. (However, the war diary of Army Group B, which Rommel commanded, indicates that he did not know; and other sources reveal that the real impetus for strengthening the Normandy area in May came from Hitler and the Armed Forces High Command.) Furthermore, Rommel seems to be everywhere during the fighting, and other commanders, whose troops actually bore the brunt of the Allied air, land, and sea onslaught, are seldom given proper credit.

Mitcham's major problem is that he has used his mainly secondary sources uncritically. Selectively, he has chosen from them what fits his preconceived notions about Rommel and discarded whatever, in his view, does not fit. This method allows him to avoid some of the arguments set forth in his sources. He accepts, for instance, the version of Rommel's then-chief of staff, Hans Speidel, concerning Rommel's increasing disenchantment with Hitler. At the same time, Mitcham includes parts of David Irving's version, even though Speidel's and Irving's interpretations are generally at odds with one another.

These examples of author bias should not convey the idea that Rommel was an ineffective commander. Rather, they may demonstrate that Mitcham's attempt to depict Rommel as "bigger than life" has done the latter a great disservice. Rommel was an outstanding field commander, one of the best the Germans had during World War II. His role in the Normandy campaign deserves a more accurate, balanced, analytical treatment, so that his genuine stature and accomplishments can be recognized.

Dr. Alan F. Wilt
Iowa State University

Spitfire legends abound, and the number of books about Reginald Mitchell's masterpiece are equally numerous. Thus, when author Alfred Price approached Mitchell's son to write something appropriate for this study, the response of Dr. Gordon Mitchell was perhaps understandable: "Oh hell, not another Spitfire saga!" (p. 7)

Since Dr. Mitchell himself recounts this anecdote in the preface, it is obvious that he changed his mind after reading the manuscript. He cites, among other reasons, the book's detail and depth, as well as a good bit of material thought to be lost and now appearing for the first time. The details and depth he alludes to are provided not in combat narratives but in the technical evolution of a remarkable aerial weapon. Readers who long for dramatic scenarios of screaming dives, chattering guns, and gut-wrenching turns will not find them here. Rather, Price has presented the technical origins and evolution of the aircraft itself—the humdrum but essential stuff that gave Spitfire pilots the capability to create all those legends in the first place.

The lineage begins with the Supermarine racers equipped with floats and proceeds to early studies of monoplane fighters that led directly to the Air Ministry's specification F.37/34, the prototype Spitfire. Author Price effectively uses recollections of many Mitchell collaborators, and a telling memoir by the team's aerodynamicist, Beverly Shenstone, quickly dispels hoary tales of the influence of the Schneider Trophy seaplanes. Although Reginald Mitchell learned much about high-speed flight from them, Shenstone emphasized that, "in fact there was not a single component of any significance in the new fighter that bore any close resemblance with its counterpart in a racing seaplane." (p. 20) He also dismisses the story that the Spitfire's elliptically shaped wing and tail surfaces were copied from the Heinkel 70, a trendsetter of the early 1930s.

The author gives due credit to Royal Air Force officers who argued to increase the Spitfire's armament to eight guns in view of modern, metal warplanes with high rates of closure in combat. He also assesses the difficulties in reaching production, since there were few subcontractors (let alone the Supermarine works) capable of the quantity demanded on the eve of the war. After Luftwaffe attacks in 1940, the dispersed production scheme in garages, bus stations, and laundries is a remarkable story. Field modifications, pressurized cockpits, the outstanding service of reconnaissance variants, and the integration of improved engines are all discussed. Postwar marks and variants are summarized also.

The generous format of this volume translates into excellent detail in the carefully chosen photos, drawings, and color plates. The text is formatted in two columns per page, yielding a thorough narrative as well as numerous technical appendixes and comparisons of performance. World War II buffs will find *The Spitfire Story* fascinating; aerospace professionals will find its technical assessments of production, operational models, and other topics instructive.

Dr. Roger E. Bilstein
University of Houston
Clear Lake City, Texas

The Spitfire Story by Alfred Price. London: Jane's, 1982, 256 pages, \$29.95.

Target Ploesti: View from a Bombsight by Leroy W. Newby. Novato, California: Presidio Press, 1983, 253 pages, \$15.95.

Between November 1943 and August 1944, Lieutenant Leroy W. Newby participated in fifty missions, mostly as a bombardier, with the Fifteenth Air Force's 460th Bombardment Group. Many of these missions were directed at the Ploesti oil fields in Romania—a vital source of German oil production. Because of Ploesti's importance, it became a major target for American bombers based in Italy and was fiercely and innovatively defended by the Germans.

