The *Airpower Journal*, published quarterly, is the professional journal of the United States Air Force. It is designed to serve as an open forum for the presentation and stimulation of innovative thinking on military doctrine, strategy, tactics, force structure, readiness, and other matters of national defense. The views and opinions expressed or implied in the *Journal* are those of the authors and should not be construed as carrying the official sanction of the Department of Defense, the Air Force, Air Education and Training Command, Air University, or other agencies or departments of the US government.

EDITORIAL

Becoming A Citizen-Soldier: A Perspective on Country

My Very Dear Sarah

> *The indications are very strong we shall move in a few days—perhaps tomorrow. Lest I should not be able to write again, I feel impelled to write a few lines that may fall under your eye when I shall be no more. . . .*
>
> *I have no misgivings about or lack of confidence in the cause in which I am engaged, and my courage does not halt or falter. I know how strongly American civilization now leans on the triumph of the Government, and how great a debt we owe to those who went before us through the blood and suffering of the Revolution. And I am willing, perfectly willing, to lay down all my joys in this life to help maintain this Government and to pay that debt.*
>
> *Sarah, my love for you is deathless: it seems to bind me with mighty cables, that nothing but Omnipotence could break, and yet my love for country comes over me like a strong wind and bears me irresistibly on, with all these chains to the battlefield.*

—Maj Sullivan Ballou, Union Army, July 1861

THIS PASSAGE appears in a letter Major Ballou wrote to his wife a week before he died in the battle of Bull Run. Although I was moved strongly by his words, I think it is difficult for most of us in today's Air Force to identify completely with his feelings, perhaps because our society uses words such as *love* so glibly that their full impact is lost. Or perhaps we simply go through the busy details of everyday life so frantically that we don't have time to think about or understand such strong, uncomfortable emotions.

The opening scene of the movie *Patton,* where George C. Scott delivers Patton's famous speech, is almost a cultural icon. Standing in · front of an enormous flag, Scott's gravelly voice, combined with the historic words, evokes powerful emotions in us. At that moment, we truly seem to understand what "love of country" means: the willingness to give our lives in battle. So we pat ourselves on the back for being willing to do such a fine thing. But when the lights go up and the VCR rewinds, that gut-wrenching, heart-stopping passion usually dims. We return to tripping happily through our civilian lives—eating, drinking, and consuming the pleasures our country provides, blithely unconcerned about the cost of those pleasures. Clearly, good military officers frequently aren't very good citizens.

Yes, being a good citizen means obeying the law, helping with the local scout troop, and so forth. But good citizens are also good stewards. All too often we are merely good consumers. We enjoy our spacious skies and amber waves of grain as we drive on abundant roads—our only thought a fleeting irritation at the farm tractor that gets in our way or the road construction that slows us down. We go to state-of-the-art supermarkets and fill our carts with bread and milk, fresh produce, and convenience foods, but we complain because only one register is open and we have to stand in line an extra 10 minutes. We send our children to public schools, play in public parks, and rely on the protection of community police and fire forces—usually without much thought about their cost.

Major Ballou spoke of his willingness to lay down all his earthly joys to pay the debt he owed for living in his society. We too

may one day need to be willing to make the ultimate sacrifice. Meanwhile, modern society requires that we sacrifice our daily joys for the pleasures and privileges our country gives us. Apart from our military service and the sacrifice it exacts, we have to get involved as concerned citizens. We have to vote more often than once every four years. We have to attend local school board meetings even if it means missing our favorite TV show. We have to recycle. We need to be aware of what is being debated in our legislative houses of government, and we need to take time to write our local and national representatives with our views. Also, each of us has a responsibility to do something to help people less fortunate than we.

I've heard that love isn't an emotion—it's a decision. That argument transfers love from the heart and its fleeting passion to the head—the center of surviving will. On this level, if we decide to love our country, we accept the responsibilities that love entails, in spite of how tired we are or how we feel. We may never have to give the ultimate sacrifice on the bloody field of battle, but there are battles all around us every day. Someone has to fight them. We, like Major Ballou, have a debt to pay.   GDF
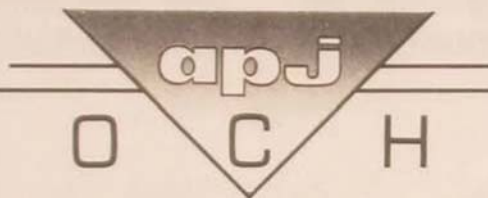
R I C O C H E T S

AUTHOR ANONYMITY

I am concerned about the failure to indicate the author of the excellent article "A New Defense Industrial Strategy" in the Fall 1993 issue. The article was thoughtful and valuable, but one is left with a nagging concern that no one is taking responsibility for authorship.

I can see both *pros* and *cons* on this matter. If we banned all unsigned articles entirely, we might deprive the journal of some excellent articles that would otherwise not be published. One can appreciate that high-ranking officers might be reluctant to sign an article if they felt it could unduly influence subordinates when in fact they simply wanted to float a provocative idea for discussion. But there are dangers in unsigned articles in that they can lead to lack of responsibility. In

general, to be credible, a journal should indicate authorship of all articles.

Maj Gen I. B. Holley, Jr., USAFR, Retired
Durham, North Carolina

I enjoyed very much "A New Defense Industrial Strategy" in your Fall 1993 issue. I applaud your decision to publish this article with the author's name withheld and hope that you continue to do so in the future. Some may argue that withholding a name goes against the spirit of academic freedom, but realistically, if the article is "politically incorrect" or if the author holds a particularly sensitive position, then printing the name may actually constrain the author's true view. On the other hand, I would urge that letters to the editor remain accountable to ensure that any "potshots" be held to a minimum.

But as much as I liked the article and agreed with the majority of the conclusions, I do have some points of contention. First, I was surprised to see no list of references. Although the figures provided an ability to follow the author's arguments, I was at a loss to substantiate some of the conclusions.

VALUING LEADERSHIP
in an Era of Prophets, Politicians, and Pugilists

CAPT CHARLES T. BARCO, USAF

THE MOVE TO a quality culture is a refreshing and courageous concept that, in the long term, can only make the Air Force more capable of performing its wartime mission. However, in our feverish rush to implement quality, we run the very real risk of changing a warrior culture whose values were once embedded in the art of personal mastery[1] and coup d'oeil[2] (see below) to a culture that emphasizes scientific models and broadbrushed, committee-based compromise and consensus. Further, in a parallel and equally blind-ing effort to build quality teams, we may be sacrificing the development of our future leaders and creating a generation of soft-skilled quality bureaucrats focused on politics and group process. Such people would lack the personal courage, vision, and situationally driven read-and-act skills[3] required to take definitive and timely action in a manner consistent with our great leaders of the past.

To successfully implement quality in the USAF, one must first comprehend the overriding attributes associated with nurturing

our most important characteristic—leadership. Few writers have defined the essence of our calling more succinctly than Gen Douglas MacArthur, who wrote, "Duty, honor, country: Those three hallowed words reverently dictate what you ought to be, what you can be, what you will be."[4] MacArthur clearly suggested that these were the virtues by which our military careers should be measured.

If duty, honor, and country provide the long-term direction or vision for our travels, then what innate force should keep us on that path? Gen Ira Eaker suggested that a leader possesses strength of integrity, wisdom, and courage and that these characteristics alone provide the focus to keep one on the proper course in life.[5] Carl von Clausewitz also struggled with the attributes of leadership before outlining the qualities consistent with a military genius: (1) cour-

age (both moral ["courage to accept responsibility"] and physical ["courage in the face of personal danger"]) and (2) power of intellect ("War is . . . wrapped in a fog of greater or lesser uncertainty. A sensitive and discriminating judgment is called for").[6] From these characteristics, Clausewitz derived two others: (1) coup d'oeil (the inner eye or the "quick recognition of a truth that the mind would ordinarily miss or would perceive only after long study and reflection")[7] and (2) determination ("the capacity, having taken a decision, to stick to it").[8]

Clausewitz links these concepts by saying that leaders must have *"first, an intellect that, even in the darkest hour, retains some glimmerings of the inner light which leads to the truth; and second, the courage to follow this faint light, wherever it may lead"* (emphasis in original).[9] Regardless of how we might describe it, the art of leadership is best built on

Gen Douglas MacArthur defined our profession when he wrote, "Duty, honor, country: Those three hallowed words reverently dictate what you ought to be, what you can be, what you will be."

wisdom and honor, focused on service to country, and fueled by the desire to develop coup d'oeil. Our professional military education (PME) schools reinforce these tenets, but does our emerging quality culture do the same?

To answer this question, one must not battle the conceptual foundation of quality, but the reality of its implementation in the USAF. Years ago, leaders emerged who possessed the wisdom to see and tackle abstract problems in minimal time. Today, we run

the danger of tasking teams to wrestle with problems simply because our leaders are not adequately prepared to do so. Though this situation is expected and acceptable in complex situations, *it must not become the norm.*

Clearly, the Air Force is rapidly moving away from what Peter Senge calls personal mastery, mentioned above, into what I call the pseudosynergy of everyday quality teams. As we strive to cut costs and manpower, we spread our responsibilities over a wider spectrum of areas, robbing leaders and subordinates alike of the ability to develop and sustain personal mastery. Without personal mastery, we are collectively and insidiously transformed into a diluted intellectual pool that may or may not produce the tough answers required. If the resultant teams are overused and ill led, the individuals on those teams gradually lose both the power of independent thought and the creative courage associated with risk taking.

The litmus test for team formation should be, Is the challenge so timely, complex, and critical that only the diverse skills of a team can be employed to solve it? If the answer is yes, then a sponsoring leader should not simply launch and forget the team but tether and nurture it to produce a true high-performance unit that develops coup d'oeil along the same lines as its individual members.

Leadership doesn't end with the formation of quality teams; it is the heart of quality teams. Bureaucrats who use team formation as a numerical metric have yet to appreciate that individual leadership and quality are—and always have been—one and the same. Throughout history, our greatest leaders implicitly appreciated the tenets of quality long before W. Edwards Deming or J. M. Juran made them explicit.

Yet, if bureaucrats and quality teams seem to work well in corporate America, why shouldn't they work in the Air Force? First, quality-based process action teams (PAT) and developmental teams are ideal in the USAF for *specific cross-functional problems* but

should be employed as an exception—not as a rule. *Developing individual leadership in the work center for future use with these teams should be the rule.* Unlike an employee of Xerox Corporation, an officer or noncommissioned officer must hone his or her leadership skill and judgment, always with a focus on the battlefield. Though the team is historically a critical war-fighting element of battle, the leader is and always has been the focal point from which the team draws its power and intellect when the fog of war descends. In our passion for creating numerous quality teams, let us not forget that leadership is nurtured with the focus on combat. There is no acceptable parallel to the battlefield at Xerox; hence, corporate teams may perpetually work without consideration for nurturing the read-and-act skills needed to independently and quickly overcome the unknown factors that emerge when troops and materiel clash. We simply must not overuse or abuse teams to the point of creating impotent leaders unable to develop/nurture coup d'oeil in peace or employ it in war. When we either employ a team or are employed as members of a team, we must prevent such a problem by

1. continually striving to develop the inner light or coup d'oeil in ourselves and the people around us;

2. occasionally placing our subordinates in learning environments that demand complex decisions under difficult conditions;[10]

3. using quality as yet another intellectual springboard to attain wisdom on our lifetime journey to personal mastery and value-driven leadership; and

4. ensuring that our personnel understand their roles as teachers, learners, and leaders.

I do not make the indictment "pseudo-synergy of everyday quality teams" without considerable deliberation. *The Team Handbook* defines a team simply as "a group of people pooling their skills, talents, and knowledge."[11] (One should note that this quality-based definition totally ignores the role of the leader.) As members of a warrior-based culture, we should learn from our PME schools and expand this definition so that it reflects the attributes of truly high-performance teams by including

1. a leader with well-defined read-and-act skills (coup d'oeil);

2. dynamic followers who without hesitation aid the leader;

3. well-defined task and maintenance skills by all members of the team; and

4. a sense of purpose, unity, and camaraderie.[12]

If these elements are present, highly successful teams eventually emerge and begin exhibiting real synergy, whereby the output of the whole team exceeds that of the sum of the individual parts or individual members. The developmental and subsequent bonding process that successful teams go through in reaching synergy is described in the Cog's Ladder Group Development Model and is similar to the process each of us goes through to reach synergy with our own developing values, as reflected in Krathwohl's Affective Levels of Learning (fig. 1).

Though by no means equivalent, the two models share the understanding that both teams and individuals grow experientially and in stages. Teams move through the stages of Cog's Ladder at their own speeds. Some operate effectively at the polite stage for years; others spiral up and down with feverish regularity. Despite this movement, the teams that remain at the top the longest demonstrate the effective and efficient results associated with synergy. A team's development, like an individual's, is dependent upon environment. Many leaders—including Col Russell V. Ritchey, the formulator and first commandant of Squadron Officer School—have found that effective combat teams mature best when they are nurtured in peacetime with a diet occasionally spiced with fear, frustration, and fatigue. Without these catalysts, teams will vacillate at the

COG'S LADDER GROUP
DEVELOPMENT MODEL

KRATHWOHL'S AFFECTIVE
LEVELS OF LEARNING

TIME

ESPRIT STAGE

CONSTRUCTIVE STAGE

BID FOR POWER STAGE

WHY ARE WE HERE STAGE

POLITE STAGE

TIME

CHARACTERIZING

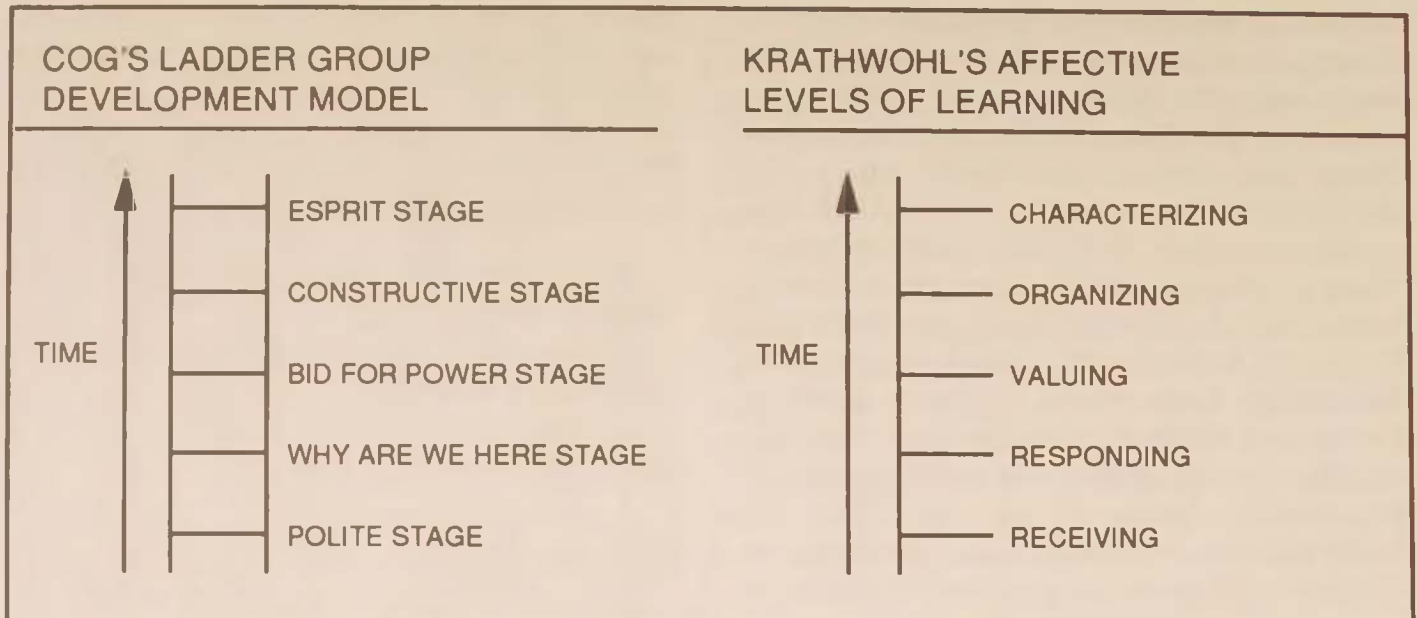ORGANIZING

VALUING

RESPONDING

RECEIVING

Figure 1. Reaching Synergy (from *Squadron Officer School Curriculum* [Maxwell AFB, Ala.: Air University, 1988], 3200 R-1 through R-4; and David P. Krathwohl, Benjamin S. Bloom, and Bertram B. Masia, *Taxonomy of Educational Objectives* [White Plains, N.Y.: Longman Press, 1964], 37)

lower end of Cog's Ladder and never truly reach maturity or the team's equivalent of coup d'oeil. The fact that our quality teams do not mimic wartime conditions does not make them pseudosynergistic; however, the environment in which we place some of our teams is often counterproductive to the peacetime development of our future warriors. The following are just a few of the matters that teams must contend with as we attempt to overlay a corporate quality culture on a leadership culture that is evolving from the values of battle:

1. hiring facilitators to work team dynamic issues versus using team leaders who practice team dynamics based on their own implicit read-and-act skills;

2. using signed contracts/charters to ensure responsibilities versus using implicit contracts based on honor and communication;

3. managing by fact to ensure proper quantification and qualification of all data versus realizing that much data is unknown

and forms the basis of the uncertainty of our own administrative battles;

4. requiring zero-defect potential for products versus using mistakes and risk taking as valuable lessons learned for the future;

5. holding expensive, week-long, off-site meetings to escape the pressures of the office versus enabling a leader to develop implicit "act" skills to use in any given situation;

6. insisting that customer expectations drive our processes versus ensuring that our documented processes contribute to enlightened customer expectations;

7. using demands exclusively focused on critical process identification versus placing equal—if not greater—importance on the infrastructures that must support and maintain the processes;

8. mandating the 10 quality tools and techniques for quality use versus teaching values and behaviors that enable practition-

ers to use any tools or techniques in their toolbox to get the job done;

9. insisting on statistically evaluated products versus employing processes with a basis in statistical thought; and

10. rigorously following corporate-based Plan, Do, Study, Act (PDSA) models versus using more predictive judgment-based hypothesis tools such as the Question, Theorize, Test, and Reflect learning model.[13]

We must fight as we train. The infusion of explicit, quality-based techniques into a leadership culture, however, may not enhance the way we want to fight. Our future

Col Russell V. Ritchey, formulator and first commandant of Squadron Officer School (SOS), believed that effective combat teams mature best when nurtured in peacetime with a diet occasionally spiced with "fear, frustration, and fatigue." Participation in the SOS leadership course helps modern Air Force officers develop both leadership and teamwork.

leaders should be learning read-and-act skills as an art that allows them to apply all the above functions implicitly through leadership values instead of explicitly as scientific tasks or psychological tools. The first choice in each of the above 10 pairs of options is a constraint to aspiring value-based leaders and the war-fighting teams they are responsible for. The only winner is the military bureaucrat, who—untethered by long-term values—stymies the emerging risk takers in an environment increasingly void of coup d'oeil and ripe with short-term reward.

This trend is further clarified by Malham M. Wakin, who divides leaders into two basic types: (1) transactional (contract-based leadership "encouraging adversary relationships between the leader and those led") and (2) transformational (moral-based leadership "stressing the role of education, persuasion,

If the Air Force is to be prepared for future combat situations, it must develop transformational leaders now, within a quality environment.

and cooperation in mission accomplishment").[14] Perhaps a twentieth-century prophet, Wakin suggests that the "transformational leader sets the moral tone for his subordinates by the example of integrity he provides."[15] Integrity can't be instilled via contracts or charters. Yet, in quality we find these politically based concepts becoming the basis of all we do. Collectively, contracts, management by fact, zero-based defects, off-sites, and so forth seem to fly in the face of every attribute to which we need to expose future warriors. As a litmus test for quality, we should simply ask, Do the quality tools, techniques, or concepts being presented add to or detract from our institutional values on leadership? Some of these, such as imagineering, benchmarking, continuous improvement, self-assessments, and strategic planning may blend in beautifully with our values if they are integrated at the proper pace and time; others simply do not. A young lieutenant whose training focused exclusively on management by fact and zero-based defects may be ill prepared to solve a

maintenance problem during a chemical bombardment with casualties mounting and airframes idled on the tarmac.

We are dangerously close to tolerating and—perhaps worse—sponsoring a generation of transactionalists instead of the transformationalists that an evolving fighting force needs. By not creating and rewarding transformational leaders in conjunction with our quality culture, we are slipping into a transactional, contract-based mind-set that, if given a foothold, will rob our future prophets and pugilists of the judgment they need to realize coup d'oeil, both in peace and war. Hopefully, the ultimate transformational leader is also the synergist, a term used by M. Lawrence Miller in his brilliant book, *Barbarians to Bureaucrats.* The synergist embodies but one of seven leadership styles, which—according to Miller—typically are found in most organizations. Because the Air Force mirrors society, it too has its limited share of synergists, as well as the other six types:

1. **The Prophet:** The visionary who creates the breakthrough and the human energy to propel the [unit] forward.

2. **The Barbarian:** The leader of crisis and conquest who commands the [unit] on the march of rapid growth.

3. **The Builder and Explorer:** The developers of the specialized skills and structures required for growth, who shift from command to collaboration.

4. **The Administrator:** The creator of the integrating system and structure, who shifts the focus from expansion to security.

5. **The Bureaucrat:** The imposer of a tight grip of control, who crucifies and exiles new prophets and barbarians, assuring the loss of creativity and expansion.

6. **The Aristocrat:** The inheritor of wealth, alienated from those who do productive work, who is the cause of rebellion and disintegration.

7. **The Synergist:** The leader who maintains the balance, who continues the forward motion of a large and complex structure by unifying and appreciating the diverse contribution of the Prophet, Barbarian, Builder, Explorer, and Administrator.[16]
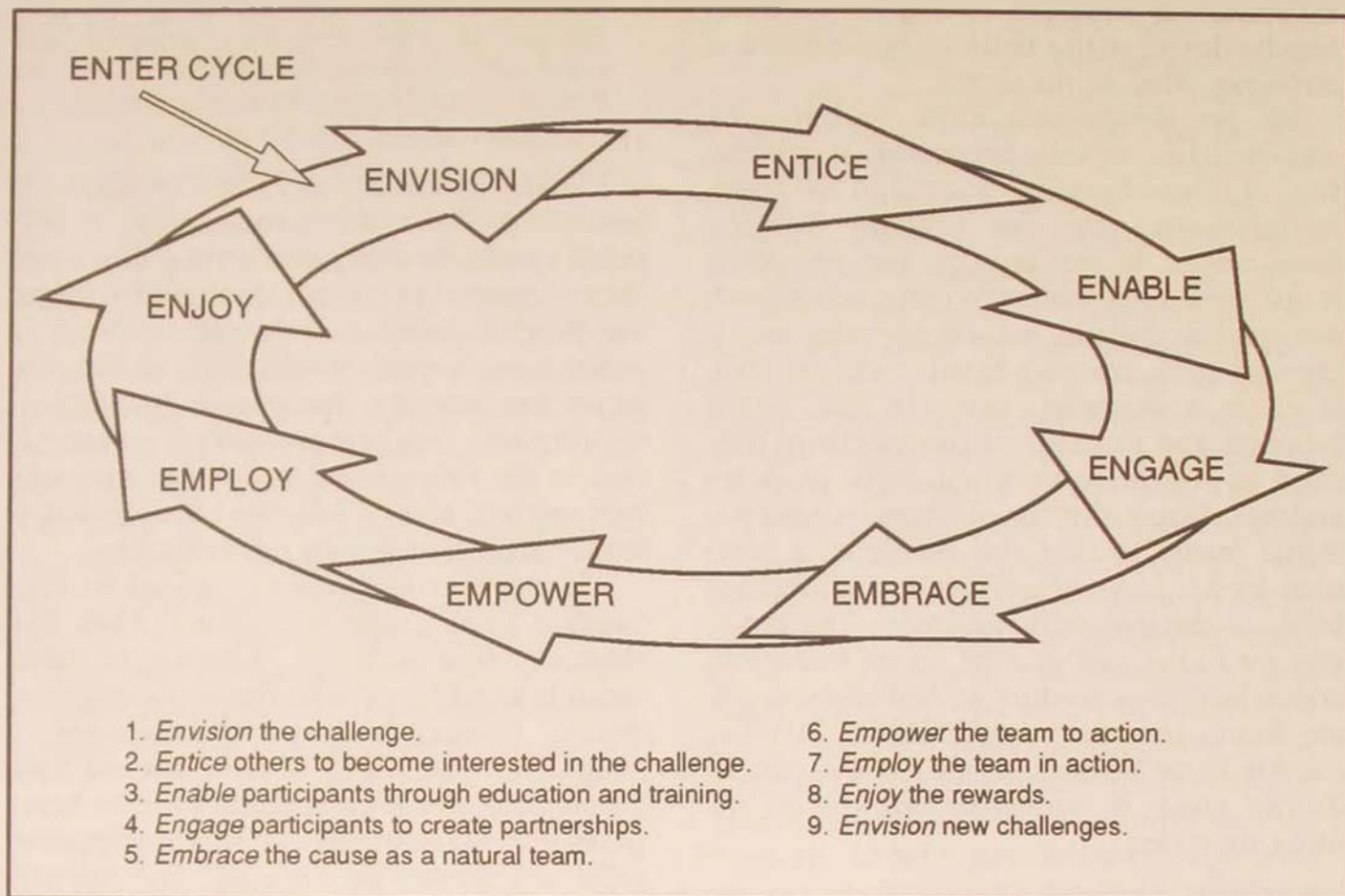
Clearly, given its focus on quality and leadership, the USAF should strive to develop synergists who possess coup d'oeil and thus perform as transformational leaders. We need to teach our people to think in peace as we hope they will think in war. Organizations learn and evolve, as do individuals—only slower. This process doesn't necessarily require the lock-step implementation of quality tools and techniques previously noted; it simply requires value-based leadership.

This type of leadership is rooted in what Stephen Covey calls the natural laws that show us "true north."[17] A return to value-based leadership must be the first step in our quality journey and our development of coup d'oeil. In search of these natural laws, I embarked on a philosophical journey based primarily on the concept of profound knowledge articulated by Deming and Barbara Lawton, whose basic construct of "profound knowledge" includes

1. Application of psychology (motivation) in the workplace.

2. Appreciation of systems and processes.

3. Understanding of variation within processes (common and special causes).

4. Understanding the theory of knowledge (developing hypothesis-based thought).[18]

Though brilliant, this construct lacks any explicit reference to leadership or environment. Alternatively, I offer a parallel construct, wherein profound knowledge is an art whose evolution occurs along three convergent veins symbolized by the acronym ASK:

1. **arête:** Greek word loosely translated as duty to oneself (i.e., turning a philosophical vision into action through personal leadership).[19]

2. **systems thought:** Essence of Deming's

Figure 2. Pathway of *Arête*

1. *Envision* the challenge.
2. *Entice* others to become interested in the challenge.
3. *Enable* participants through education and training.
4. *Engage* participants to create partnerships.
5. *Embrace* the cause as a natural team.
6. *Empower* the team to action.
7. *Employ* the team in action.
8. *Enjoy* the rewards.
9. *Envision* new challenges.

message on systems/processes and the variation associated with each.[20]

3. kaizen: Japanese term meaning "gradual improvement in the status quo. . . . Everything in life deserves to be improved."[21]

Profound knowledge doesn't just happen, nor is it quickly taught. It evolves over time, as does any value. Simply put, value-based profound knowledge is a desire for gradual improvement, focused on systems and the variations within them and motivated by a commitment through personal leadership to turn a quality vision into action.

Though Lawton and Deming's construct of profound knowledge differs from my own, this type of knowledge—once nurtured— feeds the synergist and becomes the moral springboard for the lifetime transformationalist.

By mixing quality-based, value-centered leadership with a lifetime commitment to profound knowledge, one successfully builds quality into organizations and restores synergy to both quality teams and individuals while developing coup d'oeil in transformational leaders. *Arête* is the primary pathway by which knowledge and values intertwine and then mesh with a warrior's evolution to developing the inner eye or coup d'oeil. Most appropriately, the *arête* cycle (fig. 2) ends with a clear and observable change in behavior.[22]

If one seeks leadership, coup d'oeil, and potential war-fighting teams, one must become the synergist and develop or allow the development of processes that support *arête* and coup d'oeil in peace. Our profession is too important to be caught up in an increasingly narrow quality vision without thought or consideration for its wartime impact on our emerging leaders.

Deming succinctly states that "quality cannot be shouted!"[23] Yet, the Air Force is

currently screaming quality as if it has unearthed the Holy Grail. As a value, quality is simply an awareness that grows from a gradual change in the way we see ourselves and the world around us. For a war-fighting force, quality must have deeper meaning than a pre-approved, scientific listing of specific tools, techniques, or methodologies (training-based curricula) that are to be blindly used in accordance with some requirement without engaging the guiding intellect (education-based curricula) that should truly define our culture. If the prophet properly employs his vision, the pugilist can employ his weapon system with a natural synergy that is the essence of quality. If this artistic synergy is obstructed by the politician, we become slaves to quality, entrapping ourselves and absolving ourselves of the very judgment the quality culture is trying to nurture. *As a value, quality fits beautifully into our lifetime pursuit of intellect and coup d'oeil as outlined by Clausewitz.* Used alone as a tool, it becomes an isolated cancer that erodes coup d'oeil and increases pseudosynergistic teams which defy our intellect and feed only the bureaucrats.

Regardless, quality is here to stay; we must now simply implement it in harmony with the other leadership values unique to our profession. It is my hope that the quality philosophy succeeds tenfold and in the process creates a generation of exceptionally wise leaders. The springboard to our institutional transformation lies in education and in the subsequent development of value-based synergists from the prophets, pugilists, builders, explorers, and administrators who currently fill positions in our organizations. With these leaders instructed on value-based profound knowledge (in whatever form) and learned in the art of coup d'oeil, we have an opportunity to dramatically transform not only government, but war fighting for generations to come. If, however, we take the road of the shortsighted military bureaucrat, we are doomed, for "only the dead have seen the end of the war."[24]   □

Notes

1. Peter Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization* (New York: Doubleday Press, 1990), 37.

2. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1976), 102.

3. The read-and-act skills model was developed by Dr Gus Economos, who suggests that great leaders need to be able to properly read situations and people and then act by using the appropriate methods and resources.

4. Gen Douglas MacArthur, "Duty, Honor, Country," in AU-24, *Concepts for Air Force Leadership*, ed. Richard I. Lester and A. Glenn Morton (Maxwell AFB, Ala.: Air University, 1990), 370.

5. Ira C. Eaker, "Anatomy of Leadership: Images and Reflections—The Pattern of Air Leadership," in AU-24, 317.

6. Clausewitz, 101.

7. Ibid., 102.

8. Michael Howard, *Clausewitz* (New York: Oxford University Press, 1983), 27.

9. Clausewitz, 102.

10. Russell V. Ritchey, *Year of the Tiger* (Maxwell AFB, Ala.: Air University, 1974), 67.

11. Peter Scholtes et al., *The Team Handbook: How to Use Teams to Improve Quality* (Madison, Wis.: Joiner Associates, 1988), 2–7.

12. *Squadron Officer School Curriculum* (Maxwell AFB, Ala.: Air University, 1987), 3130 R-1 through R-2 and 3160 R-1 through R-2.

13. Ronnie Lessem, *Total Quality Learning: Building a Learning Organization* (Cambridge, Mass.: Basil Blackwell, Ltd., 1991), 27.

14. Malham M. Wakin, "The Ethics of Leadership II," in AU-24, 55.

15. Ibid., 59.

16. M. Lawrence Miller, *Barbarians to Bureaucrats: Corporate Life Cycle Strategies: Lessons from the Rise and Fall of Civilizations* (New York: Clarkson N. Potter, Inc., 1989), 2.

17. Stephen R. Covey, *Principle-Centered Leadership* (New York: Summit Books, 1991), 140.

18. W. Edwards Deming, *The New Economics for Industry, Government, Education* (Cambridge, Mass.: MIT Press, 1993), 50.

19. Lessem, 6–7.

20. Deming, 98–103.

21. Masaaki Imai, *Kaizen: The Key to Japan's Competitive Success* (New York: Random House Business Division, 1986), 3–7.

22. Charles T. Barco, "Search for Profound Knowledge," in *QAF Symposium Proceedings* (Maxwell AFB, Ala.: Air University, 1993), 729. The *arête* pathway was designed to be used with a judgment/hypothesis-based learning cycle such as Lessem's Question, Theorize, Test, and Reflect model. Lessem, 27.

23. Quoted in Federal Quality Institute, *TQM in the Federal Government* (Washington, D.C.: Government Printing Office, 1992), iii.

24. Plato, quoted in MacArthur, 372.

THE EVOLUTION OF
AIR FORCE TARGETING

Capt John R. Glock, USAF

The choice of enemy targets is the most delicate operation of aerial warfare.
—Giulio Douhet, 1921

The key to air power is targeting and the key to targeting is intelligence.
—Col John Warden, 1990

FROM THE ALPHA to the omega, targeting has been the essence of air power.[1] People who have written about or employed aerospace power have long recognized the importance of targeting. They have understood that successful application of air power depends on targeting. This article examines three themes. First, it traces the evolution of Air Force targeting. Second, it shows that Air Force targeting has been a driving force in the development of air intelligence. The final theme is the Air Force's leadership in air targeting.

World War I

From their earliest days, aerospace planners have pursued the idea of the "strategic" application of air power. German Zeppelin raids on London in 1917 are probably the first known uses of air forces beyond direct support of ground operations.[2] While the material effects of these raids were minimal, the effects on the conceptual role of air power were tremendous. During this period, the US developed its concept for strategic bombing against commercial centers and lines of communications. In November 1918, then-Maj Edgar S. Gorrell developed (and had approved) the first strategic bombardment plan for the Air Service, American Expeditionary Forces (AEF).

Gorrell's objective was to "drop aerial bombs upon commercial centers and the lines of communications (LOC) in such quantities as will wreck the points aimed at and cut off the necessary supplies without which the armies in the field cannot exist."[3] To achieve this result, planners required targets. To determine these targets, airmen systematically analyzed critical enemy industrial centers and LOCs to ascertain which should become targets.[4] However, the war ended before the AEF could fully execute the plan.[5] The [World War I] US Bombing Survey concluded that the Air Service needed to identify critical targets to support a systematic plan for air operations. The survey stated that

> the greatest criticism to be brought against aerial bombardment . . . as carried out in the war of 1914–1918 is the lack of a predetermined program carefully calculated to destroy . . . those industries most vital in maintaining Germany's fighting force.[6]

It recommended that

> a careful study should be made of the different kinds of industries and the different factories of each. This study should ascertain how one industry is dependent on another and what the most important factories of each are. A decision should be reached as to just what factories if destroyed would do the greatest damage to the enemy's military organization as a whole.[7]

Another lesson from the war was that dedicated, trained individuals (knowledgeable of air power) are needed to undertake this careful study. The Intelligence Section of the General Staff (G-2) created an Air Intelligence (A-7) subsection. Then-1st Lt Alfred T. Bellinger, a G-2/A-7 staff officer, reported that there were some who believed that the "work of air intelligence belonged properly to the Air Service. . . . Supporters of this theory [believed] it was necessary for an intelligence officer to have technical knowledge of aviation for the proper performance of his duties."[8] Immediately following World War I, Gen William ("Billy") Mitchell identified the need for (target) intelligence officers at the staff and unit level. He saw the need for these officers "to compile and maintain all information of value in the preparation of bombing missions, an indexed file of photographs, and a stock of maps and charts showing bombing targets and intelligence concerning them."[9]

Immediately following World War I, Gen William ("Billy") Mitchell (first row, center) identified the need for target intelligence officers at the staff and unit level.

World War I taught us that successful application of air power requires a predetermined plan calculated to destroy the enemy's will and war-sustaining capability. Achieving this goal requires systematic analysis to determine which targets if destroyed would do the greatest damage to the enemy. An organization with a constant focus on air targeting is needed to undertake this kind of systematic study. This organization needs to maintain files of information

about potential targets as well as requisite target materials. From the beginning, the Air Service took the lead in air targeting. It not only developed the first concepts for the offensive use of air forces, but also for the intelligence support required.

Interwar Years

As a result of the lessons from World War I, the Air Service (later the Air Corps) recognized it needed to more fully develop its concepts for the employment of air power. Through the interwar period, the Air Service Tactical School (ASTS)—later the Air Corps Tactical School (ACTS)—continued to de-

Through the interwar period, the Air Corps Tactical School continued to develop the concept of strategic bombing and recognized that targeting was an integral part of bombardment.

velop the concept of strategic bombing. The instructors recognized targeting as an integral part of bombardment.[10] By 1926 many airmen considered bombardment the most important role for air power. The predominance of bombardment led to an increasing emphasis on targeting. Then-Maj Donald Wilson, an instructor at the ACTS, believed that attacking a few critical targets would disrupt an enemy's economy. These targets, if successfully destroyed, would have a two-fold effect. First, the enemy's industrial complex could not sustain its fielded forces. Second, the effect on the day-to-day lives of the civilian population would be so disruptive that they would lose faith with their government and military and force the national leadership to sue for peace.[11] According to then-Lt Haywood Hansell (one of two officers assigned to help Major Wilson), one of the principal tenets upon which the school based its strategic doctrine stated:

Prior to World War II, the Air Corps made no provision for air intelligence training. Gen Ira C. Eaker, commander, Eighth Air Force, reported that "intelligence represents the section of activity in which we are weakest."

Proper selection of vital targets in the industrial/economic/social structure of a modern industrialized nation, and their subsequent destruction by air attack, can lead to fatal weakening of an industrialized enemy nation and to victory through airpower.[12]

By the 1930s the Air Corps had developed a doctrine based on the belief that air power could achieve victory by breaking the enemy's will and capability to fight. It would accomplish this by

destroying organic industrial systems in the enemy interior that provided for the enemy's armed forces in the field; and paralyzing the organic industrial, economic, and civic systems that maintained the life of the enemy nation itself.[13]

This doctrine led to an even greater need for target intelligence. According to Hansell, the ACTS believed strategic intelligence was "vital to the planning and conduct of strategic air warfare."[14] He continues,

Much of the value of the bombing offensive, should there be one, would of necessity rest on intelligence data and the conclusions planners gleaned from it. In truth these specific questions were beyond the competence of the Tactical School. Strategic air intelligence on the major world powers would demand an intelligence organization and analytical competence of considerable scope and intelligence and complexity.[15]

Yet during the lean years of the "all-pilot Air Corps," when the Air Corps was struggling for its survival, there was no time or inclination to train officers in combat intelligence.[16] Despite the clear lessons of World War I, the Air Corps entered the Second World War without an intelligence organization capable of conducting systematic studies of potential enemies and recommending vital targets whose subsequent destruction would lead to victory. The Air Corps still relied on Army G-2 to maintain sufficient data and target materials to support both the planning and conduct of air operations.

World War II

On the eve of World War II, the Army Air Corps had a well-developed doctrine, but Army G-2 was not providing the intelligence support needed to turn doctrine into operations.

The American airman entered the war with a rather well-developed body of doctrine on how the airplane should be employed . . . but it was evident from an early date that the AAF [Army Air Forces were] poorly prepared for waging a strategic campaign against Germany, or any other enemy, because of the paucity of organized intelligence on the target itself.[17]

In 1940 Gen H. H. Arnold recognized that the Air Corps was not receiving the intelligence it needed to establish requirements or to plan operations. He requested and received permission to establish an air intelligence organization under the chief of the Air Corps. Then-Major Hansell was the first chief of the Strategic Air Intelligence Section, A-2. His section performed economic-industrial-social analyses. It analyzed and described the vital and vulnerable systems, selected targets, and prepared target folders.[18] In July 1941 General Arnold assigned Major Hansell to the new Air War Plans Division (AWPD). The initial effort of the division was to prepare the Army air section of the "Joint Board Estimate of United States Over-All Production Requirements."[19]

However, when war began, the Army Air Forces (AAF) still had inadequate intelligence to plan and conduct combat operations and lacked a systematic method for selecting targets. Prior to World War II, the Air Corps made no provision for air intelligence training.[20] Gen Ira C. Eaker, commander of the Eighth Air Force, reported in March 1942 that "intelligence represents the section of activity in which we are weakest."[21] Then-Col George C. McDonald, chief of Eighth Air Force intelligence, recalled that no one provided intelligence "in any useful form at the beginning of the war—we went into the field empty handed in this respect."[22] While there was an Air Intelligence

Section, there was still no organization capable of doing the systematic analysis required for proper targeting. There were no trained target intelligence officers. Just as important, we still had not developed the data base of potential targets and built the target materials needed to support our air forces.

During the fall of 1942, AWPD-42, Requirements for Air Ascendancy, was under discussion at the highest level, and as the discussion progressed, the plan's limitations in the field of target analysis became the more readily apparent. The AAF had accumulated a vast amount of data on Germany. However, no rational system for target selection existed. General Arnold established the Committee of Operations Analysts (COA) in December 1942 to overcome this shortfall. For the first time the United States had a single organization responsible for the collection and analysis of intelligence for the purpose of air target selection.[23] Air planners used the target selection done by the COA as the basis for the Combined Bomber Offensive against Germany and for the strategic campaign against Japan. This group eventually evolved into the first Joint Target Group. The deputy assistant chief of the Air Staff for targeting headed this organization. Also in 1942, the AAF created a school to train air intelligence officers. Another outgrowth of the attempt to find a systematic approach to target selection was the creation of a data base of potential targets. It was called the Bombing Encyclopedia,[24] and was the forerunner of the Basic Encyclopedia (discussed later) that we use today.

By 1944, most planners in the AAF recognized the importance of intelligence to air operations. General Hansell, in his memoirs, stated:

> I believed foreign industrial analysis and targeting was the *sine qua non* of strategic air warfare. Without such intelligence and analy-sis there could be no rational planning for the application of airpower. Douhet's statement to [the] effect that the selection of objectives and targets was the essence of air strategy was patently true.[25]

General McDonald, USAF director of intelligence, was even more specific about what type of intelligence when he said that "target intelligence is the basic requirement because a Strategic Air Force is nothing more than a large collection of airplanes unless it has a clear conception of what to use its planes against."[26] Just as the (World War I) bombing survey had done, the United States Strategic Bombing Surveys (USSBS) emphasized the importance of target selection to the planning and conduct of operations. The USSBS stated:

> The importance of careful selection of targets for air attack is emphasized by [our] experience. Our strategic intelligence . . . at the outset of the war was highly inadequate. . . . [I]f a comparable lack of intelligence should exist at the start of a future national emergency, it might prove disastrous. . . . The present shortage of trained and competent intelligence personnel give[s] cause for alarm and require[s] correction.[27]

Two world wars showed that the proper selection of vital targets is critical to the successful application of air power. Selection of targets is dependent on a systematic study of available intelligence. Without such intelligence and its systematic analysis there can be no rational planning for the application of air power. An organization with a high degree of analytical competence is required to perform this targeting function. It requires competent, trained personnel who understand the capabilities and limitations of intelligence as well as aerospace forces. These individuals must have access to a current data base and the knowledge to use it. Finally, as the USSBS states, the lack of this ability at the beginning of a future national emergency might prove disastrous!

Korean War

Five years after World War II, the prophetic words of the USSBS were realized. Despite the lessons of two world wars and the warnings contained in the [World War I]

Bombing Survey and the USSBS, we did not possess the organization, intelligence personnel, data base, or target materials needed to support the application of aerospace forces on the Korean peninsula.[28] We were even less prepared to target North Korea in the opening moments of the Korean conflict—the precise time when air power may have proven most decisive—than we were for Germany before World War II.

Prior to the outbreak of war, there was no organization in the Air Force maintaining and analyzing the North Korean target base. The existing data base on North Korea was inadequate. In part, this was due to the Far East Command's (FEC) lack of contingency plans for war with North Korea.[29] A Far East Air Forces' (FEAF) report highlights these shortfalls:

> The probability of fighting in Korea largely had been overlooked in the years following World War II. As a result, we had practically no ready target intelligence. . . . [We] found [ourselves] without a targeting system capable of fulfilling the requirements. . . . However, an even more serious deficiency was the small amount of Korean targeting which had been accomplished. . . . The latter stemmed from several basic causes, the most obvious of which was the small number of intelligence personnel who had been assigned to FEAF.[30]

Only 53 targets in North Korea had target folders, and these were out of date. In addition, there were no current target materials on Korean targets. There was even a lack of basic imagery products. The FEAF Bomber Command stated that the available imagery, when it did exist, was of poor quality.

The problem of inadequate numbers of trained intelligence personnel to support the targeting function continued throughout the war. Two separate studies were conducted to evaluate the effectiveness of the Air Force in Korea. Both reports indicated that the outbreak of the war had created an immediate shortage of intelligence personnel. They also pointed out that inadequate training made these shortages more acute. The shortage was so acute that FEAF had to draft flying officers to perform intelligence

functions. As late as July 1952, the FEAF Bomber Command "lacked sufficient personnel to handle any large day-to-day quantity of targets."[31] The FEAF report states that

> the Korean campaign provided more than enough evidence to bolster the contention that neglect of intelligence training during peacetime is a serious mistake, if that point had not already been made powerfully clear at the outset of World War II. The FEAF was woefully lacking in competent Combat Intelligence Officers.[32]

General Headquarters Far East Command (GHQ FEC) assumed responsibility for targeting. The chief of staff established the GHQ Target Group on 14 July 1950 and made it responsible for target nominations. However, the GHQ Target Group was not capable of performing this task. The work of this group was neither systematic nor thorough. It resulted in information of questionable value. Of the 220 primary and secondary targets that the group nominated, 20 percent did not even exist.[33] The remaining targets were often unsuitable for attack by aircraft. Finally, of the targets that did exist and that were suitable for attack by aircraft, many were not supported with adequate imagery or information. Eventually, FEAF took on a greater portion of the target-nomination process, and gradually became the theater-targeting body. It was responsible for nominating targets that were the basis for air campaigns meeting the needs of the FEC.[34] However, it was two years before there was a fully integrated joint targeting effort.

The lack of trained analysts affected two additional areas: combat assessment and weapon recommendations. The FEAF Report on the Korean War indicates that there were very few studies conducted on the results obtained from our bombing. It states, "If a more extensive effort had been devoted to [combat assessment], a more accurate appraisal of the value of [our] target plans would have resulted."[35] The report also indicates that there was little effort made to make weapon recommendations. Just 10

days before the armistice, the FEAF director of intelligence was finally able to establish a Vulnerability Division.

> The mission of this Division was to provide effective and economical weapon recommendations. If this Division had been established earlier it undoubtedly would have contributed to a more efficient accomplishment of FEAF's mission in the Korean War.[36]

FEAF lessons learned stated:

> Although we had failed to stockpile targeting materials on Korea prior to the outbreak of hostilities, a greater initial deficiency was a lack of a targeting system. . . . Our hastily improvised targeting program . . . suffered from a lack of trained and experienced intelligence officers. . . . [This] resulted in a lack of sufficient enemy reaction studies, and an inability to provide complete weapon recommendations. . . . The inability to perform these vital targeting functions caused us to over-estimate the results of several air campaigns.[37]

It went on to say that

> good target research must include physical vulnerability studies and weapons selection recommendations [and that] a truly effective targeting program must . . . be initiated before fighting starts.[38]

Our experiences gained during the Korean conflict reinforced the lessons learned in both world wars. Once again we saw that the proper selection of vital targets is critical to the successful application of air power. Selecting these targets requires an organization with trained, experienced personnel, who must be familiar with both the operations and intelligence worlds. In an effort to correct deficiencies existing at the start of the Korean conflict, the Air Force created the targeting officer career field in 1954. It also enlarged the scope of the data base of potential targets to include many more potential enemies. Also, at the request of the Joint Chiefs of Staff, the Air Force became the executive agency for the Department of Defense's (DOD) Air Target Materials Program (ATMP) in 1953. This was done to ensure

the adequacy of air targeting materials. The Air Force's ability to do targeting had made great progress since the days of Gorrell.

Vietnam Conflict

Unfortunately, much of the progress the Air Force made in the fifties was lost in the early sixties. One of President John F. Kennedy's first acts was to restructure the DOD. Kennedy and Secretary of Defense Robert S. McNamara wanted to make the department more efficient and flexible. One way of doing this was to centralize functions that were not service-specific. One of these functions was intelligence. In 1962 the Defense Intelligence Agency (DIA) took over much of the intelligence work previously done by the services. One of these areas was the maintenance of the targeting data base. DIA also became responsible for the ATMP and the Tactical Target Materials Program (TTMP). Unfortunately DIA (and the Air Force) largely ignored conventional targeting applications in the nuclear age. The Air Force would soon feel the results of both the centralization of intelligence and the neglect of conventional operations.

Some believe the centralization of the targeting functions within a national agency was imprudent. Maj Gen George Keegan, the Seventh Air Force deputy chief of staff for intelligence in 1968–69, said, "Years ago, the mission of targeting was taken away from the Department of the Air Force and passed to the Defense Intelligence Agency, where it simply died."[39] At the beginning of our involvement in Vietnam, the Air Force did not have an adequate targeting organization to support our combat operations. As one lesson learned states:

> The targeting function is an essential element in the effective employment of fighting forces. . . . [T]he Second Air Division intelligence organization could not provide adequate planning and execution support to the rapidly escalating air operations.[40]

The situation was very similar to that of the Korean conflict. The Basic Encyclopedia provided targeteers and planners with basic infrastructure and industrial installations. Pacific Command (PACOM) planners were able to identify 94 targets in North Vietnam. PACOM Operation Plan 37-64 contained a Strike Plan Target List with these targets arranged into four attack options. Each option provided for escalation of the conflict. The objectives of the war being constrained as they were, the US was forced to attack "in-country" targets. Because the Air Force did not have a targeting organization capable of supporting this, "MACV [Military Assistance Command, Vietnam] J-2 developed its own organization, the Target Research and Analysis Center (later renamed the Combined Intelligence Center, Vietnam [CICV]), to accomplish the in-country targeting task."[41]

During the battle for Khe Sanh (Operation Niagara), MACV relinquished control of targeting. The Air Force created an ad hoc targeting organization to effectively use air assets. The Seventh Air Force deputy chief of staff for intelligence (DCS/I), augmented by TDY personnel, established an intelligence control center. This center represented the first major Air Force contribution to the in-country targeting effort. In March 1968 the Air Force recalled the TDY personnel. This recall terminated the operation of the intelligence control center, effectively conceding de facto control of targeting back to MACV. This again limited the Air Force to providing on-call fire support to the ground forces in Vietnam, just as we had in Korea.[42] "The Air Force quickly found itself woefully short of targeting personnel. By 1969 [the] Air Force had just about exhausted its cadre of experienced targeteers fighting the war. The void was filled with 'CBPO' targeteers with little or no experience."[43]

The war effort was negatively impacted by a shortage of intelligence personnel and their lack of training.

Although the Air Force had been in SEA [Southeast Asia] since late 1961, adequate intelligence personnel resources were still unavailable when the rapid buildup began. . . . The buildup began at a time when the Air Force was actually reducing manpower resources in response to budgetary and gold flow constraints. . . . [T]he lack of adequate formal and technical training for intelligence personnel adversely affected the intelligence missions in SEA.[44]

There were many positive lessons from Vietnam. Air Force doctrine recognized that target intelligence is essential to aerospace operations.

The role of intelligence support in the effective employment of tactical air forces is of critical importance. Targeting is the key function and includes exploitation of all intelligence sources for target development, material production, target analysis, recommendations for strike and strike assessment.[45]

Sixty-three percent of the intelligence chapter in AFM 2-1 is devoted to targeting. Air Force intelligence also learned critical targeting lessons. It realized that it was not sufficient to just assign intelligence officers to targeting positions. Intelligence officers needed formal targeting training. In 1974 the Air Force again took the lead by establishing the Armed Forces Target Intelligence Training Course. This course trained Army, Navy, and Air Force officers in the capabilities and limitations of all services' weapons systems supporting air operations. It also trained students in analytical methodologies for selecting, prioritizing, and recommending targets meeting the commander's objectives and guidance. Graduates of this course were unique because they possessed an understanding of air operations, as well as intelligence operations. They provided the critical link between the two communities.

The Gulf War

The Gulf War was the first operational test of this link. Building on nearly eight de-

cades of history and lessons learned, the Air Force entered the Gulf War more prepared to apply aerospace forces than at any time in the past. Even with these preparations there were problems. Air Force targeting officers did not provide the support that decision makers, planners, and aircrews required. Some of these problems were institutional, some resulted from changing concepts of air power employment, and others were systemic within the intelligence bureaucracy. We will examine a few of these. The purpose is not to provide apologies or to lay blame. Rather, it is to identify the unique capability trained targeting officers can bring to the application of aerospace forces.

In 1990 an Air Force targeting element supported each unified command. In February 1990 Central Command (USCENTCOM) directed its Air Force component (Ninth Air Force/CENTAF [US Air Forces, Central Command]) to update the air plan for Operational Plan (OPLAN) 1002-90. In support of this request, the 9th Tactical Intelligence Squadron (TIS) Target Intelligence Division[46] began target development for the draft OPLAN. Air Force targeting officers took the objectives that the air planners provided and identified target systems to meet them. These targeting officers researched known installations and developed lists of potential targets. They used these lists to produce the *Iraqi Target Study,* which was published on 15 June 1990.

Two recurring problems hampered these targeting officers. First was the inadequacy of the installation data base. DIA maintains a worldwide installation data base known as the Automated Installation File (AIF). This file is a system used to store, manipulate, and retrieve target intelligence. Ideally it has information on every installation or place of potential military significance. However, 40 percent of the targets struck during the Gulf War were not in this data base in July 1990. The number of targets in some critical categories grew by several hundred percent. In addition to listing installations, the AIF should contain vital targeting information

such as construction data and identification of critical components. Unfortunately, many of the AIF records fell far short of providing the information necessary for accurate targeting.[47]

The second problem that the 9th TIS targeting staff encountered was the lack of necessary imagery and supporting target materials. Of the 218 targets that the 9th TIS identified, there was imagery of only 90. Of these 90, only 30 had target materials. At the initiation of the crisis 24 percent of the installations identified in Iraq had target materials. Of the targets actually struck during the war, only 11 percent had target materials on 2 August 1990. In a 29 August 1990 DIA memo to the deputy director for foreign intelligence, the DIA chief of targets acknowledged that DIA had "issues to resolve and problems to fix [with availability of target materials] after the crisis."[48] In addition to the basic shortage of target materials at the beginning of the crisis, many were of questionable utility due to their currency.[49] The average date of production was 1982, with the oldest produced in June 1973—17 years before the crisis.[50]

Despite these problems, the contributions of Air Force targeteers should be apparent. Ninety-seven percent of the targets in the 9th TIS *Iraqi Target Study* (produced a month and a half prior to the Iraqi invasion) were struck during Desert Storm. By comparison, 93 percent of the 12 August 1990 Air Staff target list and only 30 percent of the targets in the July 1990 CENTCOM Joint Target List were struck during the war.[51] More than four months prior to the invasion, the 9th TIS identified information and imagery shortfalls that would impact combat operations if not satisfied.