While *Target Ploesti* offers a fine account of Lieutenant Newby's part in the Ploesti raids, as well as an adequate summary of the offensive and defensive tactics employed by the opposing forces, the book's title is somewhat misleading. The author participated in numerous other missions aimed at important German war production facilities, such as the Wiener-Neustadt aircraft factories in Austria, which he writes about in this book. It was, in fact, on many of these "secondary" missions that Newby experienced the most danger. On his fiftieth and final mission (supposedly a "milk run" to southern France), Newby's B-24 crashed into the sea, and the author was fortunate to escape with his life. His moving account of this experience is certainly one of the highlights of an exciting book.

While *Target Ploesti* offers an engrossing view of World War II air combat, its main value perhaps lies (as the title implies) in offering the reader a "View from a Bombsight." There are countless bomber and fighter pilot reminiscences available, but few worthwhile memoirs had been written by crew members with less glamorous occupations than flying the plane. Newby fills this gap, in part, by carefully explaining the technical complexities of the bombardier's role. He does so in a concise, lucid manner that helps make *Target Ploesti* both a valuable historical work and a fascinating description of men in air combat.

First Lieutenant Kenneth Schaffel, USAF
Office of Air Force History
Bolling AFB, D.C.

Escort Carrier: HMS *Vindex* at War by Kenneth Poolman. North Pomfret, Vermont: David and Charles, 1983, 265 pages, \$24.50.

Escort Carrier is a reference work for World War II action buffs thoroughly familiar with Britain's Second World War military jargon. It is a detailed chronicle of the British-built HMS *Vindex*, a ship originally intended as a refrigerated cargo/passenger liner but converted into an escort carrier to protect Britain's merchant shipping. The narrative begins with selection of the ship's name on 12 December 1942 and ends with the scrapping of the vessel on 23 August 1971. Nearly 90 percent of the text proper describes the two years of action in European waters that the HMS *Vindex* saw between its launching on 4 May 1943 and V-E Day on 8 May 1945.

The book is printed on very high-quality paper, and for visual appeal it features nearly 100 black-and-white photographs. Also included are a useful index and a glossary

containing less than 200 technical terms, which is distinctly inadequate, omitting hundreds of other technical terms scattered throughout the text.

The account is a detached, even-paced one, almost entirely in the third person. Despite the inevitable anxieties, fears, despairs, excitements, and triumphs surrounding many of the wartime actions recorded in *Escort Carrier*, there are no emotional "ups" or "downs" for the reader. Kenneth Poolman, although recognized as a distinguished writer on naval affairs, piles details on details in seemingly endless succession, with little or no attempt to present or analyze strategy or tactics. A comparison of any two pages of text, selected at random, shows that they sound about the same. The book is useful primarily as a reference for those interested in what happened to the HMS *Vindex*, its crew, and its planes during World War II.

Major Steven E. Cady, USAF
Headquarters AFROTC
Maxwell AFB, Alabama

George S. Brown, General, U.S. Air Force: Destined for Stars by Edgar F. Puryear, Jr. Novato, California: Presidio Press, 1983, 306 pages, \$16.95.

One deficient area of military history is that of biographies and autobiographies of American airmen. There are few books on World War II air leaders, and even fewer on those who have served more recently. Edgar Puryear attempts to rectify this situation with a biography of General George S. Brown, who served as Chief of Staff of the Air Force (1973-74) and then as Chairman of the Joint Chiefs of Staff (1974-78).

Puryear, who earlier wrote *Nineteen Stars: A Study in Military Character and Leadership* (1973) and *Stars in Flight: A Study in Air Force Character and Leadership* (1981), certainly has the credentials to write such a book. Yet despite his qualifications and obvious efforts, he fails to write a satisfactory biography. Instead, his book illustrates the problems and difficulties of recording biographies and oral history.

One of the pitfalls of biographies is the tendency to overidentify with the subject. This may explain, for example, why Puryear fails to mention that Brown graduated toward the bottom of his West Point class. As a result, this book appears as nothing more than a 300-page laudatory hymn. The problem of the vehicle is compounded by the data: the author relies almost entirely on interviews, along with some effectiveness reports and speeches. Clearly, oral history has a place in the writing of history, but it is overworked here. Puryear's uncritical use of these interviews and the fact that only two of the many interviews were conducted before Brown's death make the situation worse. Generals speak kindly of other generals most of the time, and one wonders whether anyone would speak ill of the dead, especially a hero who had risen to the top of the U.S. military profession.