Air Force targeting officers were also available to support planners in the area of weapon recommendations and critical element analysis. They recommended the optimum mix and number of weapons, fuzing, and critical elements throughout the war. In some cases, strategic planners chose to disregard this information. The planners often
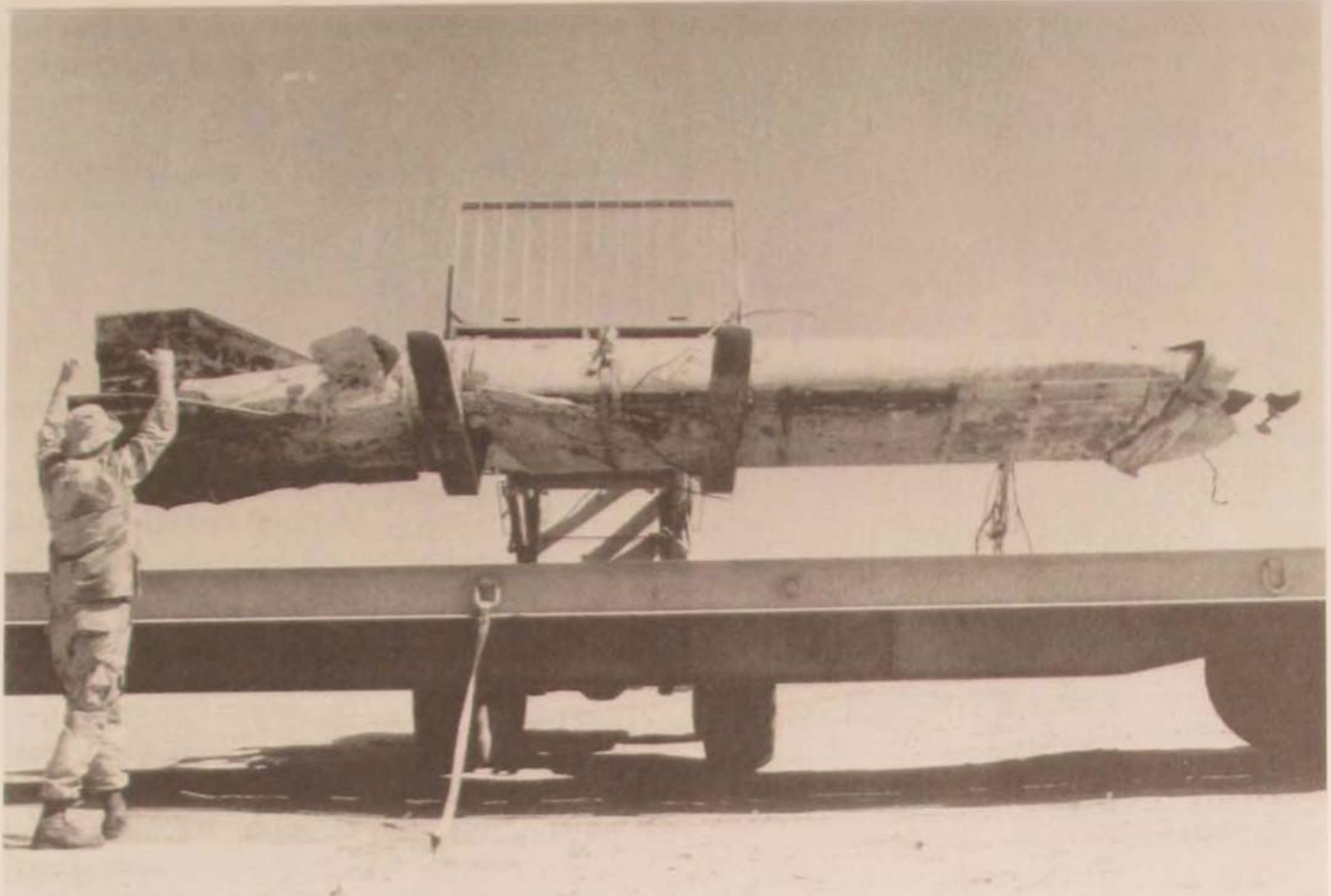
Following the strike by CBU-89s and CBU-87s against mobile Scuds (above) recommended by a targeting officer, there was a significant break in time before another mass launch. We will never know whether or not this hiatus was the result of the strike since planners returned to the use of PGMs.

thought the recommendations were too conservative. Three examples should illustrate this point.[52] In August 1990 CENTAF targeting personnel recommended that bridges only be attacked by aircraft using precision guided munitions (PGM). Initially, this advice was ignored. Based on unacceptable results, planners shifted to using PGMs against bridges. Also in August, targeting officers estimated that a particular target would require more PGMs than planners thought it should. This target type was struck but never penetrated during the war. At the end of the war it was fully functional. (In January 1993, as part of Operation Southern Watch, this same target was struck using the number of weapons recommended by the targeting staff. The result this time was the functional destruction of the facility.) Finally, on 19 January 1991, a targeting officer recommended using CBU-89s and CBU-87s against mobile Scuds. Following the recommended strike, there was a break of 60 hours before the Iraqis launched another Scud against Israel and more than five days before there was another mass launch. We will never know if this was a result of this strike or not. Planners switched back to PGMs in an effort to achieve physical destruction instead of using an area denial strategy to achieve a functional kill.

Targeting officers were not as successful in providing essential combat assessment information. One reason for this was a lack of training. The former Armed Forces Targeting Course provided only five hours of instruction on combat assessment. Exercises

also provided little training. Usually there was no poststrike imagery to work with; scripting cells had no model to generate combat assessments; and briefers failed to realistically account for limited collection assets, weather, and the general fog of war.

Desert Storm raises fundamental questions about the effectiveness of targeting. Were targeting officers always right? No. Did they provide the best support possible? No. Is there significant room for improvement before the next war? Emphatically yes! Vietnam helped forge targeting as the critical link between operations and intelligence. The lessons from Desert Storm should be used to further temper and strengthen this vital linkage.

Today

Unfortunately, the prevailing trend is not to strengthen this linkage, but to eliminate it. The global geopolitical situation has changed. One result is the downsizing and restructuring of the military services. The Air Force decided, after much thought, to eliminate the targeting officer career field. This decision was based on budgetary and manpower constraints. Part of the rationale was that it appears more cost-effective to maintain generalists at the expense of trained specialists. One question may remain unanswered until the next war: Is it more effective? The Navy has reached far different conclusions about the need for targeting. The Navy, which prior to the Gulf War did not teach targeting at its intelligence school, now teaches more hours on targeting than does the Air Force.

Since the end of the Gulf War, many have written about the war's lessons. Most authors have addressed how precision weapons and stealth platforms have altered the nature of warfare. This masks another more critical lesson—the importance of targeting. Not only have most authors failed to address the significance of targeting, they have also failed to see how greater precision requires even greater and more detailed target analysis. In each conflict we have seen our weapons accuracy improve. We have gone from Saint-Mihiel, France, to Ploesti, Rumania, to the Wonsan locomotive shops in North Korea, to the Paul Doumer Bridge in North Vietnam, to the ventilation shaft of the Iraqi air force headquarters. An enduring lesson learned about delivery accuracy during the last eight decades is that the greater the accuracy of our weapons, the more accurate we need our targeting to be.

In 1992 Congress encouraged the Secretary of Defense, heads of military services, the chairman of the Joint Chiefs of Staff, and the director of the DIA to make resources available for a Joint Target Training Program. For the first time since 1918, the Air Force has not taken the lead in a targeting program. Although the Air Force has the greatest experience in joint air targeting and the preponderance of air assets, it has taken a backseat in the future of joint targeting. The Navy is the executive agent for the new Joint Target Training Program, which is located at the Navy and Marine Intelligence Training Center.

Conclusion

This article has presented three themes. First, air targeting is fundamental to the application of aerospace forces. Second, the evolution of Air Force targeting has in part driven the development of air intelligence. Finally, the Air Force has historically taken the lead in air targeting.

We have seen that from the very beginning of aerospace planning, there was a need to systematically identify critical targets based on the wartime objectives. World War II validated the views of the Air Corps Tactical School and led to the creation of a single, wartime organization responsible for the collection and analysis of intelligence for the

purpose of air target selection. The Korean War dramatically emphasized that a truly effective targeting program must be initiated before the fighting starts. It also reinforced the lesson that the requirement is not for generic intelligence personnel but for trained and experienced professionals capable of making target and weapon recommendations and then analyzing the results of these strikes. After the Korean War, Air Force intelligence created the target intelligence career field, and the DOD made the Air Force the executive agent for the ATMP. The Vietnam conflict reconfirmed the lessons of previous wars. Further, it highlighted the need for specialized training in targeting functions. Following the Vietnam conflict, the Air Force took the lead in target training by establishing the Armed Forces Target Intelligence Course—the first course ever developed to train personnel in essential targeting functions.

The Air Force offers the quickest, longest-ranged, and most flexible force available to the nation. As we continue to draw down, our power-projection capabilities will become even more vital in protecting US interests.[53] While efficiency may be a peacetime measure of merit, effective targeting remains crucial to applying aerospace power. Targeting remains one of the easiest and most cost-effective means of preserving our diminishing resources before the first weapon is committed.[54] Yet the Air Force is in danger of forgetting that targeting is a unique, critical function. It has already eliminated the only comprehensive course in the DOD dedicated to air targeting and relinquished the lead in the development of the Joint Target Training Program.[55] Future application of aerospace power will likely suffer. As we draw down, these decisions will have a negative impact on our country's ability to respond to regional conflicts in a timely and decisive manner. The inherent range and speed of aerospace forces provide "global reach"; however, *without "global targeting," we will greatly reduce our "global power!"*

We stand at a crossroads in the development of aerospace power. The path we choose will have as profound an effect on its future as did the early debates on the fundamental roles of aerospace power. We can continue to build on the lessons of the past and reestablish Air Force targeting before our current expertise fully erodes. Or we can ignore these lessons, only to learn them again at the expense of aircrew lives. We need only look to our predecessors—the Gorrells, Mitchells, Arnolds, Hansells, Stratemeyers, Momyers, and Glossons to find the direction we should go at the operational level. *"AIR POWER IS TARGETING AND TARGETING IS INTELLIGENCE!"*[56]   □

Notes

1. The contributions of all the services are included in the collective terms *air power* and *aerospace power*.

2. The first military use of powered aircraft for bombing was in 1911. Italian pilots threw 4.4-pound bomblets from their aircraft against Libyan forces. Besides resulting in the first claim of collateral damage to a hospital, the need for better bombs and target materials was identified. Robin Higham, *Air Power: A Concise History* (New York: St. Martin's Press, 1972), 21–23.

3. Edgar S. Gorrell, "Early History of the Strategical Section," ed. Maurer Maurer, in *The U.S. Air Service in World War I*, vol. 2 (Washington, D.C.: Government Printing Office, 1978), 143.

4. Given the accuracy of bombing at this point, only installations needed to be identified. The ability to identify critical elements at installations would not be needed until the Vietnam War.

5. Between 12 June 1918 and 11 November 1918, US bombers dropped 275,000 pounds of bombs on railyards, factories, bridges, command posts, troop concentrations, lines of communication (LOC), and so forth.

6. "U.S. Bombing Survey," in Maurer, vol. 4, 501.

7. Ibid., 502.

8. Ibid., vol. 3, 215.

9. "Mitchell: Provisional Manual of Operations," in ibid., vol. 2, 279.

10. Maj T. D. Milling, "The Air Service Tactical School: Its Function and Operation," (Langley Field, Va.: Air Service Tactical School, 1924).

11. Robert T. Finney, *History of the Air Corps Tactical School, 1920–1940* (Maxwell AFB, Ala.: Air University, 1955), 31.

12. Haywood Hansell, *The Strategic Air War against Germany*

and Japan (Washington, D.C.: Office of Air Force History, 1986), 10.

13. Ibid., 11.

14. Ibid.

15. Ibid., 19.

16. Harold B. Hinton, *Air Victory: The Men and the Machines*, with a foreword by Barton K. Yount (New York: Harper & Brothers Publishers, 1948), 145–46.

17. William A. Goss, "The AAF," in Wesley Frank Craven and James Lea Cate, eds., *The Army Air Forces in World War II*, vol. 6, *Men and Planes* (Washington, D.C.: Office of Air Force History, 1983), 40.

18. Hansell, 21–22.

19. The AWPD input was known simply as AWPD-1. While technically a requirements document, it was really a blueprint for our air operations plan against Germany.

20. Thomas H. Greer, "Other Training Programs," in Craven and Cate, vol. 6, 687.

21. Alfred Goldberg, "Establishment of the Eighth Air Force in the United Kingdom," in ibid., vol. 1, *Plans & Early Operations, January 1939 to August 1942*, 624.

22. Robert Frank Futrell, "US Army Air Forces Intelligence in the Second World War," in Horst Boog, ed., *The Conduct of the Air War in the Second World War* (New York: St. Martin's Press, 1988), 539.

23. Arthur B. Ferguson, "The CBO Plan," in Craven and Cate, vol. 2, *Europe: TORCH to POINTBLANK, August 1942 to December 1943*, 352–54.

24. The Bombing Encyclopedia was the first effort to automate the handling of the vast amount of information needed to provide target recommendations for every country in the world. See James Lowe, "Intelligence in the Selection of Strategic Target Systems," lecture, Air War College, Maxwell Field, Ala., 1946, 13–15.

25. Hansell, 22.

26. George C. McDonald, "The U.S. Air Force Intelligence Prior to and During World War II and Today," lecture, Air War College, Maxwell Field, Ala., 1947, 5.

27. *The United States Strategic Bombing Surveys (European War) (Pacific War)* (Maxwell AFB, Ala.: Air University Press, 1987), 39, 117.

28. The advent of nuclear weapons led many to believe that targeting was not a required discipline. There was no need to analyze the enemy target sets when we were going to bomb whole cities. According to Futrell, there was a belief in the USAF Directorate of Intelligence during the late 1940s that "targets should be working for the Directorate of Plans." Much of the intimate relationship of air intelligence and air operations was lost during the rapid demobilization of the wartime intelligence force. Futrell, "US Army Air Forces Intelligence in the Second World War," 547–48.

29. *United States Air Operations in the Korean Conflict, 25 June–1 November 1950* (Maxwell AFB, Ala.: Air University, 1952), 84.

30. *FEAF Report on the Korean War*, Far East Air Forces report, 26 March 1954, vol. 2, 141.

31. *United States Air Operations in the Korean Conflict, 25 June–1 November 1950*, 52–53.

32. *FEAF Report on the Korean War*, vol. 2, 142.

33. *United States Air Operations in the Korean Conflict, 1 July 1952–27 July 1953* (Maxwell AFB, Ala.: Air University, 1956), 10.

34. *FEAF Report on the Korean War*, vol. 2, 142.

35. Ibid., 144.

36. Ibid., 146.

37. Ibid., 147.

38. Ibid.

39. Robert Frank Futrell, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force*, vol. 2, *1961–1984* (Maxwell AFB, Ala.: Air University, 1989), 304.

40. *USAF Intelligence Activities in Support of Operations in Southeast Asia, 1 January 1965–31 March 1968* (Maxwell AFB, Ala.: Air University, 1972), 8.

41. Ibid.

42. Ibid.

43. Thomas E. Lee and Samuel M. Taylor, "Air Force Intelligence Enhancement Program," technical note, Bolling AFB, Washington, D.C., Air Force Intelligence Service, 1985, 4.

44. Ibid., 29–31.

45. Air Force Manual (AFM) 2-1, *Tactical Air Operations—Counter Air, Close Air Support, and Air Interdiction*, 1969, 8-1.

46. In wartime, 9th TIS (now the 609th AIS) became CENTAF Intelligence.

47. John Heidrick, "9TIS/INT Planning Procedures for Internal Look-90 and Operation Desert Shield," undated paper provided to the author for the Gulf War Air Power Survey (GWAPS); and memorandum for record, Col James R. Blackburn, USAF/INT, subject: Targeting/MC&G Support to DESERT SHIELD (U), 17 October 1990. (Secret) Information extracted is unclassified.

48. DIA memo from chief, Target Intelligence Directorate, to deputy director, Foreign Intelligence, subject: Overall Perspective on Target Materials Available at Crisis Initiation, 29 August 1990.

49. The ATTG was the basic target material at this time. Figures taken from CENTAF, 15 June 1990, and CENTCOM, 27 June 1990, target list and the *Consolidated Tactical Target Materials Catalog*.

50. *Consolidated Tactical Target Materials Catalog (TTMC)* (Langley AFB, Va.: 480th Tactical Intelligence Group, 1990).

51. Looking at the issue from the standpoint of what percentage of the total targets struck was identified in various lists prior to the war, one finds that the percentages for 9th TIS, CENCOM, and the Air Staff were 43, 22, and 19, respectively.

52. All examples are based on the author's experiences. The second example is corroborated by Col David Deptula, one of the air campaign planners for Desert Storm, in an interview conducted by Dr Barry Watts, and the third is recounted in DOD's *Final Report to Congress on the Conduct of the Persian Gulf War* (Washington, D.C.: Government Printing Office, 1992), 166.

53. Secretary of the Air Force Donald B. Rice, *The Air Force and U.S. National Security: Global Reach—Global Power*, white paper (Washington, D.C.: Department of the Air Force, June 1990).

54. Thomas E. Lee, "Targeting—The Key to Effective Air Power" (Thesis, Armed Forces Staff College, 1975), 47.

55. According to the draft memorandum of agreement for the Joint Target Training Program (JTTP), it is intended to ensure that all DOD targeting personnel serving in joint and service targeting positions will have a common knowledge base reflecting current joint targeting terms, tactics, techniques, and procedures. *It is not intended to train targeteers*.

56. Buster C. Glosson, "Impact of Precision Weapons on Air Combat Operations," *Airpower Journal* 7, no. 2 (Summer 1993): 8.

A SITUATIONAL LEADERSHIP MODEL FOR MILITARY LEADERS

Col Donald E. Waddell III, USAF

Leadership remains the most baffling of arts . . . as long as we do not know exactly what makes men get up out of a hole in the ground and go forward in the face of death at a word from another man, then leadership will remain one of the highest and most elusive of qualities. It will remain an art.

—James L. Stokesbury

THE ART OF leadership that Stokesbury alludes to is a subject studied more seriously in military schools than in civilian institutions. Given the life-and-death nature of our business and the importance of the military to a nation's survival, this should surprise no one. What is surprising, however, is that most Air

Force professional military education (PME) schools rely almost exclusively on the civilian-oriented Hersey and Blanchard Situational Leadership model to help teach military leadership and management.

The Air University Leadership and Management Program Advisory Group (LMPAG) recently discussed the Hersey and Blanchard Situational Leadership model used extensively by the Reserve Officer Training Corps (ROTC), the Officer Training School (OTS), the Squadron Officer School (SOS), and the Senior Noncommissioned Officer Academy (SNCOA). While most were happy with the model as presented in the various schools, the group decided to review other models to see if they might better portray military leadership. At the same time, Air War College was looking for a model to use in studying leadership in its academic program.

The general feeling was that the Hersey and Blanchard model is useful but has some significant limitations. Specifically, the model does a good job of highlighting the appropriate leadership style based on the "maturity" or "development level" of the followers but does not adequately address other military considerations. These consid-

Nineteenth-century management ruled tyrannically, often employing children for backbreaking work under appalling conditions, as witnessed by this girl hauling coal from a mine.

erations include the level at which leadership is exercised; different styles that may be required because of the demands of combat; staff versus operational leadership; or the differing styles appropriate to service, joint, or combined leadership. The purpose of this article is to suggest another leadership model that is helpful in modeling leadership situations unique to the military. While this model will be used in the Air War College curriculum next year, it has numerous applications and is particularly appropriate for midcareer officers faced with transitioning from unit-level to leadership positions involving more people and more complex missions.

Evolution of Leadership Theory

As a backdrop, we should first review the evolution of leadership theory in this century. Almost all leadership theory is based on the relative importance assigned to the leader versus the follower in mission accomplishment. Those who believe that leaders are sufficiently enlightened or *heroic*[1] (to use Morris Janowitz's term) cite examples of bold leaders such as Napoléon, Alexander, and Frederick the Great, and they favor the authoritarian model of leadership. Those who have greater confidence in the followers' maturity, capability, and insights favor the democratic model.

Our perspective of leadership with regard to the respective roles played by the leader and follower has changed dramatically in this century. In the nineteenth century, the industrial revolution pulled many Americans out of rural areas into the city where industry was producing unprecedented wealth at the expense of the worker. Working conditions were appalling as management ruled, tyrannically enjoying enormous power to hire, fire, and generally dictate working conditions for the worker. We began the twentieth century focused almost
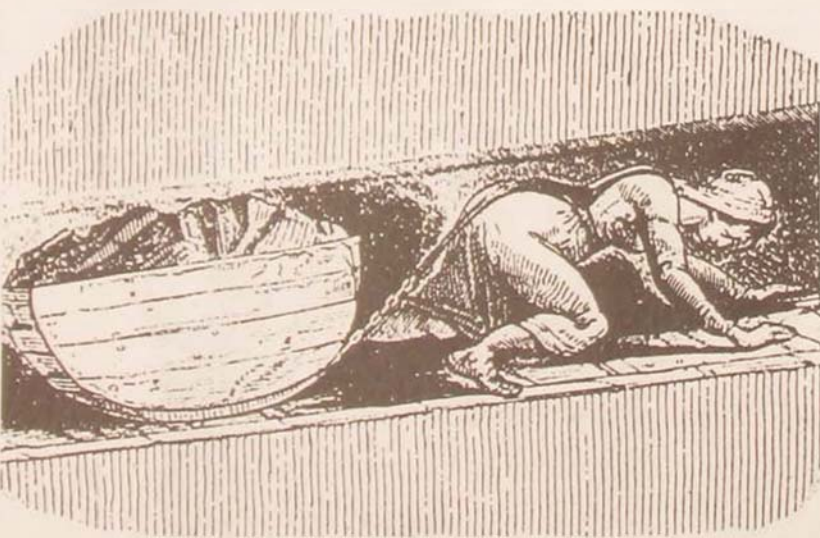
exclusively on a leader-dominant theory of leadership that assumed a low opinion of the followers' motivation, maturity, and abilities. In the early part of the twentieth century, child labor laws and unions helped improve working conditions of America's workers but also exacerbated the divisive relationship between management and labor, leader and follower. The military, long a bastion for authoritarian leaders, also maintained a predominantly authoritarian leadership style.

At the turn of the century, however, social scientists began to be interested in the worker as a means to improve production. In *Management of Organizational Behavior: Utilizing Human Resources,* Paul Hersey and Kenneth Blanchard do an excellent job of tracing the evolution of leadership theory during the twentieth century. They use Robert Tannenbaum and Warren Schmidt's "Continuum of Leader Behavior" diagram to illustrate how all leadership theory is based on the relative emphasis placed on either the follower or the leader.[2] I have adapted this diagram (fig. 1) by flipping it over so that the continuum evolves from leader-dominant to follower-dominant.
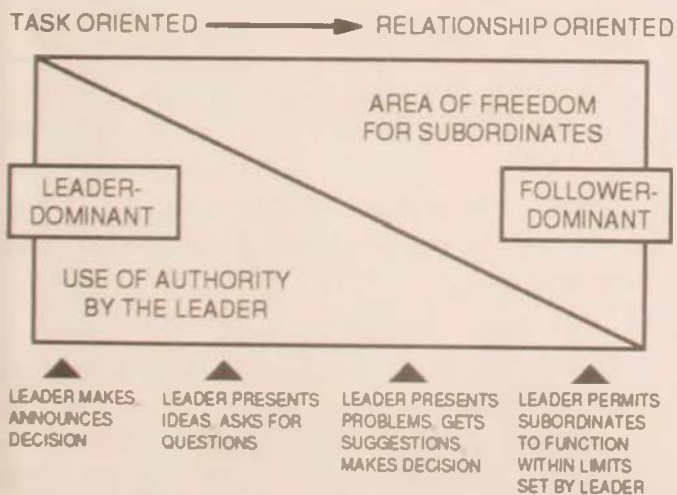

Figure 1. Continuum of Leader Behavior (adapted from Paul Hersey and Ken Blanchard, *Management of Organizational Behavior: Utilizing Human Resources* [Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1982], 92)

Hersey and Blanchard describe how leadership theory has evolved beginning with Frederick Winslow Taylor, whose scientific management movement in the early 1900s sought to improve production by increasing worker productivity through time and motion studies. In their book, Hersey and Blanchard observe that

> the function of the leader under scientific management or classical theory was obviously to set up and enforce performance criteria to meet organizational goals. The main focus of a leader was on the needs of the organization and not on the needs of the individual.[3]

Elton Mayo shifted the emphasis to the human relations movement in the 1920s. This movement sought to examine employee needs and motivation to increase output. Mayo's best-known work was the Hawthorne Study conducted at the Western Electric Company. In this study, lighting was varied to observe its effect on productivity. Surprisingly, worker productivity was less sensitive to changing lighting conditions than it was to the perception on the behalf of employees that management was interested in studying their behavior. Hersey and Blanchard observed:

> The function of the leader under human relations theory was to facilitate cooperative goal attainment among followers while providing opportunities for their personal growth and development. The main focus, contrary to scientific management theory, was on individual needs and not on the needs of organization. In essence, then, the scientific management movement emphasized a concern for task (output), while the human relations movement stressed a concern for relationships (people). The recognition of these two concerns has characterized the writings on leadership ever since the conflict between the scientific management and the human relations schools of thought became apparent.[4]

The depression and World War II resulted in a gap in organizational leadership scholarship, but immediately after World War II and into the 1960s, others began to seriously examine the leader-follower interac-

tion. Studies conducted at Ohio State University, the University of Michigan, and the University of Iowa all addressed the leader's role in balancing the competing demands of mission (task orientation) and employee (relationship behavior). Each study developed new terms to describe its particular orientation, but the fundamental issue in each case was the relative authority given to the employee or the follower.

One of the more recent studies, Douglas McGregor's Theory X and Theory Y, provides a useful framework for analyzing a leader's attitude concerning his or her followers. Theory X leaders assume followers are not sufficiently mature or motivated to be allowed much autonomy. Theory Y, in contrast, assumes just the opposite.

Figure 2 depicts a composite of these theories as they relate to leader-dominant and follower-dominant leadership styles and situations. Note the generalized chronology beginning at 1900 and ending at 1990. This illustrates how leadership theory has evolved since the turn of the century to the point
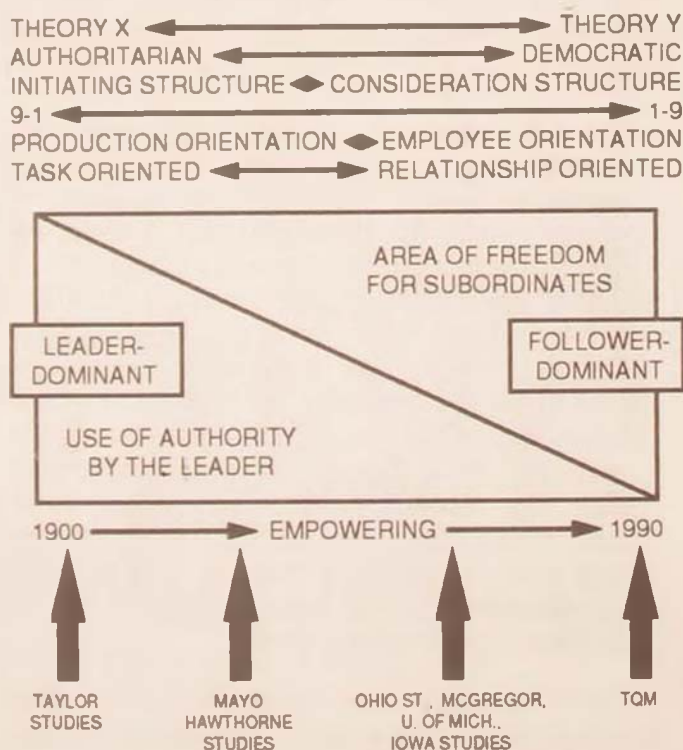
Figure 2. Leader-Dominant and Follower-Dominant Styles and Chronology

where, in contrast to the predominantly authoritarian style in 1900, our leadership style today is substantially follower-dominant as witnessed by the development of total quality management (TQM) within the Department of Defense.

Hersey and Blanchard conclude that no one theory of leadership is wholly correct and therefore developed the situational leadership model. This model holds that the leadership style used depends primarily on the maturity of the follower. They depicted their model with the diagram shown in figure 3.[5]
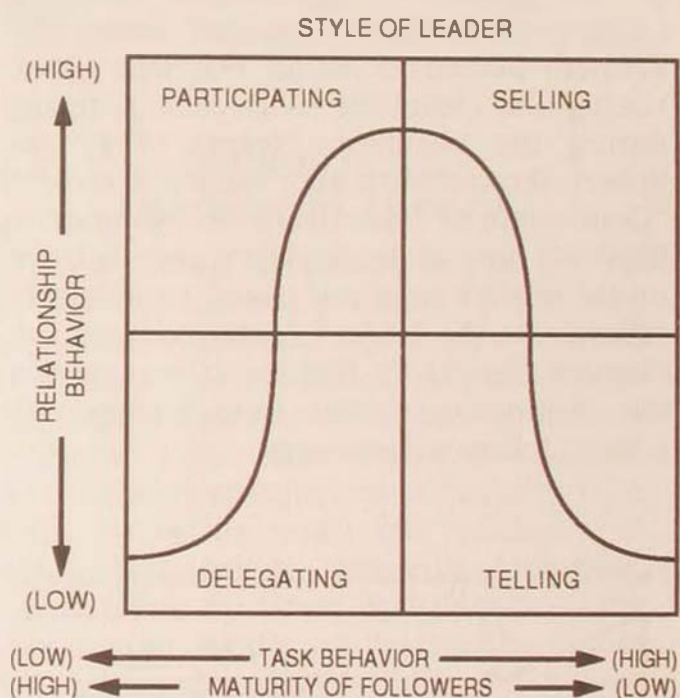
Figure 3. Hersey and Blanchard's Situational Leadership Model (adapted from Hersey and Blanchard, 169)

In sum, the substance of these studies and theories reflects a gradual evolution from an authoritarian leadership style based on a Theory X orientation to a democratic orientation that seeks to motivate the employee to feel that he or she is a contributing part of the organization. That evolution has culminated recently with the development of TQM and a quality Air Force (QAF) that seek

to further empower the employee. According to the total quality philosophy, "the challenge of our leaders is to invert the organizational pyramid and change the role of the leader or manager to a more supportive and empowering one."[6] Compared to the decidedly autocratic model of the US military in the past, the TQ approach to leadership is just about as follower-oriented as a system can be. Gen John M. Loh, commander of Air Combat Command (ACC) and QAF advocate, articulated just how far we have come since the turn of the century when he said of the QAF environment, "No one in my organization is more important than anyone else."[7]

The Air War College Model

The AWC model is designed to describe situational leadership in a military context, though it can be applied to a variety of other circumstances. We can begin to build this model with a review of the definition of leadership. According to Air Force Pamphlet

By the midtwentieth century, factory conditions had improved significantly. The depression and World War II, however, saw a hiatus in the study of leadership theory.

(AFP) 35-49, *Air Force Leadership,* "*leadership* is the art of influencing and directing people *(followers)* to accomplish the *mission.*"[8] I would add "to accomplish the mission in a particular *situation* or environment." In their book, *Management of Organizational Behavior,* Hersey and Blanchard suggested the above modification to the Air Force definition might be appropriate. They note that "there is no best leadership style or stimulus. Any leadership style can be effective or ineffective depending on the response that style gets in a particular situation."[9] They concluded that "empirical studies tend to show that there is no normative (best) style of leadership. Effective leaders adapt their leader behavior to meet the needs of their followers and *the particular environment*" (emphasis added).[10]

In his introduction to *The Mask of Command,* John Keegan alludes to a similar thought when he speaks of "the particularity of leadership" or the necessity for studying and understanding leadership in "context."[11] The following model stresses the components of leadership identified in the AFP 35-49 definition (leader, follower, mission) as they are influenced by the situation or context in which leadership is exercised. Thus, the AWC model looks like this:

Figure 4. The AWC Leadership Model

A few observations can be made about the components of the model and the relationship of these components. First, note that the arrow from followers to mission is unidirectional. That suggests that it is the followers, not the leader, who actually do the work and accomplish the mission. While the leader may get his or her "hands dirty" occasionally, the followers do the work. It is also the followers who provide feedback to the leader on their progress in accomplishing the mission. For that reason, among others, communication between leader and follower needs to be free-flowing, unencumbered as much as possible by administrative obstacles and psychological barriers.

The bidirectional arrow between leader and followers makes this point. Communication between the leader and the followers must be in the form of a dialogue, not a monologue. Many scholars have suggested that *the* critical factor in determining the effectiveness of this relationship is communication. "Congress can make a general," Omar Bradley once observed, "but only communication can make him a commander."[12] John Kline notes that

the importance of effective communication by leaders is demonstrated daily in all organizations. Indeed, since 1938 when Chester Barnard concluded that communication was the main task of managers and executives, emphasis has been placed on improving communications in organizations. . . . Not only is communication down the chain of command important, subordinates need to keep each other and their supervisors informed. In other words, to be effective, communication channels need to be open down, up and throughout the organization.[13]

That's why the arrow between the leader and the followers points both ways.

As outlined in the previous discussion, a major consideration in the understanding of leadership is the relationship between the leader and follower. The other major variable component (given that the mission remains a fixed component for a specific situation) is the situation, the environment, or the context in which leadership is exercised. This is where I think the AWC leadership model is most useful since it helps us understand how the dynamics of the leadership relationship change as the situation changes. For this reason, the "situation" component of the AWC model includes all the other components under its bracket (fig. 5). The various situations we will examine are:
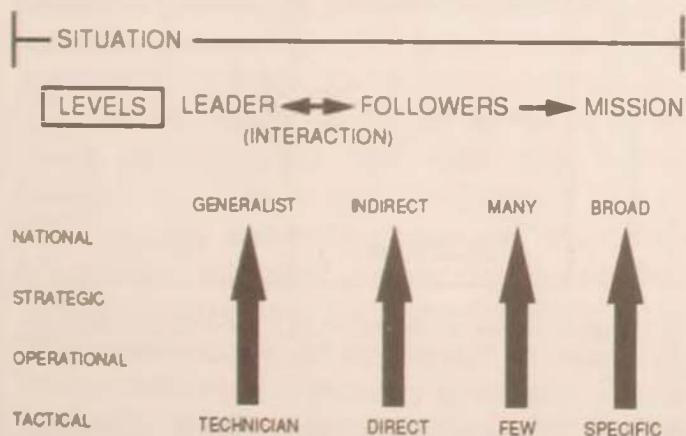
1. The *levels* at which leadership is exercised.

2. *Peacetime* leadership as compared to wartime operations.

3. A comparison of service, *joint*, and *combined* leadership.

4. *Staff* leadership as opposed to leadership of *operational* units.

├─ SITUATION ──────────────┤

LEADER ◄──► FOLLOWERS ──► MISSION
(INTERACTION)

1 LEVELS
2. COMBAT/PEACE
3. JOINT/COMBINED
4. STAFF/OPERATIONAL

Figure 5. Situation Component of the AWC Leadership Model

Figure 6 reveals a number of relevant observations about how the leadership equation varies as the level of leadership rises from the tactical to the operational level and above. Look first at the column under "mission." The mission is very specific at the tactical level but becomes broader at the higher levels of leadership. For instance, junior officers operate primarily at the tactical level. Their missions are specific: bomb a target, seize and hold terrain, provide support for a specific operation, and so forth.

├─ SITUATION ──────────────┤

[LEVELS] LEADER ◄──► FOLLOWERS ──► MISSION
(INTERACTION)

	GENERALIST	INDIRECT	MANY	BROAD
NATIONAL				
STRATEGIC	↑	↑	↑	↑
OPERATIONAL				
TACTICAL	TECHNICIAN	DIRECT	FEW	SPECIFIC

Figure 6. Levels of Leadership

On the other hand, higher levels of leadership have broader missions. An excellent example of broader mission tasking at the operational level was the Operation Overlord directive given Gen Dwight D. Eisenhower by the Combined Chiefs of Staff: "You will enter the continent of Europe and, in conjunction with the other Allied Nations, undertake operations aimed at the heart of Germany and the destruction of her Armed Forces."[14] The model helps us see that as the leadership situation changes from tactical to operational and higher, mission tasking should become less specific.

The model allows us to visualize changes in the interaction between the leader and the followers as levels of leadership change. As the leader rises above the tactical level, the number of people for whom the leader is responsible increases. Consequently, the interaction with the "troops" becomes less and less direct. For instance, the relatively small number of people in a squadron allows the flight commander and even the squadron commander to have frequent, direct interaction with his or her people. To discuss an issue, the leader need only use the intercom or walk down the hall to talk to the person who will actually do the work.

However, as an officer becomes a group or wing commander or above, he or she inevitably becomes insulated, and communication is now less direct and more through intermediaries. Most successful leaders have attempted to reduce the effect of this isolating phenomenon by visiting their troops in the field as often as possible. Robert E. Lee was able to maintain extraordinary rapport with his troops even while serving as an operational commander. Likewise, Omar Bradley and George Patton made their presence felt among the soldiers they led. Even the aloof Napoléon went out of his way to be visible to his followers by presenting awards and visiting the troops in the field. The same principle practiced by these senior leaders applies to lower levels as well. The most effective leaders today are highly visible.

On the other hand, leaders who, as they rise above the lower and more direct leadership levels, attempt to maintain the same interaction with their followers and the same control over mission accomplishment are called micromanagers. "Micromanagementitis" may be the most pernicious disease common to leaders above the tactical level.

Instead of micromanaging, the leader needs to become an expert at what I would call "climate control." The effective senior leader controls the climate of the organization by ensuring that his or her vision, values, and vitality permeate the organization. This is achieved by defining the leader's vision for the organization, packaging it so everyone can understand it, and then communicating that message repeatedly through a variety of means. The concept of climate control includes delegating work and empowering subordinates to accomplish the mission.

As illustrated in figure 6, the changes in mission and followers associated with the rise above the tactical level force certain changes upon the leader as well. The leader at the tactical level is primarily a technician, a practitioner, who actually participates in an operation. For instance, at the tactical level a flight commander or squadron commander flies an aircraft, a submarine officer directs the navigation and employment of his weapons system, and a battalion commander leads his men into combat. As leadership is exercised at the higher levels, the technician becomes a generalist, less concerned about operations at the tactical level and more concerned about the broader application of military power at the strategic levels.
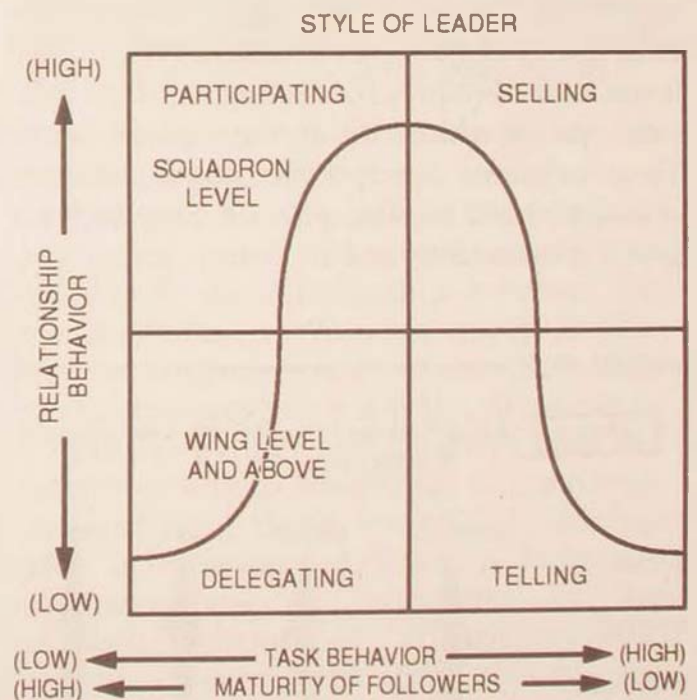
The Situation:
Tactical Level and Above

What does all this mean to the military leader? On the basis of the discussion above, we can make five generalizations about leadership at the tactical level and above.

1. Your leadership style should probably change as you move from company grade to field grade and above. We can see this by examining the Hersey and Blanchard Situational Leadership model shown in figure 7. It is safe to say that the dominant leadership style for midcareer officers is a combination of "telling," "selling," or "participating" depending on the maturity of the followers. It is also correct to note that the leadership styles of selling and telling are less common today due to the empowering effects of QAF. As we include our youngest airmen on process action teams (PAT) and solicit their input in production and operations decisions, the S1 and S2 leadership styles will become more or less limited to basic training and other highly structured, routine tasks.

As you rise to higher leadership positions, the "maturity of your followers" (bottom horizontal line) will increase. The increased maturity of followers is associated with lower task behavior. That is, above the unit level you are less involved in "tasking" peo-

Figure 7. Hersey and Blanchard's Situational Leadership Model (adapted from Hersey and Blanchard, 169)

ple to do things and more dependent on them to get the job done with less supervision.

As task behavior decreases there is an associated decrease in the senior leader's interaction (or "relationship behavior") with followers. According to Hersey and Blanchard, all this means that your leadership style should evolve from "participating" (the style most common at the unit level) to "delegating" (the style leaders above the squadron should adopt).[15]

2. Because of the greater number of followers who work for leaders above the tactical level, these leaders will have less direct contact with the majority of them. For instance, the officer in charge of a maintenance squadron has 50 to 100 people working for him or her. These subordinates have frequent, direct contact with the leader. As a result, it is relatively easy to communicate values, goals, and guidance. On the other hand, as the midcareer officer today becomes the senior leader of tomorrow, the greater number of subordinates will make frequent, direct contact difficult and eventually impossible. As a consequence, a significant responsibility of the senior leader is to create the appropriate operational and ethical atmosphere in which everyone knows what is expected of him or her—"climate control."

3. Leadership above the unit level must become less hands-on, less technical. The leader must remain firmly in touch with the mission the unit performs, but he or she is now more of a generalist who leaves the details of the operation in the hands of those most familiar with the day-to-day operations.

4. As the individual rises in leadership above the unit level, he or she is removed farther from where the organization's activity takes place, and therefore is more out of touch with what is actually going on. Consequently, decisions made above the tactical level are frequently made with less than 100 percent of the required information. In his book *Taking Charge*, Gen Perry Smith refers to this as the "60 percent rule," which means a leader makes a decision when only 60 percent of the relevant information is available.[16] This is often a difficult step for the rising leader to take because it involves risk. It is, in many respects, a step of faith, but a step that must be taken because the consequence of not taking that step is inefficiency at best, paralysis at worst.

5. Above the tactical level, vision becomes more essential. Vision is essentially the ability to see into the future. According to Warren Bennis and Burt Nanus:

> To choose a direction, a leader must first have developed a mental image of a possible and desirable future state of the organization. This image, which we call vision, may be as vague as a dream or as precise as a goal or a mission statement. The critical point is that a vision articulates a view of a realistic, credible, alternative future for the organization, a condition that is better in some ways than what now exists. A vision is a target that beckons.[17]

The midcareer leader's vision is near term. At one extreme, a senior captain or major in combat may be required to focus 100 percent of his or her attention on the next mission. Under normal circumstances, the outer limits of the vision of a leader at the unit level probably doesn't extend much beyond the fiscal year. As leaders rise above the tactical level, however, the time frame for which they must plan increases considerably. In his article "Building Strategic Leadership for the 21st Century," Maj Roderick Magee notes that

> one of the primary responsibilities of the strategic leader is to look ahead 10 to 20 years and determine what the Army will be required to do and thus how it must be structured to satisfy national objectives. There is universal agreement that vision is a key factor for organizational success and survival. Of course, it is the strategic leader who is responsible for establishing the vision.[18]

Creating a long-range, strategic vision for

The climate of QAF challenges the leader to empower the junior members of his or her organization to seek new ways of dealing with problems or work methods.

the organization requires the leader to deal with issues that are more complex, conceptual, and abstract than the tactical concerns of a unit commander. In this respect, leadership is a more intellectual activity. Clausewitz expressed a similar thought when he said, "Every level of leadership of command has its own intellectual standard."[19] Maj Magee refers to the Jacques and Jacob Stratified Systems Theory (SST) to make this point. He notes that

> one basis of their model (SST) is that cognitive complexity increases hierarchically as you go up the organization and that the leader's cognitive complexity must match what is required by the organizational level. According to SST, cognitive complexity can be thought of in terms of "differentiation and integration." The complexity associated with the organizational level, or organizational strata, is based on the time span of the role the leader is in.[20]

The Situation: Peace and War

The foregoing discussion was concerned primarily with helping leaders understand how

the leadership equation changes as the leader moves from tactical leadership to higher levels. The model can also be used to examine other leadership situations. For instance, we can use the model depicted in figure 8 to observe how the wartime environment affects the dynamics of leadership. As a general rule, the wartime mission is more critical and the result of failure takes on potentially tragic consequences. For this reason, the arrow under the "mission" column is substantially larger than the other arrows. A unit that fails to meet its peacetime tasking may bust an operational readiness inspection (ORI) or get a commander fired. On the other hand, Desert One, Gallipoli, Gen J. E. B. Stuart's absence at Gettysburg, and the disaster at Kasserine Pass are examples of the tragic consequences of not accomplishing a wartime mission.
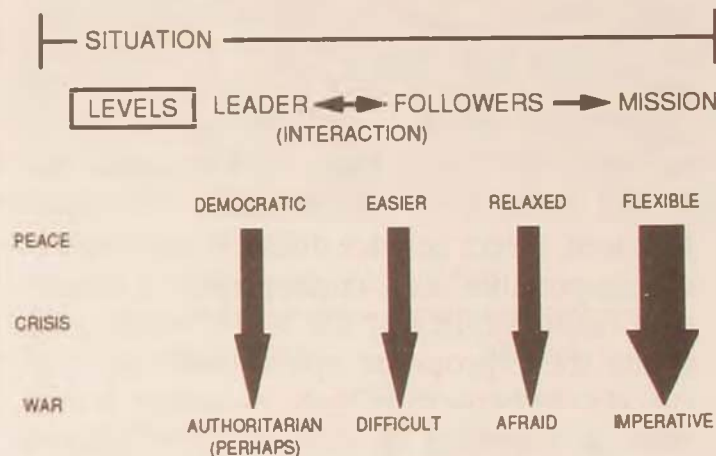

Figure 8. The Situation: Peace or War?

In time of war, the mental state of followers takes on greater significance since fear complicates their ability to perform. Leaders must take this factor into consideration when transitioning from peace to war. To compensate for fear and the greater importance of mission accomplishment, leaders may understandably become more authoritarian. The movie *Twelve O'Clock High* studied at various PME schools illustrates this point. As you'll recall, General Savage assumed command of a World War II bomber group whose aircrews were suffering from

low morale due to combat losses. To turn the situation around, the new commander adopted a very authoritarian leadership style. The renewed emphasis on strict discipline and the resulting antagonism toward the demanding boss led to improved mission accomplishment and ultimately higher morale.

Lest we infer too much from the above example, I would suggest that an authoritarian style is not an automatic response to a combat environment. Under normal circumstances, a leader's style won't change simply because the bullets are flying. It depends on the situation and the leader.

Looking again at the model, we can make some observations about the interaction between leader and follower in a combat environment. During peacetime operations, this interaction is complex and difficult. During war, this interaction is even more difficult since it is exacerbated by the fog and friction of war. Clausewitz's familiar observation is relevant:

> If one has never personally experienced war, one cannot understand in what the difficulties constantly mentioned really consist, nor why a commander should need any brilliance and exceptional ability. . . . Everything in war is simple, but the simplest thing is difficult. The difficulties accumulate and end by producing a kind of friction that is inconceivable unless one has experienced war.[21]

A final "war versus peace" related issue should be addressed at this point. As we transition to a more follower-oriented, "empowering" leadership model in peace such as TQM, there are potential pitfalls for us when engaged in combat operations. The fundamental purpose of basic training over the years has been to break down the individual's civilian mind-set that is naturally resistant to following potentially life-threatening battlefield orders. In place of the civilian mind-set, we substitute military discipline during basic training, a reflexive obedience to an authoritarian leadership style. The intent of QAF is just the opposite. It seeks to transfer power from the leader to subordinates and to solicit ideas and insights from followers in a very friendly, benign environment. How will the thoroughly indoctrinated and empowered QAF follower respond if the unit's leadership takes on a more autocratic style during combat? This is an issue that future leaders, particularly at the unit level, need to address.
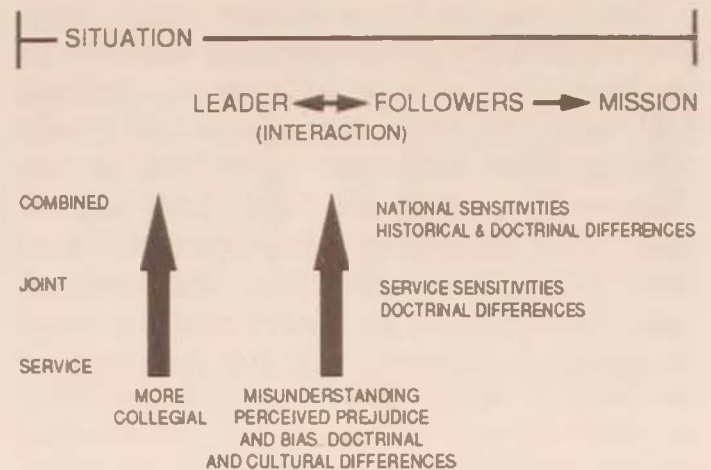

Figure 9. Joint and Combined Leadership

The Situation:
Joint and Combined Leadership

Another variation in the leadership equation that will become increasingly important in today's environment involves the composition of friendly forces. A single-service operation is relatively easy to coordinate since like-minded individuals are involved in accomplishing the mission. Their interaction is facilitated by a common lexicon and a common orientation to their particular way of fighting. Once we include members of another service, however, additional considerations and sensitivities need to be addressed. Differences in service doctrine and operational methods not only frustrate working together but can have a deleterious, even fatal effect on operations. You might, for example, consider the difficulties that arose due to doctrinal disagreements between Army ground and air commanders in North Africa during World War II.

In addition, interservice rivalries have complicated and will continue to complicate mission accomplishment. The competition between Gen Douglas MacArthur and admirals Ernest J. King/Chester W. Nimitz in the World War II Pacific theater led to a less than optimum coordination of operations. On the other hand, Army general Omar Bradley and Air Force general Elwood R. Quesada worked well together.

The situation becomes even more complex when allies are involved. In addition to doctrinal and service differences, cultural and historical differences compound efforts to coordinate combined operations. In his *Airpower Journal* article "The 'Staff Experience' and Leadership Development," Gen John Shaud noted that "the likelihood of your participation in a joint coalition staff in this post-cold war world has increased by an order of magnitude."[22] He served as chief of staff for the Supreme Allied Commander, Europe (SACEUR) until recently and from that experience made the following observation:

Junior officers operate primarily at the tactical level with specific missions such as bombing a target.

On the coalition staff, as is the case with any new leadership position . . . my primary mission was to coordinate the activities of the staff. . . . In addition to what you might normally expect that to entail, I found that I also had to be a negotiator, diplomat, taskmaster, and cheerleader. I learned also that on the SHAPE staff (as well as on most coalition staffs), some of the most important factors to be considered were appreciating inherent differences in culture and language and possessing a solid sense of history.[23]

The Axis alliance in World War II provides an example of the liabilities of coalition warfare. Germany found itself dragged into a North African campaign and into combat in Greece by its Italian allies who, according to German generals Albert Kesselring and Erwin Rommel, failed to perform effectively.[24] On the other hand, Eisenhower's collegial, accommodating leadership style was a key to the success of Operation Overlord. It is doubtful that a Patton-type leadership style would have been successful.

Gen H. Norman Schwarzkopf's sensitivity to Arab culture, acquired as a child growing up in Iran, was an important factor in forging the coalition during the Persian Gulf War. "Storm'n Norman" may be the consummate practitioner of adaptive, situ-

ational coalition leadership in the recent past. In *Crusade*, Rick Atkinson describes Schwarzkopf as a tyrant, a bellowing autocrat who was abusive to US members of the coalition. At the same time, he was diplomatic and accommodating to most allies. One has to wonder if this wasn't precisely the leadership style that was necessary to keep the coalition together. As Atkinson observed,

> In a curious way, Schwarzkopf's temper also helped quell interservice squabbles by unifying natural rivals beneath a common fear. Moreover, he prudently spared the allies his wrath. Here he showed himself most competent at that for which he was presumed least prepared by training and constitution: the muster and master of a huge coalition drawn from three dozen nations.[25]

The Situation:
Staff and Operational Leadership

A final leadership situation we can examine is the difference between the staff and operations environment—a key issue for midcareer officers moving above unit level for the first time. As illustrated in figure 10, leaders in operational units are probably more effective if they conform to the heroic leader style, while a staff leader's style is more appropriately bureaucratic and participative. The interaction between leader and followers is primarily verbal and informal in an operational environment but in the staff environment is written and more formal. Likewise, the followers are more sophisticated in the staff environment and the mission is more in the arena of policy and plans. In the Air Force, the further you get away from the flight line, the greater becomes the leader's challenge to keep followers focused on flying and fighting and to promote institutional, as opposed to occupational, values.
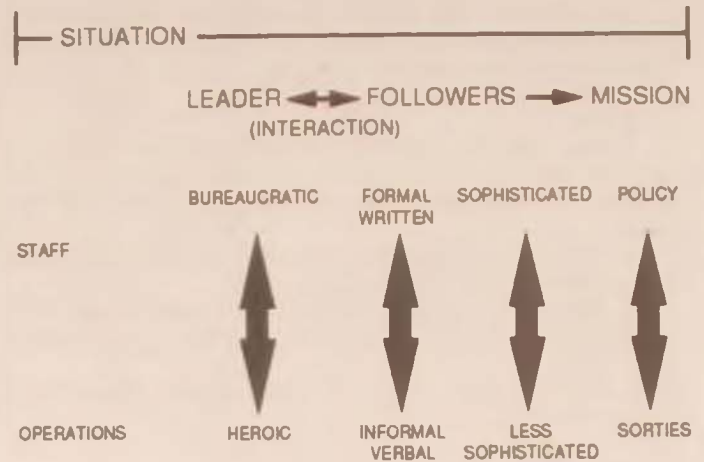

Figure 10. **Staff versus Operational Leadership**

James Stokesbury called leadership the most baffling of arts, and those of us in the military would certainly agree. At the same time, our PME curricula are designed to make the art of leadership less baffling for the military practitioner. The AWC situational leadership model described above is, I think, a useful framework to assess leaders and their leadership in context. In a rapidly changing world, this view of leadership can also help you adapt your leadership style to the situation as you find yourself in more senior leadership positions. In light of unprecedented technological developments, rapidly changing world events, and compressed cycles of social change, the need for adaptive, flexible, empowering leadership has never been greater.   □

Notes

1. In his article "The User of Leadership Theory" (*Michigan Business Review*, January 1973), James Owen defines bureaucratic leadership style in terms we can all understand. Heroic or charismatic leadership is more difficult to pin down. In his book *Leadership* (New York: Harper Collins, 1982), James MacGregor Burns noted that charismatic leadership may mean "an emotional bond between leader and led; popular assumption that a leader is powerful, omniscient, and virtuous, imputation of enormous supernatural power to leaders (or secular or both); and simply popular support for a leader that verges on love."

The sense in which I use *heroic* or *charismatic leadership* implies a leadership style that reflects a strong personality that inspires and energizes followers to accomplish extraordinary feats. In this sense, it is very similar to Morris Janowitz's definition in *The Professional Soldier: A Social and Political Portrait* (New York: Free Press, 1964), which calls the heroic leader a perpetuation of the warrior type, the mounted officer who embodies the martial spirit and the theme of personal valor.

2. Paul Hersey and Kenneth H. Blanchard, *Management of Organizational Behavior: Utilizing Human Resources* (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1982), 86.

3. Ibid., 85.

4. Ibid.

5. Ibid., 152. Depending on the edition of their book, you may see different terms used to describe the Hersey and Blanchard model. Nevertheless, the meanings are essentially the same.

6. *The Quality Approach*, published by the Air Force Quality Center, Maxwell AFB, Ala., II–7.

7. Speech by Gen Mike Loh, National Quality Month Kick-off, Hampton Roads Quality Council, Hampton, Va., 1 October 1992.

8. Air Force Pamphlet (AFP) 35–49, *Air Force Leadership*, 1 September 1985, 2.

9. Hersey and Blanchard, 102.

10. Ibid., 103.

11. John Keegan, *The Mask of Command* (Middlesex, England: Penguin Books, Ltd., 1987), 1–4.

12. Omar Bradley, *A Soldier's Story* (New York: Henry Holt and Co., 1951), 474.

13. John A. Kline, "Communications for the Leader," in AU-24, *Concepts for Air Force Leadership*, Richard I. Lester and A. Glenn Morton, eds. (Maxwell AFB, Ala.: Air University, 1990), 261.

14. Fleet Marine Force Manual (FMFM) 1-1, *Campaigning*, 1990, 42.

15. Richard H. Kohn, ed., *The United States Military under the Constitution of the United States, 1789–1989* (New York: New York University Press, c. 1991), 220.

16. Perry M. Smith, *Taking Charge: A Practical Guide for Leaders* (Washington, D.C.: National Defense University Press, 1986), 108.

17. Warren Bennis and Burt Nanus, *Leaders: The Strategies for Taking Charge* (New York: Harper and Row, 1985), 89.

18. Maj Roderick R. Magee, "Building Strategic Leadership for the 21st Century," *Military Review*, February 1993, 39.

19. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1976), 111.

20. Magee, 37.

21. Clausewitz, 117.

22. Gen John A. Shaud, USAF, Retired, "The 'Staff Experience' and Leadership Development," *Airpower Journal* 7, no. 1 (Spring 1993): 9.

23. Ibid.

24. Norman Polmar and Thomas B. Allen, *World War II: America at War, 1941–1945* (New York: Random House, 1991), 537.

25. Rick Atkinson, "Desert Storm's Angry Caesar," *Washington Post National Weekly*, 4–10 October 1993.

DISABLING SYSTEMS AND THE AIR FORCE

Maj Roger C. Hunter, USAF

S UN TZU said nearly 2,500 years ago that "the acme of skill is not winning a hundred victories in a hundred battles but to subdue the armies of the enemy without fighting."[1] It seems oxymoronic—to win a war without fighting. Despite that apparent contradiction, the professional warrior's goal to achieve Sun Tzu's objective has been constant. Recently the media has given considerable coverage to some "weapons" that make Sun Tzu's proposition seem somewhat more attainable. Sometimes they are referred to in the press as "nonlethal" or "low-lethal" weapons, but the Department of Defense (DOD) has adopted the term *disabling systems* for this class of weaponry. In November 1991, the Air Force vice chief of staff approved a position paper that stated, inter alia, that "the Air Force has an interest in pursuing the conceptual maturation and operational exploitation of disabling strategies and technologies, and should pursue a lead role in an integrated DOD systems' development effort."[2] As the Air Force develops its force structure for the developing "new world order," it may be instructive at this time to understand what "disabling systems" are, why they are becoming more important, and why we need to further the doctrine, policy, and operational employment concepts for their use.

What Are Disabling Systems?