There are other weaknesses in the book. Puryear inadequately treats some areas that are critical to Brown's life story and would be interesting as well. For example, the

author mentions two of Brown's setbacks but does not explain either one. The first, Brown's failure to get the position as Commandant of Cadets at the Air Force Academy, lacks comment by the man who made the decision, General Curtis LeMay. The other incident involved Brown's alleged anti-Semitic remarks at Duke University. While Puryear mentions both of these incidents, he does not indicate either their cause or their significance. In addition, I believe that Brown's World War II service deserves more than the nine pages that the author gave it. In view of Brown's spectacular rise to the rank of full colonel at age twenty-six and the impact that combat service must have had on him, more detail is merited. Most of all, the author does not detail his subject's contributions. General Brown certainly was a great success, and the author claims that he "was one of the most outstanding leaders in Air Force history" (p. 284); but how and why are not explained. Specifically, what difference did he make to the Air Force, and what were his lasting contributions?

That is not to say that *George S. Brown, General, U.S. Air Force* lacks value. Puryear does a decent job of relating Brown's story of success. He tells why Brown made it, concentrating on the varied positions that Brown held after World War II. Puryear highlights how well Brown performed his duties and how his abilities and leadership traits enabled him to get the job done and gain advances to the top.

For those seeking the elements of leadership or career advancement, this book will be valuable. However, for most readers, the book's faults will dwarf its virtues. Based almost entirely on interviews, it is nothing more than a narrow narrative, with little or no analysis. The book covers what others thought of Brown and how he operated, but not really what he did. Even the dedicated reader, I think, will be overwhelmed (or worse) by the 300 pages of redundant praise and will be disappointed with what is presented. Both George Brown and the reader deserve better.

Dr. Kenneth P. Werrell
Radford University, Virginia

A General's Life: An Autobiography by General of the Army Omar N. Bradley and Clay Blair. New York: Simon and Schuster, 1983, 752 pages, \$19.95.

This autobiography is actually a biography of General Omar N. Bradley written by Clay Blair. Blair's description of the work as Bradley's autobiography is based essentially on his claim that he could read Bradley's mind. "By that time my own mind was so deeply immersed in Bradley's that I *thought* like Bradley . . . I could reconstruct the war virtually in his words." (p. 11) Although Blair's assertion in his Foreword is at best dubious, he proceeded to write an excellent book.

In Chapter 1, Blair relates that Bradley idolized his father. Bradley described his father as a mixture of "frontiersman, sportsman, farmer, and intellectual." (p. 17) John Bradley entered school at age nineteen and two years later became a teacher. He taught Omar a love of mathe-

matics and history, discussed at home such topics as the Sherman Anti-Trust Act, had a passion for baseball, and often took Omar hunting. When Omar Bradley was fifteen year old, his father died. Bradley described this loss as a "shattering blow." (p. 22)

Although Blair does not use the terminology of psychoanalysis, he spends the rest of the book showing how Omar Bradley so strongly identified with his lost father that during various periods in his life he became a teacher, baseball player, hunter, and intellectual (an intellectual in its best sense—a person who constantly learns for the enjoyment of learning).

As a young man, Omar Bradley played baseball both in high school and at West Point on the varsity team. After World War I, in which he tried unsuccessfully to get European duty, he became a mathematics instructor at West Point. Later he became an instructor at Fort Benning, Georgia, and still later, in 1934, a tactics teacher at West Point. He was a hunter for most of his life. Like his father, Bradley spent a lifetime learning new tasks and enjoying these endeavors.

When Bradley began the campaign in North Africa in 1942 as a tactician, his grasp of strategy was weak. For example, he then supported General Marshall's contention that American forces should have been committed to an early invasion of France and that the North African invasion was an unfortunate diversion. By 1943, he had gained the strategic insight to realize that American soldiers had been too "green" in 1942 to invade fortress Europe. By December 1944, he had mastered strategy to the extent that he could not only criticize General Montgomery's plans with forcefulness and clarity but also present his own strategic alternative.

After World War II, Bradley headed the Veterans Administration. He was able to learn the intricacies of this sprawling agency and to develop veterans' programs significantly. Under his leadership, the GI education program and loans were instituted, VA hospitals were upgraded, and the entire system was decentralized to reduce drastically the mammoth confusion characteristic of the VA after the war.