The Office of the Secretary of Defense's (OSD) Non-Lethal Strategy Group chose the term *disabling weapon (system)* to designate "any instrument which is intended to disable personnel and equipment while avoiding killing personnel or doing catastrophic physical damage to equipment." The Army has distributed a draft of an operations concept for disabling "measures" that defines disabling measures as a "collection of capabilities employed with the intent to disable human or materiel system capabilities."[3] In other words,
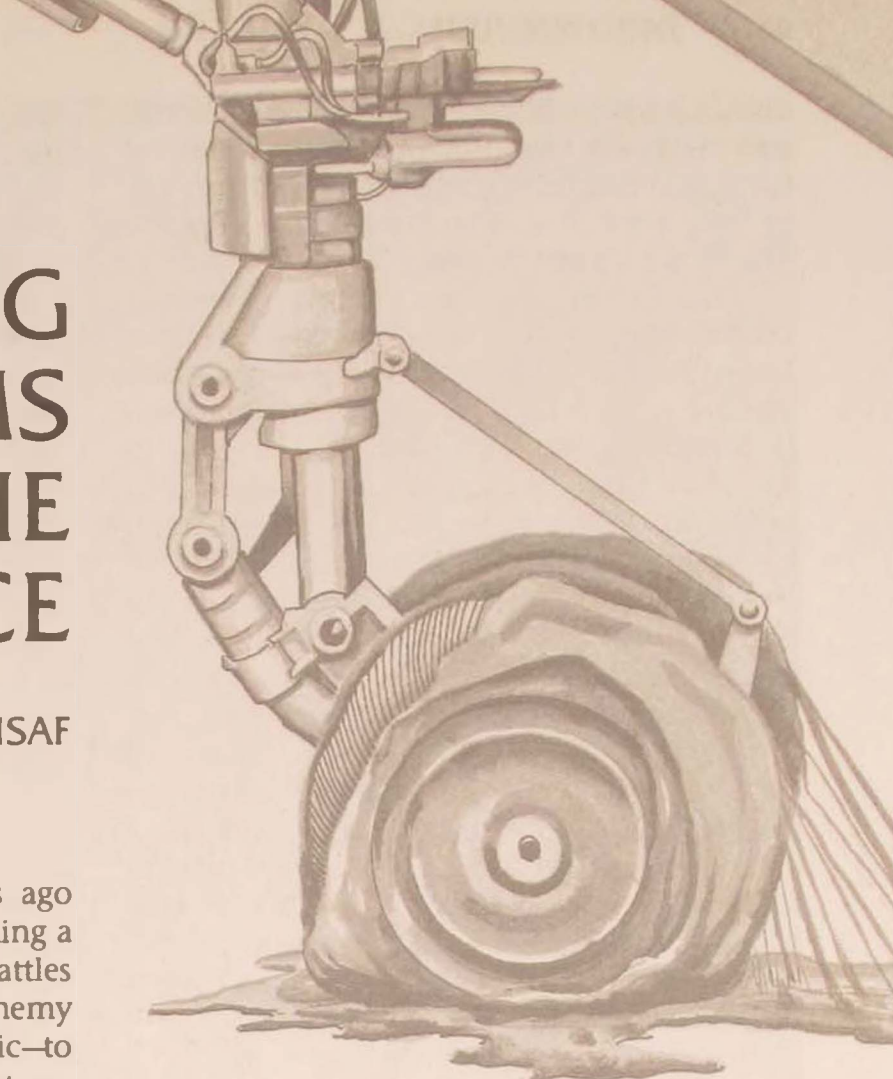
disabling measures are the strategic, operational, and tactical application of disabling systems (weapons) to achieve stated politico-military objectives, albeit with a complementary objective to preserve life and property.

Disabling systems are not new. We saw several examples of their use in Operation Desert Storm. The use of electromagnetic warfare against Iraqi radars and communication nodes sometimes obviated the need to destroy those assets. Coalition forces also employed a psychological operations campaign against Iraqi forces by dropping leaflets instead of bombs on enemy positions. The leaflets provided directions on how Iraqis could surrender to coalition forces. For surrendering Iraqis this proved less deadly than the cluster bombs they could have faced. Precision guided munitions (PGM) perhaps represent a class of disabling weapons, though they have the potential to kill and maim personnel and to destroy property. Yet, an intention behind the employment of PGMs is to lessen the collateral damage to innocent life and property.

If leaflet dropping, electronic warfare, and PGMs are not new, then what is? Many technologies are maturing that provide more tools for the disabling weapons kit. Advancements in such areas as electromagnetics (e.g., lasers, high-powered microwave systems, conductors); materials (e.g., adhesives, acids, lubricants); bioengineering; robotics; and other sciences are yielding instruments that can make war more "humane." Today F-4G "Wild Weasel" aircraft carry high-speed antiradiation missiles (HARM) that are used to impact and destroy enemy radars by detonation. Tomorrow perhaps a different platform might carry a pod housing a high-powered microwave system that would "fry" the enemy's electronics, rendering the system useless with less violence. Today cluster bombs might be used to stop a convoy in its tracks. Tomorrow a special caustic substance, safe for organic material, might be dispersed on the convoy's path to "melt" away the convoy's inorganic tires and treads. Today we conduct psychological operations, another disabling effort, with leaflets and loudspeakers. Tomorrow we may supplement leaflet dropping and sonic messages with holographic images and low-frequency generators to influence or disorient opposing forces.

Today the Air Force possesses and employs several disabling systems. Newer "weapons" in this class are being developed that can supplement those we have. Although the possession and use of disabling systems in the Air Force are not new, the appropriate incorporation of additional capabilities in this class will permit enhancement of a particular dimension of military operations. For that and perhaps more profound reasons, the dimension of "disabling warfare" (or "nonlethal warfare" as the more romantic would call it) is becoming more important.

Why Are Disabling Systems Becoming More Important?

Containment of a monolithic communist threat dominated US strategic and military strategies for most of the post-World War II era. Since the dissolution of the Soviet Union, the US has adopted a regional focus for its national security strategy. This is largely due to the realization that the world is becoming more polycentric with the US as the lone remaining superpower. Some have argued that in such a polycentric world, US strategic doctrine should change and that it "must be based on the containment of barbarism [vice communism]."[4] Despite that assertion, the US must continue to ensure its strategic nuclear deterrence capability. Yet, we also must continue to plan for US force employment at lower levels of conflict. The realities of a polycentric world mandate that the US (and the Air Force) be prepared to operate within those realities. We have probably seen the characteristics of those realities in operations Urgent Fury, Just Cause, and Desert Storm. These operations and many that we

Although the leaflets we dropped during the Gulf War resulted in the surrender of many Iraqi troops, psychological operations as a disabling technique is not a new idea. In this World War II–era picture, German soldiers surrender to American troops as a result of leaflets fired by light artillery into German-held areas.

will conduct in the future will likely have the following characteristics:

- Be limited in objective and duration.
- Involve coalition warfare.
- Be aimed at restoring or ensuring regional stability.
- Take place in conflicts short of the threshold of general conventional war.

As this multipolar, polycentric world develops, the US and its allies may find deterrence more difficult to enforce in a regionally focused security environment. Strategic nuclear or conventional destructive

deterrence may not prevent situations like those in the Persian Gulf or in the former Yugoslavia. As Miguel Walsh puts it, "Threatening to throw sophisticated capabilities into lower-level contingency situations may have just the opposite effect—that of rendering such means incredible, unbelievable, at least in terms of employment."[5] This would create a dilemma for the West: if present US and allied arsenals, and their implied threat of use, carry no weight with an adversary, how do we protect our national interests if they are threatened by an adversary who, on paper, appears militarily weaker than we? The Western

sense of morality and the growing access to near-instantaneous information may be contributing factors to this dilemma. The bombing of the camouflaged Al Firdos command bunker during Desert Storm and the errant impact of a Tomahawk cruise missile into Baghdad's Al Rashid Hotel two years later during an attack on Iraq's Zaafaraniyah industrial complex raised concerns around the world over the regrettable deaths of civilians in these incidents. In another Desert Storm incident, Saddam Hussein directed his

Disabling systems will become even more important in future wars, especially if they lessen the danger to civilian populations. An errant Tomahawk cruise missile, such as this one being fired from the USS Merrill, *hit Bagdad's Al Rashid Hotel rather than its targeted Iraqi industrial complex, raising much concern around the world about collateral civilian deaths.*

forces to place military equipment he wished to preserve for future use near religious buildings. Fearing damage to the holy places—and the rupturing of allied-Arab relations—coalition forces did not attack these "protected" forces. Such incidents may forebode the constraints US and allied forces will face in future operations. As a result, we may have to further increase our emphasis on limiting collateral damage and casualties, perhaps to the point-near-zero tolerance. Proportionate response and deliberate damage limitation—two important principles of the international law of war—are becoming more important as technology apparently increases capabilities. Ironically, it will be the law-abiding nations of the polycentric world who must be careful how they apply force to avoid being held hostage to their own sense of law and morality.

What Are the Policy and Doctrinal Impacts of Disabling Systems?

Disabling systems represent another evolution in warfare, not a revolution. Though the cold war is over, deterrence remains a cornerstone of our national defense strategy. Doctrines and capabilities we possess today should not be discarded cavalierly. Yet, we must be objective in assessing our current capabilities in determining which ones will serve us well tomorrow. Consequently, US national security thinking is moving away from scenarios dominated by strategic nuclear confrontations to an era where the flexible response doctrine is becoming more flexible. Though this process may be complicated by the downsizing of our forces, we can help the process by establishing coherent policy and doctrine.

One policy implication may be derived from the military success of Desert Shield and Desert Storm: traditional, lethal weaponry and disabling systems are not necessar-

ily stand-alone systems. During Desert Storm, combinations of disabling systems and lethal weaponry were used synergistically to achieve military objectives. It would be foolish to think that one can supplant the other. Still, that does not imply that there may be no situations in which one class of weapons could be used exclusively.

The US also can adopt a policy that dispels the notion that the adoption of disabling systems into our arsenal implies weakness or a lack of will to use more lethal weaponry when necessary. Making weapons more "humane" should not mean we would be more freewheeling with the application of American military power either. The US will continue to take seriously its obligations as a superpower and the leadership role that comes with that position. Yet, the addition of another class of weaponry into the arsenal to make war less bloody and less destructive does not necessarily mean we should be more willing to become the world's policeman.

Technology sometimes forces a change in a military's doctrine. Although the US Air Force updated Air Force Manual (AFM) 1-1, *Basic Aerospace Doctrine of the United States Air Force*, in March 1992, we should revisit that doctrine to decide if it adequately addresses the potential doctrinal changes that disabling systems might bring. For example, paragraph 2-3b of AFM 1-1, vol. 1, states, "Weapons should be selected based on their ability to influence an adversary's capability and will," and paragraph 2-3c states, "Precision weaponry requires precise intelligence and effective command and control." Both paragraphs have importance for disabling systems. Some systems in this class may not have the effect of influencing an adversary's capability and will and therefore should bear serious consideration before proceeding to production and deployment. Some disabling systems are not precise in the terms of the precision guided munitions used during Desert Storm. Yet, these systems still require precise intelligence and effective command and control to be employed effectively in a military operation.

Finally, as we consider the policy and doctrinal impacts of assimilating disabling systems into the inventory, we should review Carl von Clausewitz's words:

> If the enemy is to be coerced you must put him in a situation that is even more unpleasant than the sacrifice you call on him to make. The hardships must not of course be merely transient—at least not in appearance. Otherwise the enemy would not give in but would wait for things to improve.[6]

Despite what some may think, disabling systems do not represent a panacea for curing the horrors normally associated with the conduct of war. Nor does the incorporation of disabling systems into our armed forces represent a ratification of the strategy of gradual response, a strategy that failed miserably in Vietnam. Imposing our will on the enemy is still the objective. Disabling systems merely represent another tool that military strategists can use to reach that end. Hopefully, that end can be achieved as Sun Tzu envisioned it—"without fighting." □

Notes

1. Sun Tzu, *The Art of War*, trans. Samuel B. Griffith (London: Oxford University Press, 1971), 77.

2. Headquarters USAF, Special Technical Plans Division, "Position Paper on the Air Force Role in Development of Disabling Systems/Strategy," 13 September 1991, 4.

3. US Army Training and Doctrine Command (TRADOC) Pamphlet 525-XX, "Operations Concept for Disabling Measures," draft, 4 September 1992, 3.

4. Janet Morris and Chris Morris, *Creating an Office of Nonlethality: A New Paradigm for a New Era* (Washington, D.C.: US Global Strategy Council, 1992), 1.

5. Miguel Walsh, "New Technology, War and International Law" (Washington, D.C.: Office of the Secretary of Defense, 14 June 1991), 5.

6. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1976), 77.

WHAT DOES CHAOS THEORY MEAN FOR WARFARE?

Maj David Nicholls, USAF
Maj Todor D. Tagarev, Bulgarian Air Force*

FOR THE LAST 30 years, the study of chaos has intrigued investigators, prompting many to see a great future for the study and application of chaos theory. In science and engineering, chaos theory has significantly improved our understanding of phenomena ranging from turbulence to weather to structural dynamics.[1] Chaos theory has even been used to drastically improve our ability to control some dynamic systems.[2] In the social sciences, there has been considerable interest in whether social phenomena, previously thought to be random, have an underlying chaotic order. Several mathematical tests for chaotic behavior have been applied to historical data from both the stock market and cotton prices. These tests indicate that these economic phenomena are chaotic and so have a deterministic basis (i.e., are governed by rules) as opposed to being random. Naturally, this has received some business attention, and at least two firms are now using chaos theory to guide their financial advice.[3]

There is evidence that warfare might also be chaotic. First, strategic decision making, an integral part of war, has been found to be chaotic.[4] Second, nonlinearity, which is a requirement for chaotic behavior, appears to be a natural result of Clausewitzian friction.[5] Third, some computer war games[6] and arms race simulations[7] have been found to exhibit
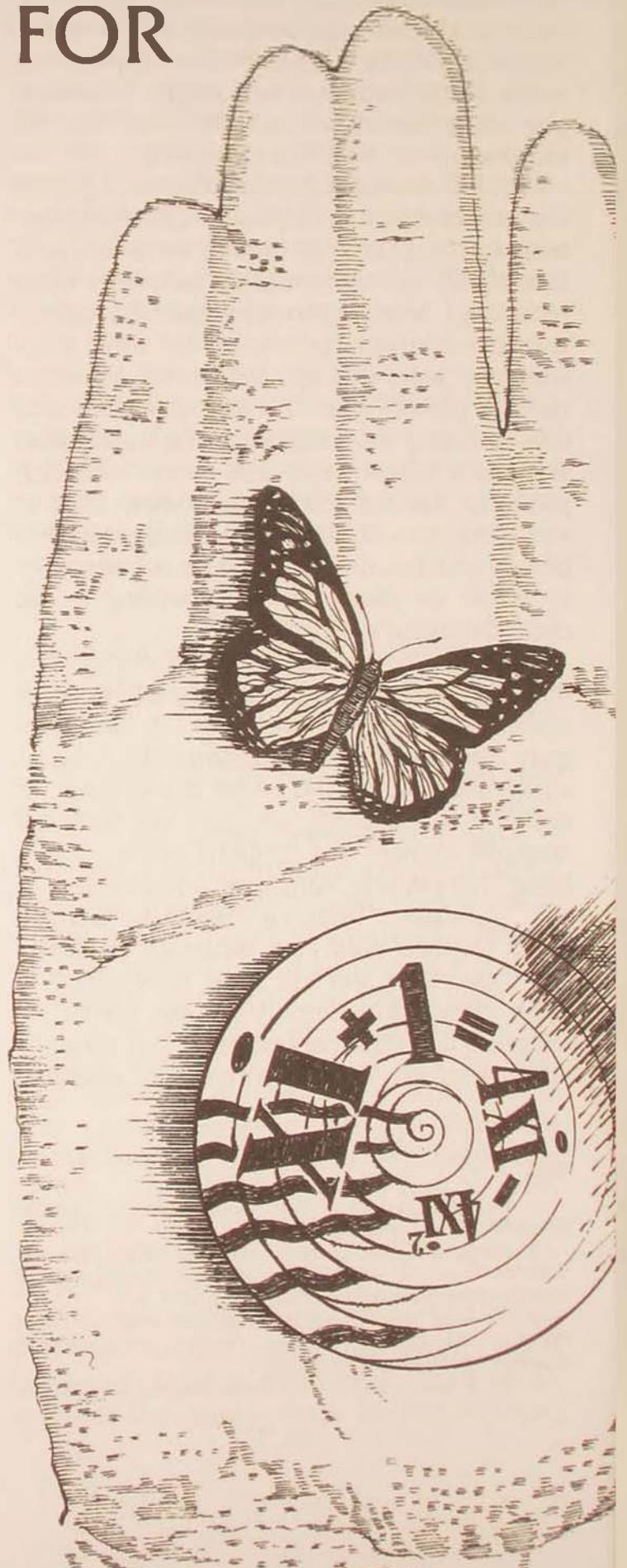
chaotic behavior. Fourth, previous work by the current authors applied several tests for chaos to historical data related to war. Those tests demonstrated that warfare is chaotic at the grand strategic, strategic, and operational levels.[8]

An Overview of Chaos Theory

In this paper, we will discuss some important implications of chaos theory in the context of warfare. First, however, we will briefly summarize some important aspects of chaos theory.

Nonlinearity

If a system is linear, it means that the output of the system is linearly related to the input. In other words, if the input is doubled, the output will be doubled; if the input is tripled, the output will be tripled, and so on. In nonlinear systems, however, the output might be related to the square or the cube of the input. Such systems are often very sensitive to input. All chaotic systems are nonlinear.

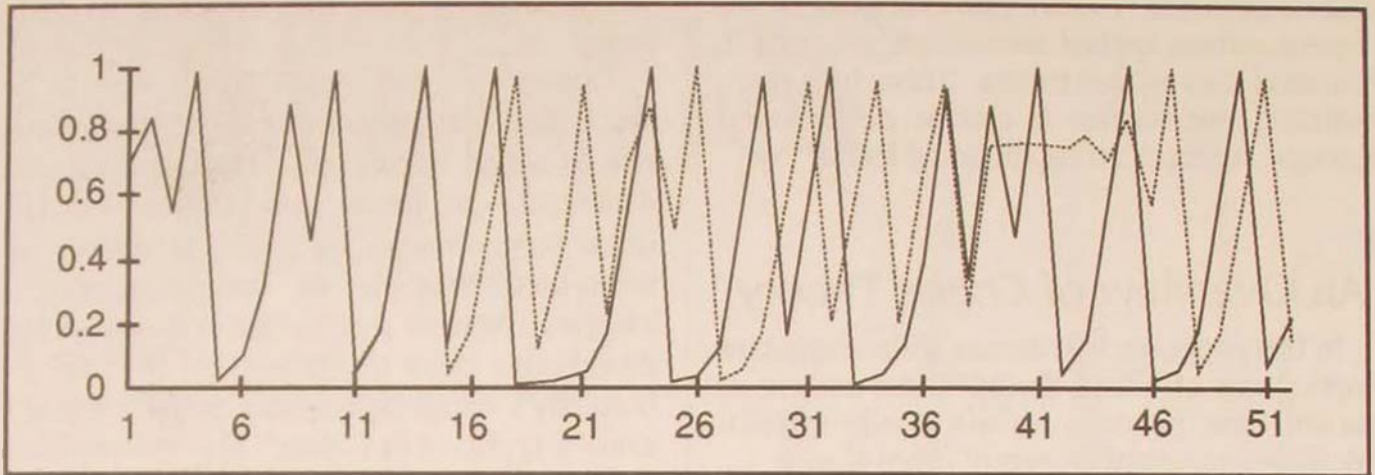### Predictability of Chaotic Systems

Dynamic systems can differ from one another in how they change with time. In random systems, future behavior is independent of the initial state of the system and can be characterized only in terms of probabilities. For example, unless the dice are loaded, the next roll of the dice is totally independent of the previous roll. On the other hand, periodic systems return regularly to the same conditions, as exemplified by the pendulum clock. Such systems are totally predictable because once one period is known, all others must be identical. Chaotic systems are neither random nor periodic. They are not random because the future of a chaotic system is dependent upon initial conditions. They are

not periodic because their behavior never repeats.

Chaotic systems never repeat exactly because their future behavior is extremely sensitive to initial conditions. Thus, infinitesimal differences in initial conditions eventually cause large changes in system behavior. An often-used example of this sensitivity is weather. Weather is so sensitive to initial conditions that there is a belief that the flap of a butterfly's wings in America could eventually cause a typhoon in China.[9] It is inconceivable that conditions on the earth could ever duplicate an earlier time to the point where even all butterfly flights are duplicated. Therefore, the earth's weather will never be periodic.

In addition to making chaotic systems aperiodic, extreme sensitivity to initial conditions means that it is not possible to determine the present conditions exactly enough to fully predict the future. Figure 1 illustrates this point. In figure 1, successive values for x are plotted resulting from the nonlinear equation $x_{i+1} = 4x_i - 4x_i^2$. For one plot the initial value of x was 0.7. For the other plot it was 0.70001. Initially, they are indistinguishable from one another, but as time goes on, even such a small difference between the two is magnified until their behavior appears totally unrelated. Short-term predictions are still possible because small influences will not have had time to grow into large ones. However, what is short-term depends on how sensitive the system is to small changes at that point in time.

The importance of this concept is that it explains how a system can be governed by a set of equations and yet still be unpredictable. We cannot know the initial value of a system, such as that illustrated in figure 1, precisely enough to predict which path the system will follow. If warfare is chaotic, this tells us that we cannot make perfect predictions even if we could reduce war to a mechanistic set of equations. Fortunately, as is also illustrated by figure 1, there are bounds to the unpredictability of a chaotic system. Furthermore, chaos theory provides tools that can predict patterns of

Figure 1. Divergence from Nearly Identical Conditions for a Chaotic System

system behavior and can define bounds within which the behavior is unpredictable.

Phase Space

The construction of a phase space plot is often used to better understand chaotic behavior. A phase space plot is a plot of the parameters that describe system behavior. It is useful because it provides a pictorial perspective for examining the system. An example of a phase space plot for a simple pendulum is shown in figure 2. At point A in figure 2, the pendulum is the maximum positive dis-
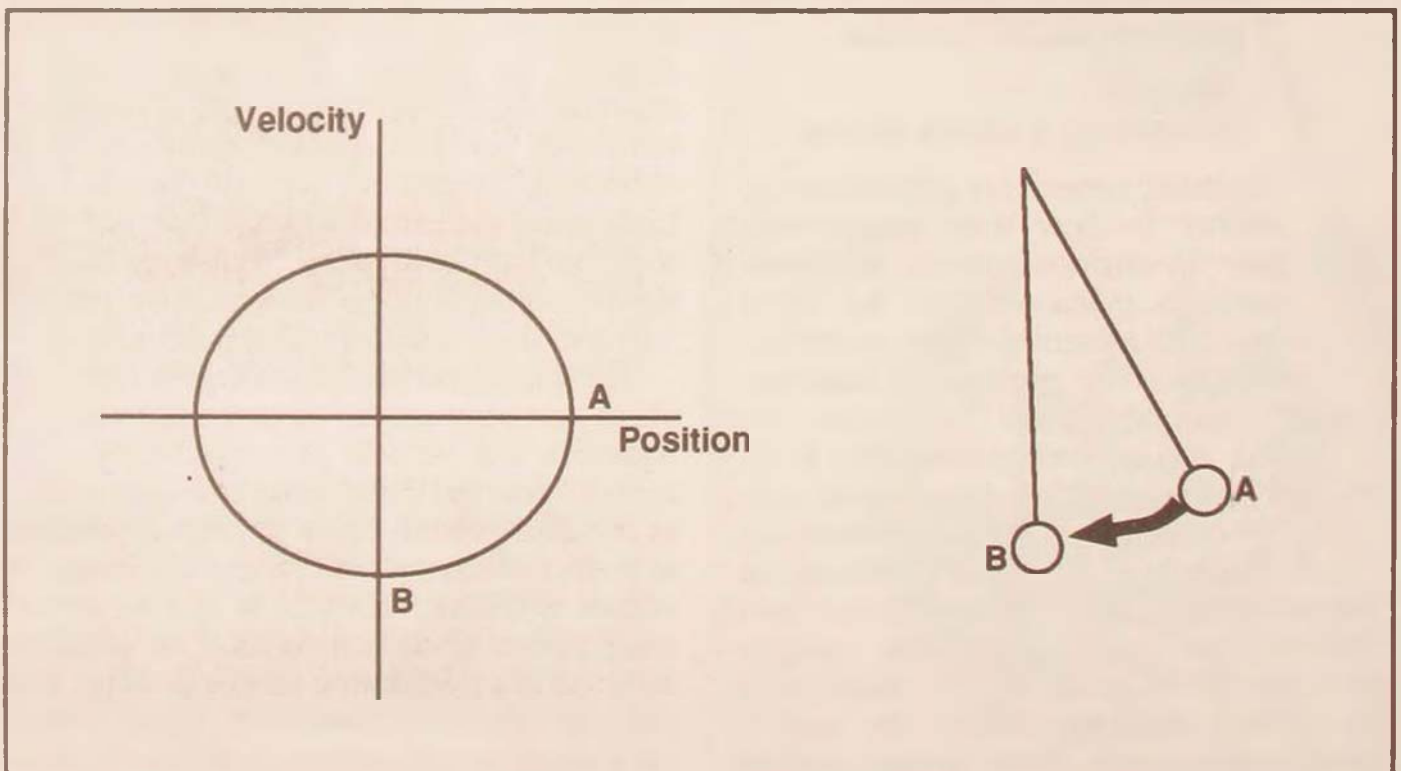
Figure 2. Illustration of Phase Space for a Pendulum
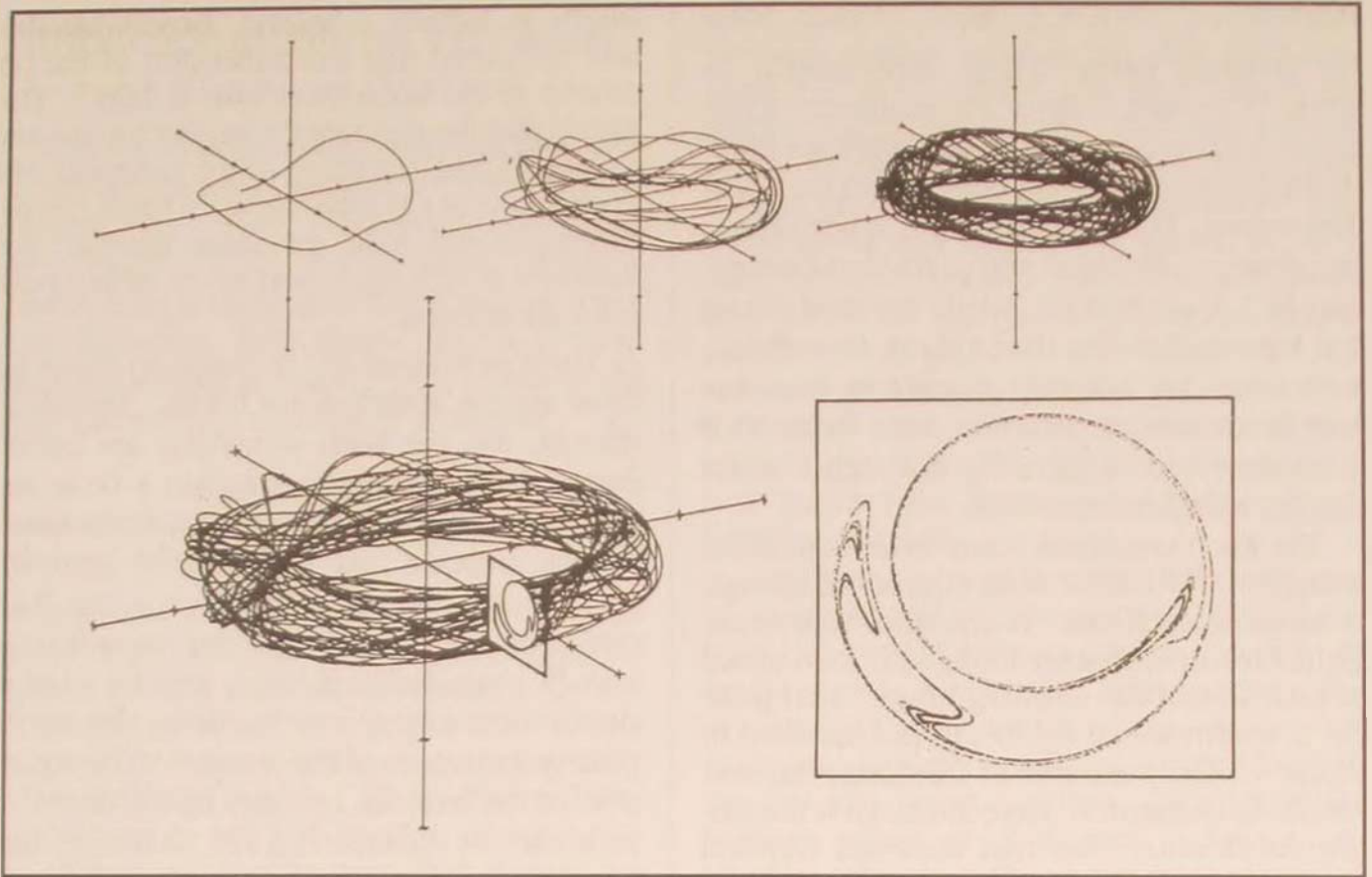
Figure 3. Illustration of a Strange Attractor and the Associated Poincaré Map (from James Gleick, *Chaos: Making a New Science* [New York: Pengin Books 1987], 143)

tance from the bob's neutral point but its velocity is zero. This is shown as point A on the phase space diagram. At B the distance of the bob from its neutral position is zero, but its velocity is at a maximum (in a negative sense). The other points of the phase space plot show the relation between the velocity and position for other pendulum positions. In this case, where there is no friction, the motion of the pendulum is constrained to remain on the elliptical path shown in the phase space plot. The technical term for this ellipse is the attractor for the system. One can see that this attractor is periodic because the path of the system exactly repeats itself in each orbit around the origin.

In contrast, figure 3 shows an attractor for a chaotic system. This attractor is a tangled mess of trajectories. The complexity of this attractor has led to its being dubbed a *strange at-*

tractor. Although there are still constraints as to how the system behaves, there are a lot more possible states for the system. It is important to note that the phase space paths of a chaotic system will never coincide. If this were to happen, the system would become periodic. The longer a chaotic system is observed the more paths are taken and the messier the phase space plot of the attractor appears. Superficially, the attractor may appear to be completely disorganized. Closer examination of the phase space, however, reveals that the attractor is organized but in an unconventional manner.

It is possible to simplify the portrayal of the attractor by taking a two-dimensional slice through it (shown in the lower half of figure 3). This also makes the structure of the attractor more obvious. This two-dimensional section is called a Poincaré map.[10]

Fractals

We generally define things dimensionally in terms of integers. Lines are one-dimensional, planes are two-dimensional, and solids are three-dimensional. *Fractals* are objects with fractional dimensions. This concept appears at first sight to be nonsense. An object with a fractional dimension of 1.5, for example, would be more than a line but somehow less than a plane. Nevertheless, such things are not only thought to exist, but such geometries are central to chaos theory. One example of such a geometry, although it is not chaotic, is the Koch snowflake.

The Koch snowflake starts as an equilateral triangle. A one-third scale equilateral triangle is added to each side. A one-third scale triangle (of the new, smaller triangle) is then added to each side of the resulting figure. This process is continued ad infinitum as illustrated in figure 4. The perimeter of this shape has several unique features. First, although it is a single, continuous loop that does not intersect itself and that circumscribes a finite area, its length is infinite. Second, Benoit Mandelbrot calculated that the dimension of the perimeter of the Koch snowflake is 1.26.[11] This means that the perimeter is between a line and a plane. Third, the shape of the perimeter of a Koch snowflake is self-scaling. That is, the perimeter would look the same whether you looked at it with the naked eye or with a powerful microscope.

These geometries are pertinent to chaos because strange attractors are fractal. Strange attractors, like the Koch snowflake, are infinite curves that never intersect within a finite area or volume. If a system is chaotic, it will have a strange attractor and the Poincaré map will show fractal characteristics. That is, the Poincaré map will remain similar regardless of scale.[12] Thus, Poincaré maps can be used to determine if a system is chaotic by visually depicting the nature of the attractor. The dimension of the attractor can also be calculated. If an attractor's dimension is not an integer, then the system is chaotic.
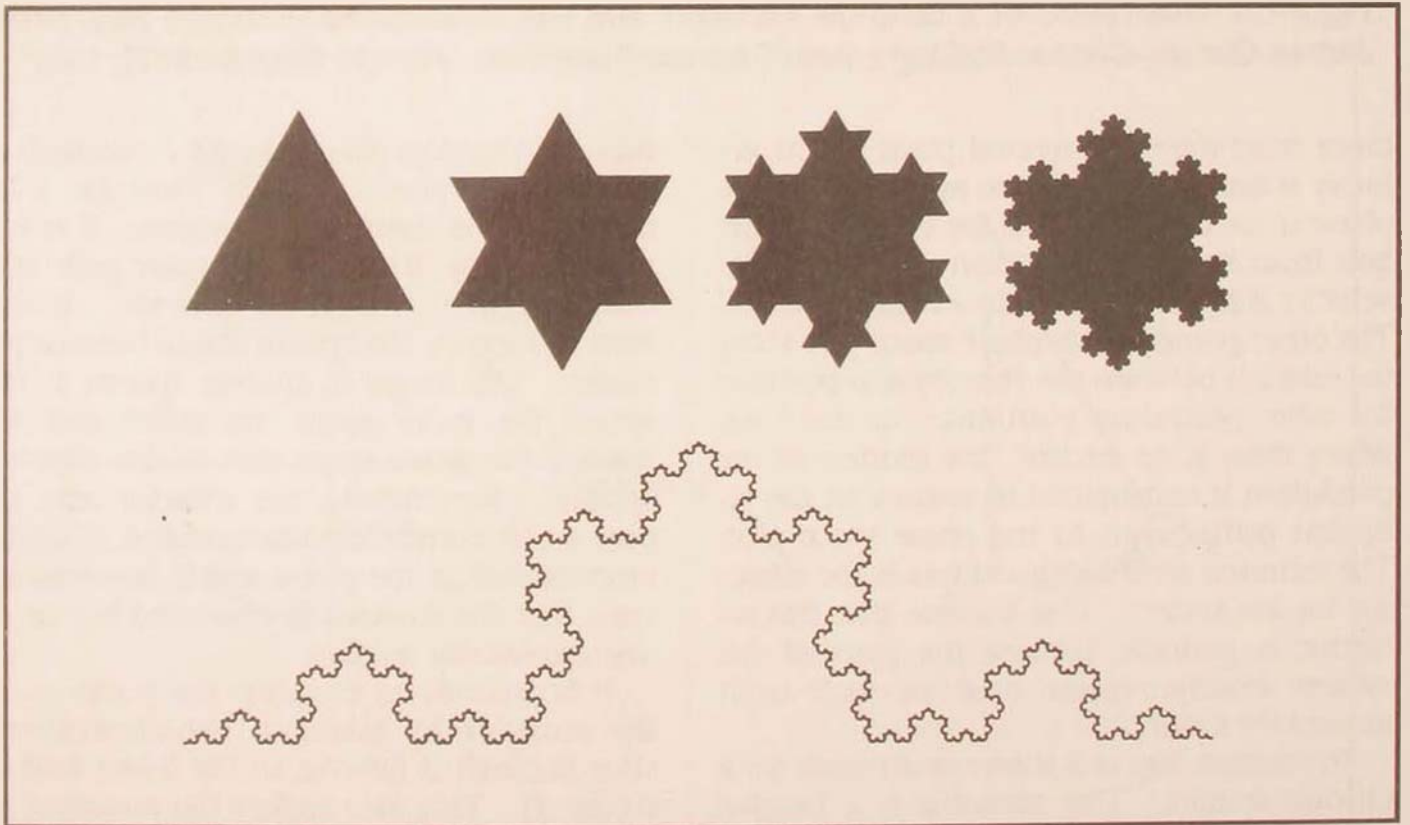

Figure 4. The Koch Snowflake (from Gleick, 99)

Implications of the Presence of Chaos in Warfare

Previous work examined historical data associated with the grand strategic, strategic, and operational levels of war. That work showed that war is chaotic on all of these levels. If war is chaotic, then it must have the characteristics of a chaotic system. We will now describe some of the characteristics of chaotic systems and define what they mean in the context of warfare.

Computer Simulation Can Enhance Understanding

Computer numerical modeling or simulation has greatly increased our understanding of physical chaotic systems. The reason for this is that the equations that govern chaotic systems are nonlinear and therefore are generally not analytically soluble. Chaos theory, however, cannot be used by itself to derive a theory of warfare. As with any other theory that describes a phenomenon, a theory of warfare must be based upon observation, hypothesis, and testing. Specifically, development of a model of warfare would require the development of the structure of the model, the determination of the number and type of variables, and the determination of the form of the equations. In addition, system parameters and control factors, as well as sources for noise, would have to be identified. This is a very difficult task for any particular situation that is complicated by the possibility that different models might apply for different antagonists.

Chaos theory can help us by suggesting ways to develop our model and ways to use the model once it is developed. For example, observation of a chaotic system can be used to determine the dimension of the system. The number of variables needed to describe the system must at least equal the dimension of the system. Therefore, chaos theory can be used to define the minimum number of variables required in our computer model. Chaos theory also suggests that computer models of warfare must contain some nonlinear relationships between system variables so that the computer model is chaotic and thus reflects the chaotic nature of warfare. This may actually prove to be advantageous since the fractal nature of chaotic systems may allow relatively small and simple war games to accurately simulate warfare. Realistic war games that could be run on a desktop computer would have significant educational and operational advantages. Finally, the rate of information loss can be calculated for a chaotic system. This quantity is related to how far into the future predictions can reasonably be made.

The ways in which computers have been used to understand chaotic behavior in physical systems also suggest ways to use the computer to model warfare. For example, although chaos theory explains some aspect of the weather, the reader has probably noted that weather forecasting has not become perfect. This criticism, however, misses one of the most important contributions that chaos theory has made to weather prediction— chaos has given weather forecasters a means to determine if their forecasts are likely to be accurate. Chaotic systems are highly dependent upon initial conditions but they are not always equally so. If a chaotic system is in a portion of its phase space where the initial conditions are critical, then uncertainty in determining the initial conditions makes a large number of outcomes possible. If a chaotic system is in a region of its phase space where the initial conditions are not critical, then only one outcome (prediction) is likely. In practice, weather forecasters use this behavior by inputting small changes in initial conditions into their model. If the small changes produce small variations in the prediction, they have shown that the system is in a portion of phase space where the initial conditions are not critical and their prediction is likely to be true. If the minor changes in initial conditions produce large deviations in future behavior, forecasters know that their prediction is likely to be in error.

The same approach could be taken to understand when predictions in warfare are

Chaotic systems never repeat exactly because their future behavior is extremely sensitive to initial conditions. Chaos theory has made important contributions to weather prediction, however, and has enabled forecasters to determine whether or not their weather predictions—clear, stormy, or bitter cold—will be correct.

likely to be accurate. This in itself would be a valuable contribution of computer simulation to understanding warfare. There are, however, two additional reasons why this approach may be even more applicable to warfare than it is to weather. First, unlike weather forecasters, we have some ability to change the initial conditions. Specifically, if we find ourselves in a region of great uncertainty, we could determine which conditions would have to be changed to move the system to a position where the outcome was predictable and desirable. The quantity and type of forces are examples of initial conditions that we might be able to change. Second, we could use our model to determine which initial conditions and which variables had the most profound effect on our predictions. This would aid in identifying centers of gravity (COG) and information that we needed to know precisely. That is, it would tell us where to concentrate our attack and what intelligence information was most critical.

Chaotic Systems Are Nonlinear

All chaotic systems are nonlinear. Among other things, nonlinearity means that a small effort can have a disproportionate effect. If warfare is chaotic, then chaos theory suggests COGs may be found where there is a nonlinear process in the enemy's system. In fact, nonlinearity is implicit in the concept of a COG. Because you can't predict future behavior of a chaotic system based on initial conditions, chaos theory suggests that the campaign planner should concentrate on processes in an enemy system rather than data on its current condition. It also suggests that identification of nonlinear processes is an essential ingredient in understanding warfare and being able to manipulate the outcome with the least effort. The following paragraphs will discuss some of the many sources for nonlinearity in warfare.

Feedback loops are one process that can introduce nonlinear effects in many systems. A feedback loop that is important to the air cam-paign is the feedback that attrition rates give to an air commander. High attrition rates could force a commander to change his tactics. For example, the loss rates of 16 percent experienced by the US in the daylight bombing raids over Schweinfurt were enough to stop the bombing raids for four months until a long-range fighter was developed. Col John A. Warden used this and other historical examples to argue that the maximum acceptable rate was about 10 percent.[13] He continued, however, by pointing out that the effect of one mission with a 10 percent attrition rate and nine missions with negligible casualties was much greater than a steady 1 percent attrition rate over 10 missions. In a linear system there would be no difference between the two—the additive effects would be the same. The fact that there is a difference shows that the feedback is nonlinear. When Warden suggested that massing for a few devastating blows is more effective than many minor blows, he described how to exploit the nonlinearity in the system.

A second source for nonlinearity in warfare is the psychology associated with interpreting enemy actions. This nonlinearity caused Clausewitz to state, "Thus, then, in strategy everything is very simple, but not on that account very easy."[14] He later amplified by saying that while maneuvers such as a flanking movement are simple in concept, they are difficult to actually accomplish because there is always the danger of what the enemy might be doing. In this environment, small actions on the part of the enemy often assume larger significance in a commander's mind than they deserve. According to B. H. Liddell Hart, this nonlinear effect occurred in World War I before the first Battle of the Marne.[15] The Germans, aware of a possible seam in their dispositions, had been ordered to retreat if the British Army advanced over the Marne. As it happened, a British division sent out a reconnaissance patrol. The Germans, misinterpreting this as a general advance, retreated when the way lay open for victory.

A third source for nonlinearity in warfare is that there are a number of processes within

warfare that appear to be inherently non-linear. The role of mass is an important example. Warden showed that for air power, losses vary disproportionately with the ratio of the forces involved.[16] In 1944, for example, 287 American aircraft attacked a target defended by 207 German fighters. The Americans lost 34 aircraft. A month later, when 1,641 American aircraft were opposed by 250 German fighters, America lost 21 aircraft—a lower percentage and a lower absolute number.

A fourth source of nonlinearity in warfare is Clausewitzian friction.[17] Basically, there will be events in war, perhaps as a result of chance, that have an effect out of all proportion to their apparent importance. This is an exceedingly difficult form of nonlinearity to anticipate, but it can be taken advantage of once it happens. The German doctrine of *Auftragstaktik*, which allowed initiative on the part of junior commanders, was designed to do precisely this.

Finally, the process of decision making itself can be a source for nonlinearity. Sometimes the decision is clear-cut. Often, however, the decision can depend upon relatively minor circumstances at the time. One source suggests that the steam engine lost out to the gasoline internal combustion engine largely as a result of an outbreak of hoof-and-mouth disease.[18] Because of this outbreak, many horse troughs, which steam engines had used to top off their water supply, were removed. Once the decision is made, it is often irreversible because of the drive for standardization. Any major decision, including those made in wartime, can be nonlinearly based on such relatively minor factors.

Fractal Geometries Apply

If warfare is chaotic, then aspects of it must be fractal. This has implications for the analysis of an enemy system. First, the attractor for a chaotic system is fractal and so is infinitely complex. Therefore, efforts to analyze every aspect of an enemy's system are bound to be in vain as there will always be some finer level to analyze.

Second, behaviors at the tactical, operational, and strategic levels are linked. If a technique is successful at one level, we can expect it to be successful at all levels. This suggests that we should, when possible, try out strategies on a small scale when the consequences of losing are inconsequential. It also suggests that analysis techniques that are useful on one level may be useful on others. An example of this is the observe-orient-decide-act (OODA) loop that was originally proposed for tactical level fighter combat.[19] The OODA loop, however, has since been applied successfully to operational level concepts such as information dominance. Third, if the small scale is similar in behavior to the large scale, then we can use observation of the small scale to predict the behavior of the large scale. For example, Adm Isoroku Yamamoto was fond of playing Shogi. In his biography of Admiral Yamamoto,[20] Hiroyuki Agawa noted that Yamamoto's style of playing this game was to risk everything on a bold, early stroke. If that failed, he would often lose the game. Agawa suggests that this philosophy was behind the way in which Admiral Yamamoto planned his large campaigns such as Pearl Harbor and Midway.

The fractal nature of war may also have implications for the way we should organize for war. Sun Tzu implied a fractal nature of war when he said, "Generally, management of many is the same as management of few."[21] This indicates that he thought that the principles of organizing to fight were essentially the same regardless of the scale of the fight. Some principles such as span of control appear to be similar regardless of organizational level. Although research on the implications of chaos for organizational structures has started, conclusions are far from certain.

Multiple Attractors Are Possible

Multiple attractors are possible in a chaotic system. This statement means that chaotic systems can have multiple quasi-stable states. The earth's climate is a good example of this sort of

behavior. Our current climate appears to be relatively stable. There is some variation in the climate, but it falls within a general range for a number of years. On the other hand, we know that the earth's climate was significantly different during the ice ages, when it fell within a very different range for a long period. Our current climate and the ice age climate are both quasi-stable states for the earth's climate. The causes of changing climates for an ice age are still not understood and might be quite insignificant, which further highlights the nonlinearity of chaotic systems.

In an analogous fashion, armed forces can drastically change their organization and means of fighting a war. The People's War of Mao Tse-tung is an example of this. Mao divided the phases of war into different stages. In some stages, his army fought a guerrilla war as small units. Only later, when conditions were right (i.e., the opposing armies had been sufficiently weakened), did he combine his units into a conventional force. If warfare is chaotic, then chaos theory warns us that enemy systems can exist in different states. The implications are that we must be aware of these possible states and, if necessary, be capable of changing our own system's state to counter the enemy strategy. Chaos theory also warns us that the transition from one state to another can be very fast.

Conclusions

• Computer simulation can be used to better understand warfare. While chaos theory tells us that warfare will never be completely predictable, it also tells us that simulations could be used to identify COGs.

• Warfare is nonlinear. This implies an extreme sensitivity to initial conditions, which means that the campaign planner should concentrate on processes in an enemy's system. Attacking nonlinear processes offers the best promise of the most effect for the least effort. There are several sources for nonlinearity in warfare.

• Fractal geometries apply. This suggests that analytical techniques and participant behaviors should be translated to the various levels of war.

• Multiple attractors are possible, which suggests a way of viewing transitions from conventional war to guerrilla war and vice versa.

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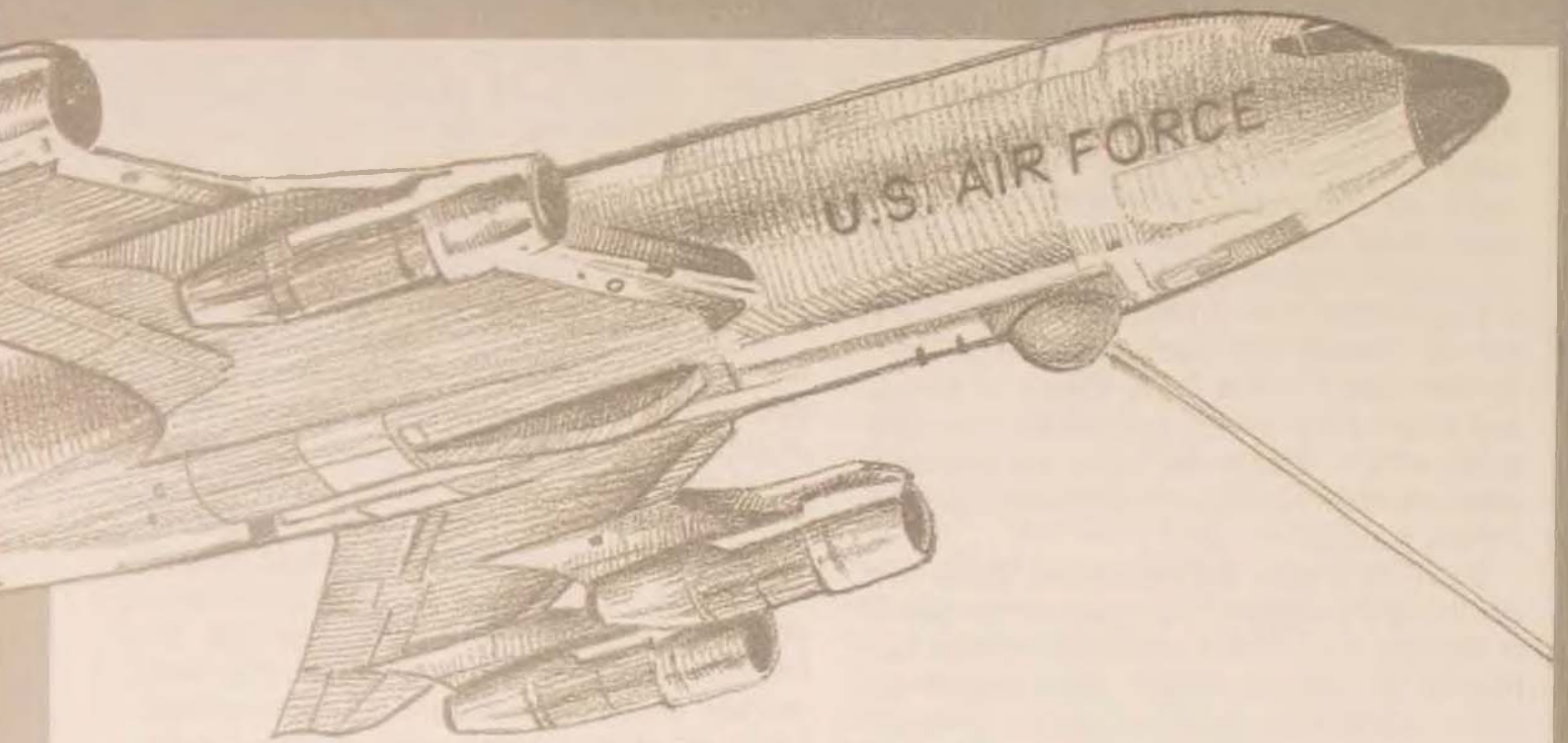
THE AIRBORNE LASER

PIE IN THE SKY OR VISION OF FUTURE THEATER MISSILE DEFENSE?

Lt Col Stephen A. Coulombe, USAF

The time will come, when thou shalt lift thine eyes
To watch a long-drawn battle in the skies,
While aged peasants, too amazed for words,
Stare at the flying fleets of wondrous birds.

—Thomas Gray, 1737

The development of Air Power in its broadest
sense, and including the development of all
means of combating missiles that travel through
the air, whether fired or dropped, is the first
essential to our survival in war.

—Viscount Hugh M. Trenchard, 1946

NEW IDEAS OFTEN meet with skepticism and sometimes ridicule. However, they also challenge us to reconsider preconceived notions and to question conventional wisdom. Although the airborne high energy laser (HEL) is not a new idea within the laser development community, it now demands renewed attention from the Air Force and the Department of

Defense, insofar as the airborne laser (ABL) may just be an idea whose time has come.

In the days before powered flight, when balloons and dirigibles occupied the imagination and seemed to be the only way to sail aloft, people laughed at attempts to build heavier-than-air flying machines. In 1807 Robert Fulton's steamboat was considered a folly but later became one of the most successful modes of commer-

cial transportation. Gen William ("Billy") Mitchell's early attempts to sink naval vessels by aerial bombing also were ridiculed. But he proved the critics wrong in July 1921 when he led the 1st Provisional Air Brigade in an air bombing exercise off the Atlantic coast and sank the battleship *Ostfriesland*. Finally, the first battle tanks were not very successful until technology matured and—perhaps even more importantly—until doctrine and tactics caught up sufficiently to make the tank truly effective.

In the early days of military aviation, bombs and aircraft were combined in the concept of long-range strategic bombing, and bitter debate broke out over its merits.[1] Interpretations of World War II events favor both sides of that debate, while questions linger over the effectiveness of the bombing. The true promise of aerial bombing in a conventional war seems to have been realized only recently—in the Gulf War. Never in the history of aerial warfare had the world witnessed in such graphic detail the effects of aerial bombardment, communicated by the almost instantaneous replay of these scenes on television. It was stunning testimony to advances in modern weapons technology.

The precise delivery of weapons, an important element of effective aerial bombing, was missing during Giulio Douhet's and Mitchell's day, although they foresaw its potential. The successes of the F-15E, F-117A, and A-10 in the Gulf War were due to the marriage of capable aerial platforms—featuring sensors and accurate navigation—with precision guided bombs and missiles. Early skepticism of long-range aerial bombardment has finally been laid to rest. Too bad it took so long. This seems to be a case of technology finally catching up with doctrine.

The combination of aerial platform, sensors, and the ultraprecision inherent in HEL weapons promises to extend the success of precision air-to-ground weapon delivery enjoyed in the Gulf War to future air-to-air engagements of all kinds. Aerial vehicles are generally highly stressed and vulnerable due to their construction from lightweight materials and the high performance continually demanded of them. The potential of a silent, very long range, speed-of-light weapon in the aerial warfare environment is staggering. ABL promises to make that potential a reality by providing defense against theater missiles such as Scuds, which caused a large share of casualties in the Gulf War and occupied a significant number of coalition air sorties.

Theater missile defense (TMD) is now at a stage similar to that of early aerial bombing. However, disagreements within and among the services over roles and missions in the theater battle arena are impeding TMD progress. What *is* the best way to kill theater ballistic missiles (TBM), and who should have that mission? This article will not settle that question but hopefully will stimulate discussion on the impact that HEL technology could have on future aerial warfare and the ways such a weapon might be employed, particularly as a solution to a daunting TMD challenge.

Further, technology and doctrine have not yet come together to make ABL a viable TMD weapon system. Technology alone cannot make ABLs work. Complex ABL technologies (e.g., uncooled optics, deformable mirrors, atmospheric compensation, and lightweight

chemical laser devices) may be sufficiently mature today, but doctrine for aerial HEL warfare is virtually nonexistent. There is no base of experience for these weapons. If ABL is to become a successful weapon, the development of doctrine must progress apace with the evolution of technology.

Is Technology the Answer?

ABL technology is reaching maturity. Aircraft platforms now exist that can carry the necessary crews, fuels, and equipment constituting a laser weapon system with potentially high operational effectiveness. This means ABLs could be used in a variety of missions, including TBM kills at ranges of 400+ kilometers (km), counterair and anti-cruise-missile kills at 100+ km range, and defense of airborne high-value assets against air-to-air and surface-to-air missiles (SAM). They could also perform surveillance, command and control (C^2), and battle management tasks yet maintain an effective self-defense capability. These missions could cover wide areas by capitalizing on the flexibility and responsiveness inherent to air power, while leveraging ABL's precision into a potent force multiplier for boost-phase missile intercepts. This vision of future ABL effectiveness is possible because of our investment in many years of HEL system development, including a significant amount of airborne HEL work in the late 1970s and early 1980s.

Certainly, questions remain. How effective—and expensive—would such a weapon system be? Can it be built with the operational availability, reliability, and robustness needed in wartime? Would this specialized technology—new to the Air Force operational world—be maintainable and sustainable in the field? Would it take more decades of development, missteps, and refinement to realize the full potential of such weapons? Is it worth the added investment? We must find out, since the potential payoff is so high. If the technological and programmatic (i.e., cost and schedule) hurdles can be over-

come, then what impact will HEL have on future aerial warfare?

Research, Development, and Testing

The main parts of an airborne HEL system are the platform (airplane), the sensor system ("eyes"), the HEL device ("photon faucet"), and a pointing and tracking system ("beam control"). Of course, other ground and airborne assets are required to support such a system, but they are not the pacing technical challenge.

Many of these elements, in earlier forms, have already been demonstrated on an airborne platform. The first airborne HEL system was the Air Force's Airborne Laser Laboratory (ALL), which flew its last laser test mission in 1983 (and now resides at the Air Force Museum, Wright-Patterson AFB, Ohio). However, ALL was a laboratory—not a weapon system.[2] Scientists used it to learn about propagating lasers through an aircraft's turbulent boundary layer and through the intervening atmosphere to a target. With 1970s technology, ALL demonstrated half-megawatt-class laser power; tens-of-microradians jitter levels (unwanted motion due to aircraft vibration sources and atmospheric turbulence) of the intense laser beam; and accurate, safe beam control. In demonstrations of potential future applications, ALL successfully conducted laser beam tests using towed diagnostic targets, engaged and defeated AIM-9B air-to-air missiles, and shot down sea-skimming target drones simulating maritime cruise missiles.[3]

In spite of those dramatic successes, ALL was not suitable for fielding as a weapon system in 1983, nor is it a candidate for today's TBM mission. After all, it was a test bed—not a fully developed weapon system. Its long, 10.6-micron-wavelength gas dynamic laser, combined with limited optical component dimensions, led to poor laser beam propagation over distances greater than 10 km. Just as importantly, the system was not designed to be operated or maintained by a war fighter. However, it did give us a glimpse of the kind of devastating damage HELs could produce when operated from an airplane and coupled with

the inherent flexibility and mobility of air power. The ALL system tracked and burned holes in high-speed aerial targets within seconds, causing them to lose control and crash. In short, this firepower was awesome! The experience gained from ALL now motivates many ABL proponents to press the case for these weapons for TMD.