In 1948, General Bradley became Army Chief of Staff. Here, like his father, he was on a frontier, a frontier of military creativity. In this position, he helped establish NATO and its various levels of command. He also participated in the formulation of the first U.S. nuclear strategy—that of massive retaliation. By the time he became Chairman of the Joint Chiefs in August 1949, he had learned to think in terms of grand strategy. Consequently, he resisted bitterly MacArthur's attempts to expand the war in Korea, consistently stressing to Congress the necessity of sending American forces to Europe (rather than Korea) to meet a potential Soviet attack. Whereas MacArthur spoke out as a theater commander, Bradley was able to see the whole of U.S. interests.

Blair has shown General Bradley to be a "chronic learner," a man who constantly grew intellectually as he moved to positions of increased responsibility. Both General Bradley and his father were lifelong learners, frontiersmen, baseball enthusiasts, and hunters, Edgar F. Puryear, Jr., in *Nineteen Stars* (1981), quoted Bradley as saying

that he had remained in the armed forces because "... I liked to teach ... I liked the outdoors ... There was always something to learn."

Dr. Kenneth J. Campbell
Gallaudet College
Washington, D.C.

Excess Profits: The Rise of United Technologies by Ronald Fernandez. Reading, Massachusetts: Addison-Wesley, 1983, 320 pages, \$16.95.

Any company that is a major contractor to the U.S. defense establishment is subject to analysis and scrutiny. The late President Dwight D. Eisenhower brought forth this fact when he voiced concern about the "military-industrial complex." *Excess Profits*, by Ronald Fernandez, puts under scrutiny United Technologies Corporation, whose subsidiaries include Pratt & Whitney Aircraft and Sikorsky Aircraft, among others.

Admittedly, Fernandez's views are colored somewhat by the premise presented in the title—excess profits. But even with this shortcoming, what emerges is a fascinating look at one of the U.S.'s premier defense contractors and an account of commercial and military aviation as a bonus.

United Technologies has had a long history of controversy, dating back to its beginnings as Pratt & Whitney Aircraft, maker of the engines for Boeing Airplane Company. The original company, founded in 1865 to manufacture weapons, continued its armament business until it came under the control of Dr. George J. Mead, Colonel Edward A. Deeds, and Frederick B. Rentschler. Mead, whose primary business was the Mead Paper Company of Dayton, Ohio, had invented an aircraft engine that needed a factory to produce it. Colonel Edward A. Deeds had gone from the National Cash Register Company (NCR) in Day-

ton to become aircraft procurement officer during World War I. He later served as board chairman of NCR, and he had substantial stockholdings in General Motors Corporation. To this duo, the Hartford, Connecticut-based Pratt & Whitney firm was ideal because of its large pool of machine-tool laborers. They bought the company and brought in Rentschler to run it.

In time, United Technologies was to own United Airlines, Boeing Aircraft Company, Boeing Air Transport Company, Boeing Airplane Company, Vought-Sikorsky (merger of Chance Vought and Sikorsky Aviation), and Northrop Aircraft Company, before being forced by public pressure and congressional threats to divest. Much of this pressure developed not so much out of concern about the company's size but, as Fernandez reveals, because of problems with government contracts—much like more recent controversies.

The most significant recent controversy centers on Pratt & Whitney's F-100 engines for the U.S. Air Force's F-15 and F-16 aircraft. One of Fernandez's premises is that the F-100 engine (on which at least \$500 million in public funds have been spent to correct "a design deficiency," while General Electric's F-110 engine offered greater thrust and better all-around capabilities) is only one example of United Technologies' past habit of prevailing through the political and bureaucratic process.

Excess Profits is not wholly critical of United Technologies, however, for, indeed, this formidable company is essential to our national security. Perhaps if the firm's officials had permitted cooperation with the book project, more of the company's perspective could have been presented. This point should not be lost among defense contractors, who must learn to give their "side" in such cases or suffer the possibly adverse judgment of the public.

Frederick M. Finney
Dayton, Ohio



The Air University Review Awards Committee has selected "The Nuclear Weapons Debate and American Society: A Review of Recent Literature," by David MacIsaac, Senior Research Fellow, Center for Aerospace Doctrine, Research, and Education, Air University, as the outstanding article in the May-June 1984 issue of the *Review*.