In the time since the ALL flights, the elements of a conceptual airborne HEL weapon system have continued to evolve. Aircraft technology has steadily advanced to the point that wide-body aircraft such as the 747 series—incorporating sophisticated wing designs and newer, more powerful engines—can now lift heavy payloads to high altitudes for extended periods of time.

Sensors developed for the satellite community and for tactical applications are smaller, more sensitive, of higher resolution, and cheaper than ever before. It is possible to electro-optically detect and track missile plumes out to many hundreds of kilometers from a high-altitude airborne platform. Active and passive radar techniques can detect many kinds of moving airborne objects, including ballistic missiles, SAMs, aircraft, and cruise missiles.
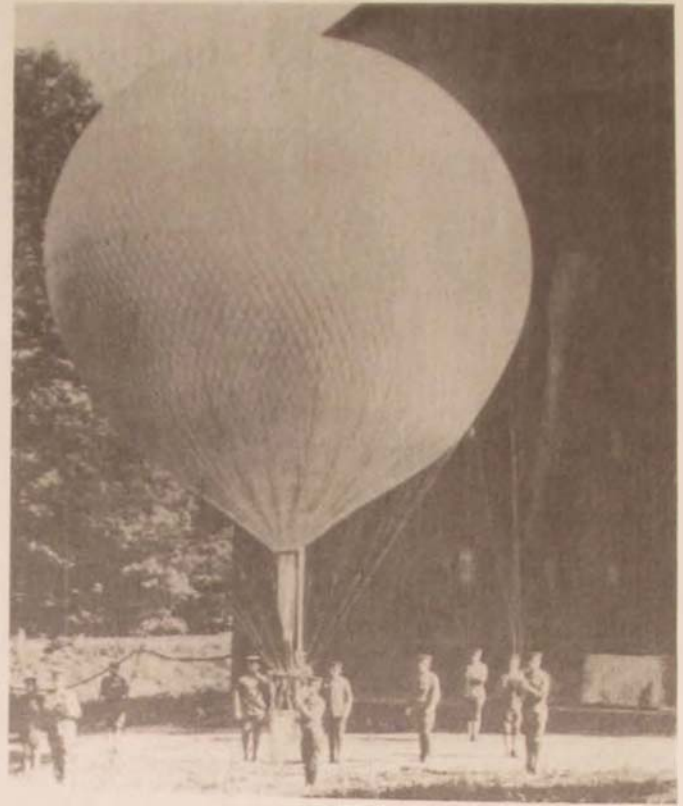
At a time when balloons seemed the only way to fly (above), people laughed at the idea of heavier-than-air flying machines, even though Leonardo da Vinci had sketched several designs for such craft centuries earlier (below).
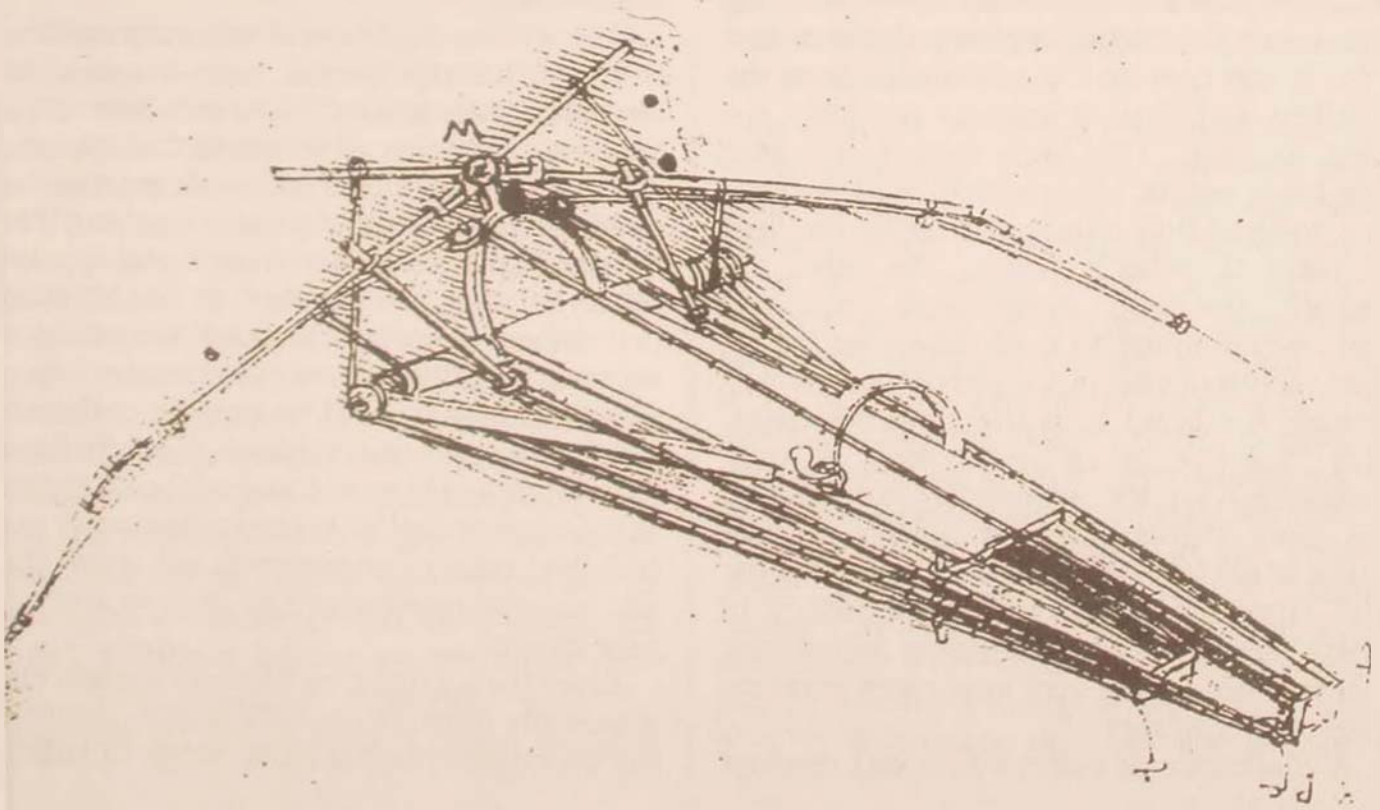
Lasers have attained megawatt power levels in ground-based systems and hundreds of kilowatts in airborne experiments. Chemical oxygen-iodine lasers offer much improved beam shape, are scalable to very high powers, operate at benign temperatures and pressures, and are much safer than many other types of lasers. As with all lasers, though, one must exercise extreme care with the lethal photon beam output. Moreover, operating wavelengths for airborne applications have decreased—with an attendant reduction in required optical system size and weight—while still maintaining high overall system performance levels.

The beam control subsystem is one of the most challenging elements of the HEL system. Developments over the years have focused on reducing beam jitter, maintaining beam shape, precisely pointing the beam within incredibly small angular tolerances, and keeping a stable target track long enough for HEL to burn a hole in a critical spot on the target. Today, systems often achieve submicroradian jitter levels, which is like saying at a distance of 200 miles, the beam will jump around no more than the width of a basketball! Uncooled mirrors have played an important role in reducing HEL beam jitter. Many formerly liquid-cooled mirrors can now be left uncooled, due to the excellent and durable coatings routinely applied to them. This improvement translates into lower weight, along with much less vibration induced into mirror surfaces by the flow of water or other coolants. The other extremely significant development in recent years is our ability to compensate for the effects of turbulence in the atmosphere, which degrade the beam as it travels to the target. This "adaptive optics" technology, recently declassified for the astronomer community, has been demonstrated at Starfire Optical Range at Kirtland AFB, New Mexico, and at the MIT Lincoln Laboratory Firepond facility in Massachusetts. It is an enabling technology that will sustain the very long range performance of laser weapons.[4]

A confluence of recent events and develop-ments has rekindled intense interest in the ABL weapon. What was lacking in 1983 besides the right technology for the ALL demonstrations was a mission and the support of a user. The mission was thrust into the spotlight by the Gulf War and the terror produced by Scud attacks, while Air Combat Command (ACC) later provided the all-important user support. This series of events led to the start of the ABL project in 1992. Defense against Scuds and other types of TBMs is now a high priority.[5] For example, ACC is developing ABL requirement thresholds and objectives, and Phillips Laboratory's ABL System Program Office at Kirtland AFB has prepared initial technical requirements for ABL.[6]

The ABL Concept

What is ABL? Notionally, it will be a large, wide-body aircraft modified to carry a laser weapon system payload to high altitudes (above 40,000 feet) and will be able to spend a significant time on station, battle ready. With data from onboard and off-board sensors, it will detect, track, and engage boosting TBMs at long ranges (i.e., hundreds of kilometers).

ABL will be capable of autonomous operation, particularly in the early stages of a theater conflict when C^2 may well be handed down to lower execution levels. Cockpit and mission crew members will work together to position ABL in a flight pattern that provides the best protection for troops and equipment entering the theater or for civilian population centers. Onboard surveillance sensors, operating in a 360-degree sweep about the aircraft, will be capable of detecting a variety of air vehicles. Coordination with ground-, ship-, and aircraft-based radars will complete the air picture. Previously established rules of engagement will allow the ABL mission commander to react to and engage threats.

Laser fuels carried by ABL will sustain engagements of more than 20 targets, depending on target type/hardness, range to target,
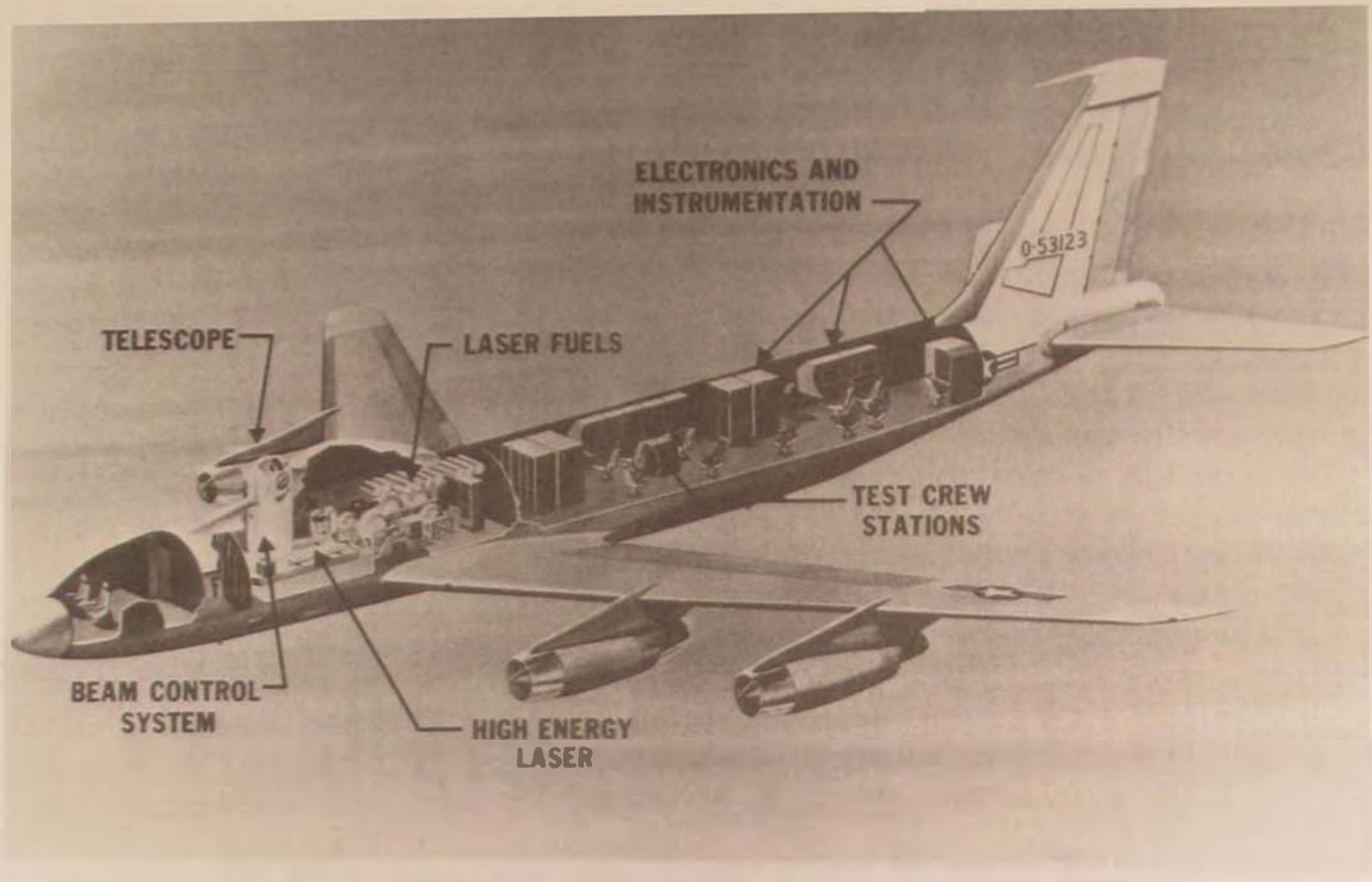
The first airborne high-energy laser system was the Air Force's Airborne Laser Laboratory, tested in the 1980s and now housed in the Air Force Museum at Wright-Patterson AFB, Ohio.

atmospheric conditions, aircraft altitude, and other factors. These fuels will be thermally and chemically managed to maintain their potency and to minimize weight. When combined in the laser device, they will produce multimegawatt power looking for a place to go. The beam control system must take all that energy and direct it to the right place—namely, a target.

If the laser beam were simply pointed toward the target, just as one points a flashlight, the beam would easily wander off its intended target because of aircraft vibration and atmospheric-induced jitter. The beam would spread out and become diffuse due to atmospheric turbulence and likely would not inflict sufficient damage on the target missile. These technical challenges must be overcome for ABL to work. Current research

and development efforts indicate that solutions are close at hand.

Mirrors are key to beam control. First, jitter is suppressed by using precision, inertially stabilized references for the laser beam, similar to aligning the whole system to something immobile—such as a star. Fast-steering mirrors, which move even faster than most vibration sources, are then used to correct for vibration-induced motion of the beam. Another class of mirror is used to correct the phase (path length) distortions of the beam, whether caused by the laser device itself or by the turbulence in the atmosphere. This so-called deformable mirror changes its shape in response to computer commands. Wave-front sensors and computer phase-reconstruction algorithms, coupled to deformable mirrors, now routinely

take the twinkle out of stars for astronomers.[7] We know they work from the ground to space; we must now be sure they work from airplanes to missiles.

Tying all this together is a fire control system with human beings in control. Crew coordination will still be as important as ever when the battle starts and hostile missiles and aircraft fill the air. The mission crew will use decision support systems to cope with a complex air picture and select which targets to engage, all the while trying to stay alive themselves.

The technology is indeed sophisticated and fascinating. But we stand the risk of becoming *too* fascinated with the technology and not immersed enough in the war-fighting doctrine required to support the use of that technology.

Need for ABL Doctrine

As is often the case, technology has outpaced the development of doctrine for ABL. Frequently, it takes time and battlefield experience to fully appreciate the capabilities of a new system and to appreciate additional ways of exploiting those capabilities. Wartime effectiveness is reduced when doctrine outpaces technology, as was the case with aerial bombing for many years. Unfortunately, a weapon system developed in a doctrinal void also may fall far short of the effectiveness it might otherwise enjoy early in its application. It is time to think about warfare doctrine for ABL.

This article makes no attempt to rewrite Air Force Manual (AFM) 1-1, *Basic Aerospace Doctrine of the United States Air Force,* or to define tenets of basic, operational, or tactical doctrine.[8] Nor does it enter the debate over whether doctrine should be defined as fundamental, environmental, or organizational.[9] Some readers will see parallels with the development of space doctrine and all its attendant controversy.[10] Some will look at the ABL weapon as merely an extension of other conventional weapons (i.e.,

as very fast, long-range missiles). Indeed, some current Air Force modeling and simulation efforts simplify an ABL weapon by using existing missile models and making them fly extremely fast. But thinking of a photon as a fast missile can lead to constricted thinking about ABL doctrine. Some initial thoughts to encourage ABL doctrine development by more astute "doctrinaires" should be considered.

The key to air power is flexibility, which can be defined as the ability to rapidly reconfigure forces for the tasks at hand, deploy those forces quickly, position them to greatest advantage, concentrate individually weak elements into superior masses (even if only for short periods of time), and redirect their goals in real time. ABLs, by virtue of being *airborne,* are potentially very flexible forces. Yet, this attribute could be lost if they are not specifically designed to exploit flexibility (i.e., to deploy very quickly, stand alert, be efficiently maintained and supported, be serviced [turned] quickly in the theater of battle, and be tightly woven into the theater C^2 architecture). ABL aircraft must retain an effective maneuvering capability in spite of high operating weights and altitudes. The platforms must operate over great distances and for long periods of time, which means they must be air refuelable and should accommodate augmented aircrews and provide rest facilities on board. ABLs must be ready to take up battle stations immediately upon arrival in a theater and must be able to fight their way into a theater, if necessary.

Given the fact that ABL systems must maintain flexibility, what else can be said? Concerning doctrine and technology, Air Force historian Dr Richard P. Hallion writes that

> doctrine must function in the *present,* be appropriate for the *near-future,* possess *flexibility* and *adaptability* to meet changing conditions, and be rooted in the *past,* in *military history* and *experience.* It must reflect the complete climate in which it is framed, a climate including existing political and economic realities. (Emphasis in original)[11]

In the airborne laser, the Air Force stands to gain a silent, very long range, speed-of-light weapon. These contractor versions of ABL weapon system platforms are part of an Air Force Advanced Technology Transition Demonstrator program to develop and demonstrate technologies for tracking and killing theater ballistic missiles during boost phase.

Since there are no bases of *operational* experience, lessons learned, or "rooting in the past" for HEL weapons, one must build upon other proven lessons of air power application, just as space doctrine now builds on proven principles of employment.[12] One might argue that the classical principles of air power are more appropriate for offensive than for defensive operations. However, ACC's current emphasis on "active defense" (i.e., pushing the defensive theater missile fight back over to the enemy's territory) mandates consideration of a more active/offensive role for "defensive" elements like ABL. Thus, the same principles may apply equally well to active defense in the TMD arena and could be used as a surrogate experience base for ABL.

Consider Offensive Action versus Defensive Action

Although the notion seems contradictory, a defensive system such as ABL could play a vital role in the offensive against the enemy's theater missile forces. ABL's wide-area coverage could be used to force enemy launch points into smaller and smaller zones to make missiles more vulnerable to attack. Precision tracking and target identification by ABL could backtrack missile launch points for immediate counterforce attacks. The laser weapon in a counterair and counter-SAM mode of operation could potentially support offensive strike packages. Indeed, the psychological impact of an effective long-range laser weapon, "silent but deadly," could itself be wielded as a weapon.

Gain and Maintain Control of Airspace

ABL would be capable of exchanging air picture information with the Air Force's airborne warning and control system (AWACS), the Navy's airborne early warning/ground environment integration segment (AEGIS), and the Army's area and point defense systems. It would also be able to operate in a cooperative mode with other ABLs, assigning target priorities and fields of fire where their coverages overlap. Positive human-in-the-loop control, laser engagement floors, and safe corridors would have to be es-

tablished to assure proper target identification and to avoid fratricide.

Centralize Control and Decentralize Execution

ABL would be designed to operate somewhat autonomously in early stages of the theater conflict, when ground-based C^2 assets may not yet be in place. Yet, ABL may be the best platform from which to direct the active TMD battle during the early stages and could play an important role in centralizing control for airborne kinetic kill vehicle (KKV) missile interceptors, if they are part of TMD architecture.[13]

Seize the Initiative

This principle can be interpreted in temporal terms: getting inside the enemy's short-launch and missile-flight time lines and keeping control of the tempo of battle. Speed-of-light transit of lethal laser energy means that ABL could meet many of the TBM-reaction time lines, perhaps uniquely.

Execute Constant and Persistent Attacks

ABLs would be capable of maintaining constant, round-the-clock surveillance; launch detection; and engagements of single and multiple missile boosters and could rapidly retarget from one missile to the next. Precision, even beyond that achieved by smart bombs or missiles, would allow application of lethal force at the desired point of vulnerability. Careful application of laser fluency and real-time kill assessment would allow termination of track/kill after only the necessary amount of energy has been delivered to the target, thereby conserving resources and extending the number of targets engaged. Based on threat assessments, ABLs would be deployed to effective orbit locations, with deep laser-fuel magazines and with high operational availability. Resupply, replenishment of fuels and crew, maintenance, and aircraft turn procedures must be incorporated into the conceptual design of the system in order to maintain that high availability.

Maintain Sufficient Reserves

The ABL fleet would have to be sized to provide sufficient coverage in the expected theaters of battle and to sustain sufficient maintenance and attrition reserves. Required numbers of aircraft must be determined through careful analysis since total program cost is a direct function of the ABL fleet size.

In keeping with Dr Hallion's comment that doctrine "must reflect . . . existing political and economic realities," the changing political and economic environments in which we live must be accommodated in the transition of ABL technology to an operational weapon system. The budgetary environment at present is not good for boost-phase intercept, and ABL must survive the current decrease in available funding for new systems. If it does survive in the near term, ABL may have the chance to demonstrate its payback in economy. ABL has significant potential for lower cost per kill, insofar as each shot expends only laser fuel and the hardware itself stays put. ABL also has the potential to save money in the design and employment of other TMD tiers, since it would reduce the missile-load threat presented to post-boost-phase, defensive systems. Ongoing studies of concept design and analyses of cost- and operational effectiveness are addressing these issues.

Politics are more difficult to fathom. Summarizing the limits likely to be imposed by Congress and the public on military action, Phillip Meilinger writes,

1. We will seldom [use] conventional . . . ground troops. Instead, we will use special operations forces. . . .

2. The draft will not be reintroduced. . . .

3. There will be great pressure to extract [troops] quickly. The American public is monumentally impatient with long wars and has a low threshold of pain regarding casualty figures. . . .

4. If we apply air power in lieu of ground forces, we must do it with precision and minimal collateral damage. . . .

5. Civilian leaders will maintain extremely close control over military operations. . . . Given the high stakes involved with world opinion and the sensitivity of political relations, the perceived need for such tight civilian control will not diminish.[14]

Some implications of these constraints for ABL are as follows:

1. The value of ABL's ultraprecision will increase in the future.

2. Returning the responsibility for collateral damage to the aggressor will be possible with boost-phase intercepts by lasers, which do not launch residual (friendly) hardware over—or leave it on—enemy territory.

3. ABL can remain outside the political boundaries of a hostile nation, not overtly provoking but posing an instant response to an outbreak of hostilities (or a TBM launch). Lack of—or delay in receiving—border crossing authority is not a factor in the face of a launch. Required levels of civilian control can be maintained.

Finally, considering the international political environment, a difficult problem is what to do about TBMs carrying chemical, biological, or nuclear warheads. Certainly, it is desirable to keep them from being launched in the first place. What will it take to do that? Are we willing to threaten to use and then actually use the same kinds of nasty weapons that a Saddam Hussein might launch? Would our threat to employ such weapons be credible in tomorrow's world? These questions delve into the possible role of ABLs in providing deterrence to the use of TBMs, a subject clearly beyond the scope of this article yet an interesting topic for future discussion.

Conclusion

ABL boost-phase intercept meets the requirements for effective TBM defense and offers the potential for high operational effectiveness. ABL is perhaps the only viable

candidate for the boost-phase job. Further concept definition, system design analysis, and continuing research should answer many of the questions about technology and cost by 1997. A working operational prototype could be built by the year 2000.

These and other doctrinal inputs must be factored into ABL operational requirements and, ultimately, into system technical requirements. A timely discussion of ABL doctrine will complement the evolution of this impressive technology.   □

Notes

1. See Edward Meade Earle, ed., *Military Strategy* (Washington, D.C.: National Defense University, 1983), 47–61.

2. For a description of the early ALL program, see Maj Thomas J. Dyble, "Peace through Light: The Airborne Laser Laboratory," Student Report 83-0615 (Maxwell AFB, Ala.: Air Command and Staff College, February 1983).

3. The author was a beam-control-system crew member on the ALL from 1982 to 1983 and a test director for turret aero-optics experiments in 1984. A complete history of the ALL program is being assembled by the Phillips Laboratory historian at Kirtland AFB, New Mexico.

4. For an excellent introduction to the principles of adaptive optics, see MIT Lincoln Laboratory *Journal* 5, no. 1 (Spring 1992).

5. "The FY 92–97 Defense Planning Guidance, 24 Jan 90, and the FY 91 Appropriations Conference Committee Report, H. Rep. 101-938, Title IV, 24 Oct 90, directed the Strategic Defense Initiative Organization (SDIO) and Department of Defense (DoD) to commit resources to TMD programs and accelerate research and development for systems to be fielded as soon as technologically and fiscally feasible. To expedite TMD efforts, the Warner-Nunn amendment, FY 92 Defense Appropriation Bill, required an improved capability by the mid-1990s. The National Defense Act for FY 93 consolidated all theater defense projects under a DoD-wide Theater Missile Defense Initiative (TMDI), assigned by the Secretary of Defense, and transferred the management of several technology programs from SDIO to the Advanced Research Projects Agency (ARPA)." *Program Management Plan for the Theater Missile Defense Program within Theater Air Defense* (Los Angeles AFB, Calif.: Space and Missile Systems Center, 5 December 1993), 1.

6. "Airborne Laser Technical Requirements Document" (U) (Kirtland AFB, N.Mex.: Phillips Laboratory, June 1993). (Secret) Information extracted is unclassified.

7. C. A. Primmerman et al., "Compensation of Atmospheric Optical Distortions Using a Synthetic Beacon," *Nature* 353 (12 September 1991): 141; and R. Q. Fugate et al., "Measurement of Atmospheric Wavefront Using Scattered Light from a Laser Guide Star," *Nature* 353 (12 September 1991): 144.

8. AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force,* 16 March 1984, v–vi.

9. Lt Col Dennis M. Drew, "Of Trees and Leaves: A New View of Doctrine," *Air University Review* 33, no. 2 (January–February 1982): 43.

10. Col Kenneth A. Myers and Lt Col John G. Tockston, "Real Tenets of Military Space Doctrine," *Airpower Journal* 2, no. 4 (Winter 1988): 54–68.

11. Dr Richard P. Hallion, "Doctrine, Technology, and Air Warfare: A Late Twentieth-Century Perspective," *Airpower Journal* 1, no. 2 (Fall 1987): 26.

12. Capt James R. Wolf discusses AFM 2-25, *Space Operations,* in "Toward Operational-Level Doctrine for Space: A Progress Report," *Airpower Journal* 5, no. 2 (Summer 1991): 39.

13. KKVs are also proposed as weapons to combat TBMs, although the current technology only supports intercepts high in the atmosphere, after the threat booster burns out and the warhead is on a ballistic path toward its target. Extremely stressing time lines for the KKVs' flyout and intercept may ultimately limit their application to the postboost, ascent phase of TBMs. Even so, they may prove complementary to the ABL in the TMD arena. Studies are in progress (e.g., by Phillips Laboratory/XP) that examine the potential for synergy between the ABL and KKV concepts.

14. Lt Col Phillip S. Meilinger, "The Air Force in the Twenty-first Century: Challenge and Response," *Airpower Journal* 4, no. 4 (Winter 1990): 40.

IRA C. EAKER AWARD WINNER

Capt David W. Parsons, USAF

for his article

British Air Control: A Model for the Application of Air Power in Low-Intensity Conflict?

Congratulations to Capt David W. Parsons on his selection as the Ira C. Eaker Award winner for the best eligible article from the Summer 1994 issue of the *Airpower Journal*. Captain Parsons receives a $500 cash award for his contribution to the Air Force's professional dialogue. The award honors Gen Ira C. Eaker and is made possible through the support of the Arthur G. B. Metcalf Foundation of Winchester, Massachusetts.

If you would like to compete for the Ira C. Eaker Award, submit an article of feature length to the *Airpower Journal*, 401 Chennault Circle, Maxwell AFB AL 36112-6428. The award is for the best eligible article in each issue and is open to all US military personnel below the rank of colonel or equivalent and all US government civilian employees below GS-15 or equivalent.

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RON AND RQMT REQUEST

Ricochets
continued from page 3

Second, in my opinion the general tone of the article suffered from an inability to fully appreciate changing national priorities. Statements such as "We need an improved fighter such as the F-22 to ensure that we maintain air superiority" may actually backfire and work against the USAF. It is not clear how much of an improvement is "good enough" in this new world order, and simply relying on projected technological threats and past rates of foreign advancements can no longer justify the enormous expenditures demanded for new weapon systems.