R the contributors



Lieutenant General Raymond B. Furlong, USAF (Ret) (B.S., Ursinus College; M.B.A., Harvard University; Ph.D., Auburn University) is Headmaster, St. James School, Montgomery, Alabama. He was Commander, Air University, Maxwell AFB, Alabama, at the time of his retirement from active duty after a 35-year career, and he has served as Assistant Director for Finance, Alabama Commission on Higher Education. General Furlong is a previous contributor to the *Review* and other military and professional journals.



Roger A. Beaumont (B.S., M.S., University of Wisconsin; Ph.D., Kansas State University) is a Professor of History at Texas A&M University. Formerly Associate Professor of Organization Science, University of Wisconsin-Milwaukee, and Associate Director of the Center for Advanced Study in Organization Science, he is author of *Military Elites and Sword of the Raj: The British Army in India, 1747-1947* and coeditor of *War in the Next Decade*. Dr. Beaumont's articles have appeared in numerous publications, including the *Review*.



Captain Richard W. Bloom (B.A., Columbia University; M.A., New School for Social Research; Ph.D., Kent State University) is Medical Intelligence Program Manager at Armed Forces Medical Intelligence Center, Fort Detrick, Maryland. He is a graduate of Squadron Officer School and Air Command and Staff College. Captain Bloom has written for psychology journals and the *Review*.



Lieutenant Colonel David J. Dean (B.S.F.S., Georgetown University School of Foreign Service; M.A., Florida State University) is a Research Fellow at the Center for Aerospace Doctrine, Research, and Education and a Military Concepts Analyst for Aerospace Research Institute, Air University. He served in Vietnam and has held various positions in Aerospace Rescue and Recovery Service, the Defense Intelligence Agency, and the Pacific Air Forces. Colonel Dean is a Distinguished Graduate of Squadron Officer School and Defense Intelligence School, as well as a graduate of Air Command and Staff College and Industrial College of the Armed Forces. He has contributed previously to the *Review*.



Lieutenant Colonel Dennis M. Drew (B.A., Willamette University; M.S., University of Wyoming) is Deputy Director for Research, Center for Aerospace Doctrine, Research, and Education, Air University. He has served as missile combat crew commander and wing missile staff officer at Hq SAC and as Chief, Warfare Studies Division, Air Command and Staff College. Colonel Drew is a Distinguished Graduate of Air Command and Staff College and a graduate of Squadron Officer School and Air War College. He is a frequent contributor to the *Review*, and his article is the third-place winner in the third annual Ira C. Eaker Essay Competition.



Colonel William C. Stancik, USAFR (B.S., Florida State University; M.B.A., Auburn University), is a computer systems consultant in Montgomery, Alabama, and the Mobilization Assistant to the Director, USAF Historical Research Center, Maxwell AFB, Alabama. Early in his career, he flew in the B-47 as a navigator with the 306th Bomb Wing. His Air Force Reserve and Guard assignments have included tours with the Alabama Air National Guard and the Air Force Academy. Colonel Stancik is a graduate of Air Command and Staff College and Air War College.



R. Cargill Hall (B.A., Whitman College; M.A., California State University, San Jose) is Chief of the Research Division at the USAF Historical Research Center, Maxwell AFB, Alabama. Previously, he served as Deputy Command Historian at Hq Military Airlift Command and Historian, Hq Strategic Air Command. Hall is the author of numerous published articles on historical and legal aspects of aeronautics and astronautics, including previous contributions to the *Review*.

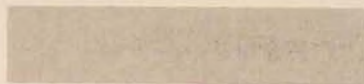


Williamson Murray (B.A., M.A., Ph.D., Yale University) is an Associate Professor of History and Director of the Military History and Strategic Studies Program at Ohio State University. He served as a Research Associate for the Airpower Research Institute, Maxwell AFB, Alabama, and as a maintenance officer while serving in the Air Force from 1964 to 1969. Two of his recent books are *Strategy for Defeat: The Luftwaffe 1933-1944* (Air University Press, 1983) and *European Balance of Power, 1938-1939: The Path to Ruin* (Princeton University Press, 1984). Dr. Murray is a previous contributor to the *Review*.



Nicholas J. Pappas (B.S., Shepherd College; M.A., Ph.D., University of Virginia) is an As-

sistant Professor in the Department of Political Science at Radford University. He has served in the United States Marine Corps. Dr. Pappas is the author of an article on academic strategists during the Vietnam era, which was published in the *Naval War College Review*.



Lieutenant General Harold L. George, USAF (Ret) (L.L.B., George Washington University) now resides in Laguna Hills, California. He is permanent chairman of the National Board of Directors, Order of Daedalians. During his military career, he was a rated command pilot and held a variety of positions, including Director of Aeronautical Science at Pennsylvania Military College; Commanding Officer, 2d Bombardment Group; Assistant Chief of Staff for War Plans; and Commanding General, Air Transport Command, Army Air Forces. General George is a graduate of the Air Corps Tactical School and the Command and General Staff School.



Richard M. Roberds (B.A., M.S., University of Kansas; Ph.D., Air Force Institute of Technology) is Associate Professor and Head of the Engineering Technology Department at Clemson University. He is a retired Air Force colonel and was the first technical program manager of the Air Force particle-beam technology program, serving in that capacity from September 1975 until July 1977 at the Air Force Weapons Laboratory, Kirtland AFB, New Mexico. Colonel Roberds is a Distinguished Graduate of Air Command and Staff College and a graduate of the Industrial College of the Armed Forces.



I. B. Holley, Jr., Major General, USAFR (Ret) (B.A., Amherst; M.A., Ph.D., Yale University)

is a Professor of History at Duke University. He has been a Visiting Professor at the National Defense University and the U.S. Military Academy and has taught at the Industrial College of the Armed Forces. Professor Holley served as chairman of the Advisory Committee on History to the Secretary of the Air Force and as Mobilization Assistant to the Commander, Air University. He is author of *Ideas and Weapons* (1953), *Buying Aircraft: Air Materiel Procurement for the Army Air Forces* (1963), and previous contributions to the *Review*.



Russell F. Weigley (B.A., Albright College; M.A., Ph.D., University of Pennsylvania) is a Professor of History at Temple University. He has taught at the University of Pennsylvania, Drexel University, Dartmouth College, and U.S. Army War College. Dr. Weigley is the author of *The American Way of War: A History of the United States Military Strategy and Policy* (1973), *Eisenhower's Lieutenants: The Campaign for France and Germany, 1944-1945* (1981), and previous contributions to the *Review*.



John F. Guilmartin, Jr. (USAFA; M.A., Ph.D., Princeton University), is Director of the Space Shuttle History Project and an Adjunct Professor of History at Rice University. He is a retired Air Force lieutenant colonel and former editor of *Air University Review*. While on active duty, he also served as an instructor, Assistant Professor, and Associate Professor of History at the USAF Academy; helicopter pilot (HH-3E and HH-53C) stateside and in Southeast Asia; and Chief of Tactics, Aerospace Rescue and Recovery Service. Dr. Guilmartin is author of *Gunpowder and Galleys* (1974, 1980) and numerous articles and reviews. . . . **Technical Sergeant Klaus J. Schiffler**, USAFR (B.A., M.Ed., University of Utah), is a Reserve Adviser with Air Force Intelligence and presently is employed by the Postal Service. His military career includes service with the Marine Corps, Marine Corps Reserve, Army Reserve, and Air Force Reserve.

Professional Staff

LIEUTENANT COLONEL DONALD R. BAUCOM, USAF, *Editor*
JANICE M. BECK, *Managing Editor*
MAJOR EARL H. TILFORD, JR., USAF, *Associate Editor*
JOHN A. WESTCOTT, *Art Director and Production Manager*
ENRIQUE GASTON, *Associate Editor, Spanish Language Edition*
LIA MIDOSI MAY PATTERSON, *Associate Editor, Portuguese Language Edition*
STEVEN C. GARST, *Art Editor and Illustrator*
HATTIE DIXON MINTER, *Copy Editor*
RAYMOND F. MATHIS, *Financial and Administrative Manager*

Advisers

COLONEL KENNETH J. ALNWICK, *Senior Fellow, SCDC, National Defense University*
LT. COLONEL JOHN F. GUILMARTIN, JR., USAF (RET), *Immediate Past Editor*
PROFESSOR I. B. HOLLEY, JR., *Duke University, Major General, Air Force Reserve (Ret)*
FRANCIS W. JENNINGS, *Air Force Service Information & News Center*
DR. RICHARD H. KOHN, *Chief, Office of Air Force History*
COLONEL DONALD E. ROSENHOVER, *Dean, Air War College Resident Program*

AIR
UNIVERSITY
review

MAXWELL AFB, AL 36112

SPECIAL FOURTH CLASS MAIL
CALCULATED POSTAGE
PERMIT G-1
USAF-ECI
GUNTER AFB, AL 36118

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300
RETURN POSTAGE GUARANTEED



The Professional Journal of the United States Air Force