The USAF has never existed during peacetime; we must learn how to do so. The attitude and mind-set that successfully won the cold war *must* change to accommodate the nation's new priorities, for if the USAF does not do so voluntarily, then Congress and the public will dictate the change. Outdated rationale will be the first casualty in the budget battle.

I personally believe the expenditures are justified, but not for the reasons given by the author. While I agree with the majority of the article and hope that most of its recommendations will be adopted, only a deeper analysis will result in more thorough arguments and stronger rationale that are less likely to fail in the next round of budget hearings. Those debates *will* occur, and the USAF will fail in those hearings unless it is willing to push ahead with insightful justification. And if so, then the nation may once again learn the hard lesson of being ill prepared for war.

Lt Col J. Douglas Beason, USAF
Colorado Springs, Colorado

CAPTION CALAMITY

My more astute Junior ROTC cadets (frustrated fighter pilots), who are well informed on aircraft and the Air Force, pointed out to me that your journal made some statements in Capt Scott A. Fedorchak's article "Close Air Support: Repeating the Past . . . Again?" (Spring 1994) that were not in agreement with what I had said about the Korean War.

Captions for the pictures on page 25 are switched around. The picture at the top is an F-

84G, while the bottom picture shows an F-86D, the air defense variant of the F-86. Note the rockets being fired from the lowerable package that holds the 2.75-inch rockets. As soon as the rockets were fired, the empty rocket package was retracted back up into the bottom of the fuselage.

Further, the caption states that the F-86 and the F-84 could not operate in Korea but that both played roles in the defense of Japan after the Korean War. I must differ with the article on this point. I was stationed at K-55 at Osan, Korea, during the war, and we flew F-86Es and F-86Fs against the North Koreans. In addition, many of my fellow fighter pilots flew F-84Gs out of K-8 and K-2 during the same time period.

On page 26, the article shows two C-47s from the Korean War era. I have spent hours hitching C-47 rides, riding on top of the cargo, freezing while trying to get to or from Japan or Korea. However, there were no fixed-wing gunships at all in the Korean War. Had we had them, the war might have gone easier for many of our ground troops. No, Sir. The first fixed-wing gunships were developed in December 1964 when side-facing miniguns were mounted at the open windows of some C-47s and some C-119s during the Vietnam War. They were first referred to as "Puff the Magic Dragon" and then by other more up-to-date names.

Someone goofed to let these errors slip by. My cadets have always held your journal up as the authority, or as source material. I hope the good captain who wrote the article doesn't get too discouraged because he is dead-on when he states that the Air Force regularly forgets to remember any of its combat history, and thereby loses some lives while it relearns how to do the job.

Keep up the good work anyway. This is the first time I can ever remember you guys making any mistakes!

Lt Col Thomas A. Varble, USAF, Retired
Biloxi, Mississippi

EDITOR'S NOTE: You caught us with our captions down. The photos on page 25 were switched. It is indeed the F-84 above and the F-86 below. On page 26 the caption should have read "The Air Force helped solve shortfalls in close air support in the Vietnam War [not the Korean War] by converting the

World War II–vintage C-47 into the heavily armed AC-47." The author says it correctly toward the bottom of the left column on page 27. We goofed, but we'll do better in the future. Please thank your cadets for pointing out our error.

Concerning whether F-84s and F-86s operated from unimproved Korean airstrips, you should know—you were there. However, we find ourselves in good company by holding this widely held belief. For example, others of no less stature than Dr Robert F. Futrell, the esteemed air power historian, have understood that jets couldn't operate from Korea. In The United States Air Force in Korea, 1950–1953, *Futrell states, "Whatever glimmer of hope there was that jet fighters could be based in Korea was extinguished as heavily loaded transport planes tore up the lightly surfaced runway at Pusan. Now it was clear that all of the jets would have to be based on Kyushu, at Itazuke, and Ashiya" (page 67).*

CAS KUDOS

I salute author Capt Scott Fedorchak, USA, for his comprehensive article. Somebody has to keep reminding the Air Force that doing whifferdills is not the same as winning wars!

Maj Gen John C. Toomay, USAF, Retired
Carlsbad, California

TERRITORY AND TRIUMPH

Lt Col Price Bingham's article "The United States Needs to Exploit Its Air Power Advantage" (Fall 1993) was to me both a stimulating and controversial article. As a student of military history and strategy, I am reminded time and time again that the more things change, the more they remain the same. In the nineteenth century, extensive research was performed that was exclusively geared toward designing the perfect cavalry force. Theorists believed that an optimum mix of cavalry, supplanted with line soldiers and artillery, would provide the most powerful punch to defeat the enemy. No soldier could face down the threat of hundreds of pounding hooves charging directly in their face, nor could any soldier match the mobility of the cavalry. It was obviously the most modern and powerful force available.

Today's modern air power can be likened very closely to the cavalry of yesteryear. Both are swift and powerful elements on the battlefield; both strike decisively, often from unexpected positions, with devastating results; and, most important, both are totally incapable of taking and holding territory. This taking and holding of territory has been universally accepted throughout the ages as the only means to ensure defeat of the enemy. A military force must take the enemy's territory to defeat both his will and capability to fight.

While Colonel Bingham makes several excellent observations about the capabilities of air power, it is entirely wrong to suggest that air power can win a war by itself. Desert Storm provided a very unusual set of circumstances: the terrain was flat, providing optimum conditions for detecting enemy forces; the enemy was a third world power, clearly no match for a superpower; and the level of training on the part of the Iraqi military was such that neither their air forces nor their ground forces were effective against the US military. They lacked both the determination and the means to mount an effective fight. Using this short engagement to draw such extensive conclusions is very unwise.

I would like to see an analysis of our air power in all other theaters before such broad conclusions are drawn. A case in point is the Vietnam War. Extensive studies have shown that air power was decisive when the enemy could be pinned down, but inconclusive otherwise. That is much different than the observations drawn from Desert Storm. How will JSTARS [joint surveillance target attack radar system] do in a mountainous European theater like Bosnia? Are F-15Es as effective under extensive hostile fire in threat environments where using radar for target acquisition makes them more of a target than the enemy? And how will this use of air power stop a determined and capable enemy from launching an offensive?

It is my contention that the basis for our military must be the basic grunt in the field and that we should build our force structure around making his job easier. In the spirit of TQM [total quality management], we must identify who our customer is and how we can provide the best service possible to that customer. Using this approach, the Army becomes the focus of our military structure. Why? Because neither the Navy

or the Air Force can occupy territory, which is the fundamental tenet to winning a war! Both the Navy and the Air Force perform important functions in fighting the war, but these functions are subordinate to getting the grunt to the right place at the right time with the right fire support. This should become the foundation for analyzing our successes and should provide the guidance we need to get us into and through the twenty-first century.

Capt James P. Pfarr, USAF
Peterson AFB, Colorado

ISSUE INSPIRATION

Occasionally, one of the journals to which I subscribe sends me an especially stimulating and seminal issue that contains a number of essays and observations of profound interest to me. The Spring 1994 edition is such an issue.

The editorial essay on honor addresses a topic that has been of great philosophical importance over the millennia. My good friend, the late Dr John D. Kelly, and I spent a great deal of time discussing honor as Jack wrestled with the concept in an attempt to write a discussion of it worthy of its meaning. Unfortunately, Jack passed away at the height of his powers and never completed his treatise.

The only motto that hangs on my walls concerns the Peloponnesian War and quotes the Athenians saying to the Spartans, "We do these things out of the three highest motives: Fear, Honor and Interest."

Capt Scott A. Fedorchak's discussion of close air support is cogent, perhaps seminal and very important. Despite Col Phil Meilinger's unshakable faith in air power's ability to single-handedly win wars by itself, the ground-pounders need CAS.

One of my great pleasures in life is poking fun at Colonel Meilinger's unabashed faith in strategic bombing and air power's ability to win wars by itself. Meilinger's review of Alan J. Levine's *The Strategic Bombing of Germany, 1940–1945* is an excellent example of his faith. The next to last paragraph of the colonel's review is, if you'll pardon a pun, "on target" whether you judge him as a historian or as an airman. That paragraph, in my view, is one of the wisest I have ever read. Meilinger's ideas should be heard in the very highest defense councils.

Lt Col Timothy G. Murphy's critique of Col John A. Warden's *The Air Campaign* is worth waiting for. Colonel Warden might well have been embarrassed by the praise given the work when it came out. While the work is a "holistic theory of air war," Warden's theoretical contributions to Desert Storm, rooted in that book, are not to be dismissed. Warden's work is a useful addition to the theories of warfare. Alfred Thayer Mahan is my personal touchstone on the theories of warfare. He wrote when they had only the sea and land dimensions. He is to be read with caution. We need, it seems to me, an author with the vision to integrate the six dimensions of military theory into a whole: land, sea, subsurface, air, space, and electronic.

Too, Capt Judy M. Graffis's review of Maj Gen Jeanne Holm's *Women in the Military: An Unfinished Revolution* is fair. It is still the best we have. Coincidentally, yesterday I sent off a review of Jean Ebbert and Marie-Beth Hall's *Crossed Currents: Women in the Navy from WWI to Tailhook.* It is a model of scholarship and an even-handed treatment of the developments. There is a high degree of probability that I will teach military history next academic year. I will use Ebbert and Hall's book as one of the required texts.

As you might guess, my evening has been spent reading and thoroughly enjoying the Spring 1994 edition of *Airpower Journal* and writing this letter. Thanks for your consistently fine efforts and for making this issue so stimulating for me.

Dr Lawrence Carroll Allin
Norman, Oklahoma

AUTOBIOGRAPHY, BIOGRAPHY, AND MEMOIRS

General Walter Bedell Smith as Director of Central Intelligence, October 1950—February 1953 by Ludwell Lee Montague. Pennsylvania State University Press, 820 N. University Dr., Suite C, Barbara Bldg., University Park, Pennsylvania 16802, 1992, 500 pages, $45.00.

I approached this book with great expectations only to find the title had misled me. Perhaps I should have read the title a little more carefully. Instead of being a book about Gen Walter Bedell Smith, this book turns out to be a detailed account of the organizational growing pains of the Central Intelligence Agency (CIA) during General Smith's tenure as director. Insights about and references to General Smith are unhappily few and, for the most part, shallow.

This book is the second in a series of previously classified internal CIA historical studies. The first was *The Central Intelligence Agency: An Instrument of Government, to 1950* by Arthur B. Darling (Pennsylvania State University Press, 1990). The present work was first published as a secret internal document by the CIA in 1971 and declassified in 1990 under the CIA Historical Review Program (an outgrowth of the CIA Information Act of 1984). The editors of this book state in the preface that "practically speaking, the material missing from the present text does not, in our opinion, diminish the value of what has been released." They also note in the text exactly where and how much of the original was deleted. I found the fact that material had been excised annoying at best and downright puzzling at times. Certainly, some material needs to remain classified to protect sources and methods. However, it is hard to believe that revealing the number of people assigned to the Office of National Estimates in November 1950, an example of excised material highlighted by the editors, would endanger sources, methods, or national security in any way. Particularly vexing was the deletion of an entire 36-page chapter and four pages of notes related to external relations. As the editors speculate, this chapter probably dealt with the CIA's relations with foreign intelligence services.

The book begins by providing "the essential background" needed to place the material in context. We are treated to brief biographical sketches of the three major figures in the CIA during this period (General Smith, William Jackson—Smith's deputy—and Allen Dulles, deputy director for plans). We find out, for example, that General Smith was the fourth director of Central Intelligence (DCI), being preceded by Adm Sidney W. Souers, who served for only five months; Gen Hoyt Vandenberg, who served for 11 months; and Adm Roscoe H. Hillenkoetter, who reaped "the whirlwind left by General Vandenberg" and served until General Smith took over in October 1950. The background information continues by reviewing the multitude of studies, reports, and plans for reforming the post–World War II intelligence structure for the United States government. We are then taken through an account of General Smith's reign as DCI, which, unfortunately, includes excruciatingly detailed descriptions of the organization and reorganization of the CIA.

The book highlights what the author considers General Smith's three major achievements as DCI: his development of a cooperative relationship with the Intelligence Advisory Committee, his reorganization of the Deputy Director of Intelligence offices pursuant to National Security Council Directive 50, and his organization of the Clandestine Services. It also confirms the editors' assertions that General Smith's term as DCI is significant and deserves study for at least three reasons. First, he was the first "successful" DCI and thereby established the role and responsibilities of that office. Second, it was under his reign that many of the enduring institutions of the US national intelligence community, such as the National Intelligence Estimate, were established. Finally, he was responsible for putting life into the CIA itself.

In spite of the book's focus, we are treated to a few insights regarding General Smith. He came to the CIA with a reputation as an acerbic, demanding, and impatient personality who tended to haze the members of his personal staff unmercifully. Based on his performance as General Eisenhower's chief of staff in the Mediterranean and European theaters during World War II, he was considered one of the most disliked senior officers of his time. As a result, even William Jackson, who was reluctant to expose himself to the ravings of a "tyrannical soldier" and referred to General Smith as "the Ogre of SHAPE," agreed to come to the CIA for six months on three conditions, one of which included "no bawling out." In day-to-day dealings, General Smith liked to work out differences of opinion based on oral agreements, preferring to "assert his authority in practice rather than attempt to define it in writing, lest the formulation of a text provoke controversy and result in some undesirable limitation through compromise." Apparently, this approach worked well for him as he deftly treaded the murky waters of the Washington bureaucracy.

This book is definitely not for the casual reader. Its tedious use of unfamiliar (at least outside of the intelligence community) abbreviations and acronyms makes the text difficult to read and often confusing. I often had to refer back to previous material in order to decipher what was being said. An example of one such "clear as mud" passage was the following: "Although ORR was administratively the continuation of ORE, OIR (and ONE) came to realize that ORE had actually survived in OCI." This book is also not for those interested in an understanding of General Smith, the individual and military leader. For that, you would be well served by reading D. K. R. Crosswell's *The Chief of Staff: The Military Career of General Walter Bedell Smith* (Greenwood Press, 1991). On the other hand, if you are researching the origins of the United States's intelligence apparatus and are willing to deal with a dry, frequently excised text, this book will likely provide valuable insights.

Lt Col William F. Furr, USAF, Retired
Montgomery, Alabama

Soldat: Reflections of a German Soldier, 1936–1949 by Siegfried Knappe and Ted Brusaw.

Orion Books, 225 Park Avenue South, New York 10003, 1992, 384 pages, $23.00.

Military memoirs need to be read with caution. At their best, they are well written and shed valuable light on historical events. At their worst, they are boring and tend to muddy the historical waters.

Siegfried Knappe's *Soldat* is not one of the best memoirs of the Wehrmacht, but it is quite readable and provides some useful insight into the history of the Third Reich. Knappe, from a middle-class, conservative German family, planned to go to a university but was drafted into the army in 1936 and found he had a real aptitude for army life. He volunteered for training as an artillery officer and graduated from the officers' academy in Potsdam in 1938 with top honors.

Knappe received his baptism of fire as a battery commander in France in 1940 and was wounded late in the campaign. Like most of the German army of 1940, Knappe's artillery unit was horse-drawn. Indeed, Knappe's memoir is a good reminder of what blitzkrieg warfare was for most of the Wehrmacht in 1940—a slow plod far behind the mechanized troops, with only occasional action to break the tedium and exhaustion. *Soldat* provides a good view of the 1940 campaign and the campaign in the Soviet Union from the point of view of the company-level officer.

The author served as a line artillery and staff officer on the Eastern Front for most of 1941–43. Involved in much hard action, he was decorated for bravery and was wounded at the gates of Moscow. He was lucky enough to be ordered to France in 1943 just after the collapse of the German southern flank. In 1943 and 1944, Knappe served in France and Italy—working for a short time on Field Marshal Albert Kesselring's staff—and was promoted to major. His performance in combat and on the staff earned him a place at the prestigious General Staff Academy.

Major Knappe graduated from the abbreviated General Staff course in early 1945 and was rushed to the Eastern Front that had already pushed into Germany. In April 1945 he was appointed as the operations officer for the 56th Panzer Corps and thus became the chief of staff for the final defense of Berlin. This part of the book provides a valuable new account of the last great battle of the European war. The 56th Corps retreated to the west as the Soviets broke the last

major defense line before Berlin on 19 April 1945. The 56th Corps and its parent unit, the Ninth Army, intended to avoid fighting in Berlin. However, a chance visit by General Weidling, commander of the 56th Panzer Corps, to the Army High Command in Berlin resulted in an order for his corps to take over the defense of Berlin on 24 April.

Soldat provides one of the most memorable accounts of the Battle of Berlin now available. As General Weidling's chief of staff, Knappe was able to have a close-up view of Hitler and his senior officers during the final collapse of the Third Reich.

Unfortunately, memoirs are often plagued by an author's selective memory, and memoirs of the Third Reich tend to suffer exceedingly from this failing. Despite his honest reporting in most of the book, Knappe insists that in his two years of service in the line and on the staff in the USSR, he saw no deliberate cruelty inflicted by the Wehrmacht upon Soviet prisoners or civilians. Further on in the book, when Knappe acknowledges that such things must have happened, he insists that crimes could have occurred only under the jurisdiction of fanatical Nazi party officials sent out from Germany. Of course, Knappe never knew of any death camps. What nonsense! Atrocities by line units of the army and Luftwaffe (not just the SS) were a common occurrence on the Eastern Front—as other Germans who served there have related to me. The author would have had to have been stupid or blind not to see some very ugly things—and General Staff officers were not stupid.

Soldat provides a good illustration of the largely unsuccessful effort of Germans to come to grips with the history of the Third Reich. I do not believe that the author is intentionally lying. After 50 years, he probably now firmly believes the account that he has presented. However, that part of the book is bad history, and it is unpleasant to see Germans explaining away history rather than explaining it.

Despite its numerous flaws, *Soldat* ought to be on the reading list of anyone interested in the German army. Knappe provides a good account of many less-researched aspects of the German army, such as the peacetime training, the wartime General Staff course, and the horse-artilleryman's view of the war's major campaigns.

<div align="right">

Dr James S. Corum
Maxwell AFB, Alabama

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She Went to War: The Rhonda Cornum Story by Rhonda Cornum as told to Peter Copeland. Presidio Press, 505 San Marin Drive, Suite 300B, Novato, California 94945-1309, 1992, 203 pages, $19.95.

Unlike the exciting media account of how Maj Rhonda Cornum (USA) was shot down and taken prisoner in Iraq during the Persian Gulf War, Major Cornum's own version in *She Went to War* is calm and straightforward. Further, her story reflects her belief that gender is an incidental factor in serving one's country.

Major Cornum, a flight surgeon, begins her narrative on the day she was shot down—the fourth day of the ground war. Her technique of alternating between wartime events and those which led to her participation in the Gulf (e.g., details of her childhood, her college years, and her family) gives us a clear picture of her strong character and high standards. These impressions are reinforced as we read about her performance during the eight days she was held as a prisoner of war (POW). Shot down while trying to rescue an Air Force pilot, she was badly injured, captured, and molested by an enemy soldier:

> We had heard the stories of what the Iraqi soldiers had done to women in Kuwait, so I had thought about the probability that I would be sexually abused if I were captured. I had never considered that I would be so badly injured, though. When I really was shot down, I was thinking of myself as a soldier, and a POW, and a very severely injured person. I was not thinking of myself as a woman. I was amazed that this Iraqi soldier could only see me as a woman. (Page 50)

The fact that the Iraqi was incapable of seeing her as anything other than a female raises the much-discussed question of women in combat. Major Cornum answers this question herself by noting that "sexual abuse was one form of torture, just like being beaten or wired" (page 173). Further, she likens the experience of being a POW to the humiliation of rape:

> Being a prisoner of war is the ultimate loss of control. . . . The best analogy I can think of is rape, and both experiences have the potential to be devastating. . . . But what I learned . . . is that the experience doesn't have to be devastating, that it depends on you. . . . You still have control as long as you can think. (Page 203)

Despite her experience, Major Cornum maintains a sense of balance in her story, observing that many of the Iraqi soldiers and citizens she

met were professional and that others were courteous and kind. Through her frank—sometimes wryly humorous—appraisal, she presents a clear image of a diverse people—snapshots of individuals in a time of stress and war. Her story, like that of other POWs, is a testimony to the amazing will and potential of the individual and a reminder that gender is not a determinant of one's courage and strength.

Capt Elise A. Rowe, USAF
USAF Academy, Colorado

World War II Fighter-Bomber Pilot, 2d ed., by Bill Colgan. Sunflower University Press, 1531 Yuma, Box 1009, Manhattan, Kansas 66502-4228, 1988, 209 pages, $9.95.

Most books on World War II air operations fall into one of three categories: strategic bombardment, air-to-air combat, or carrier operations in the Pacific. As author Bill Colgan states in the preface, however, *World War II Fighter-Bomber Pilot* is a personal account of the fighter-bomber's role during the war.

Colgan's credentials are impressive. One of our most experienced and highly decorated World War II fighter-bomber pilots, Colgan flew two combat tours (208 combat missions—116 into Italy and, after some leave at home, 92 into France, Germany, Austria, and northern Italy) and served as a forward air controller (FAC) in direct support of British forces near Bologna, Italy.

The book begins in the fall of 1941, when Colgan was a 21-year-old minor league baseball player and an apprentice locomotive fireman. It ends in mid-1945 with Major Colgan, US Army Air Forces (USAAF), commanding a squadron of P-47s.

As expected, the book's autobiographical elements stand out. The most powerful passages left me with a lasting impression of the crusading mood in Georgia before and during the war when Colgan returned home for 30 days' leave. However, my interests lay more in the war fighting.

The book touches on a multitude of topics. Some are humorous, such as USAAF pilot salaries compared to those of pilots in the Brazilian Expeditionary Air Force. Others are professional issues of general interest, such as deploying a squadron forward without interrupting combat operations. The rest are technical issues, such as

the intricacies of strafing. In every case, the narrative is informative and interesting.

Some readers may dislike the fact that there are no dates and times to help them determine when events occurred. This omission may irritate people who are expecting a history book instead of Colgan's recollections, but it does not significantly detract from the book's historical value.

As the introduction indicates, the focus is on three tasks of fighter-bombers: (1) air superiority, (2) interdiction, and (3) direct support of friendly forces in battle. However, Colgan thoroughly covers the second and third tasks but barely touches the first; furthermore, interdiction is the subject of most of the book's 100 black-and-white photographs.

Colgan's single most remarkable anecdote is about the "highway of hell," which relates his part in the destruction of over 2,000 German vehicles on a 30-mile stretch of road in the Rhone Valley (centered around the town of Montélimar) in 1944. The most interesting chapter was about his job as a FAC; unfortunately, that chapter presents only one anecdote.

Colgan's recollections are very readable and are accompanied by photos that enhance the story. Even though the author could not do justice to his experiences in just 209 pages, his anecdotes offer insight into critical factors such as combat training and logistics, both of which contributed to America's aerial dominance in Europe.

World War II Fighter-Bomber Pilot would have been superb if the editor had done a better job of eliciting details from Colgan and proofing the copy that went to print. This reader was left wishing that Colgan had expanded this second edition with more detail. In any case, even though Colgan did not write a World War II history of fighter-bombers, his book fills a void in that category and merits a place in your library.

Lt Col Ricardo G. Cuadros, USAF
Norfolk, Virginia

Captain Hook: A Pilot's Tragedy and Triumph in the Vietnam War by Capt Wynn F. Foster. Naval Institute Press, Preble Hall, 118 Maryland Avenue, Annapolis, Maryland 21402-5035, 1992, 242 pages, $26.95.

What makes this memoir of a Navy attack pilot's experience in the Vietnam War unique and interesting enough to set it apart from the dozens of other memoirs that have appeared? Although Captain Hook lacks the righteous indignation of Jack Broughton's *Thud Ridge* or the hard-edged introspection of Robert Mason's *Chickenhawk,* it is an entertaining but narrow look at the Navy's early air war in Southeast Asia (SEA).

A career naval aviator with over 200 combat missions in Korea and Vietnam, Wynn Foster was in a good position to view naval aviation during the early years of Vietnam. In some ways this book is schizophrenic, dealing with both the air war and the author's nearly career-ending loss of an arm following an antiaircraft artillery (AAA) hit on his A-4 Skyhawk. The story of his recuperation and fight to remain on active duty is inspiring, but the most interesting part of the book is found in chapters 3 through 12, which deal with Foster's first two rotations in Vietnam and provide an interesting look at a Navy attack squadron's life from the inside.

As the executive officer and—later—the commander of Squadron 163 (VA-163) aboard the USS *Oriskany,* Foster viewed firsthand the initial blooding of his squadron in SEA. In readying itself for combat, the squadron had to upgrade aircraft (from the A-4B to the A-4E) and shift the emphasis in training from the delivery of nuclear weapons to the delivery of conventional weapons. Squadron leaders found themselves in the dark with regard to tactics and rules of engagement until their arrival on station. Indeed, even the Pacific Fleet's senior leaders seemed unaware of the type of war to be fought—witness their scheduling a massive amphibious assault as the last exercise before the *Oriskany* sailed for the South China Sea. The book contains intimate portraits of everyone from junior pilots to flight surgeons; both amusing and serious vignettes of the hectic, cramped life aboard an aircraft carrier; and accounts of camaraderie and competition between pilots and squadrons.

Foster characterizes his first combat experience as a "calm," in-country mission to provide tactical support in South Vietnam. Later, the *Oriskany* moved to the Tonkin Gulf, and the VA-163's war became earnest as the squadron began to fly missions in support of Operation Rolling Thunder. Flying over North Vietnam entailed a greater threat from AAA and—later—surface-to-air missiles (SAM). From "Alfa strikes" on heavily defended targets deep in enemy territory to truck-hunting missions at night, Foster's descriptions are terse and powerful. He was also a first-hand participant in gradually evolving tactics, which included the ill-fated decision to avoid SAMs by flying low and the development of techniques for attacking from higher altitudes and angles in order to survive in an increasingly hostile environment. Foster also saw his friends shot down and then killed or captured (e.g., he was on James Stockdale's wing when Stockdale was shot down on 9 September 1965). Later that year, as commander of the VA-163, Foster became a participant in the "sortie war," which reduced combat effectiveness to counting the number of missions flown. He details the results: expanded duty days, lowered morale, and ineffective missions. Like other people who have written about their experiences in SEA's air war, Foster refers often to his frustration with both civilian and military leaders and their conduct of the war.

Following his successful effort to remain on active duty, Foster was promoted to captain and served on two more rotations to Vietnam. But he does not dwell on that sort of thing, just as he spends little time on his Korean War experiences. Rather, the strength of *Captain Hook* is the author's detailed account of his experiences in the Navy's early efforts at fighting the air war in Vietnam. Anyone interested in the men who flew in that war—who they were and what they did—will like this book.

Maj Budd Jones, USAF
Durham, North Carolina

My Father's Son: Memories of War and Peace by Farley Mowat. Houghton Mifflin, 215 Park Avenue South, New York 10003, 1993, 340 pages, $24.95.

At first glance and after reading the cover flaps of Farley Mowat's *My Father's Son,* I was a bit dispirited. A Canadian poet's World War II recollections? A "world famous writer's" wartime experiences including yarns about his oft-published dad? How much ancillary research and other study would be needed for a robust-enough "assessment" pleasing to even the amateur military historians or poetry buffs? A charlatan I'd be if I dared consume these memoirs without even a minimal background check

on the author and his times. Darn, if only I had picked up Canadian poetry and prose in college.

The prejudgments about this pleasant book might seem ominous and scare off most disciples of Tom Clancy or William Shirer. They should not. Mowat's memories create a story that comes full circle although still piquing your interest for those ancillary items—some of which are in the book. Mowat's summary of his book as a story "about coming of age in a world gone mad" would inform you that there is much more involved here. Granted, Mowat's biographical sketch is a prerequisite for a fuller understanding and transition into his wartime chronicles. Expect also a little family history, a little romance, and—through his eyes—a look at post–Victorian and pre–World War II Canada and his country's effort in maintaining a standing militia. The main plot here is a chain of letters between a young Farley and his parents—most often his father.

Mowat describes his father, Angus, as one of the "last and by no means least of the great practitioners of an admirable but vanishing skill. He was a superb letter writer." The younger Mowat is wrongly modest in denying that the same legacy was passed down to him also. Their transatlantic communiqués make up the meat of the most enjoyable reading. Farley Mowat is right when he laments the erosion of letter-writing skills caused by the advent of telephones, faxes, videomail, and whatever Japan is next sending our way.

Mowat's military life begins at 18 with his failure to enter the Royal Canadian Air Force due to his small stature and boyish looks. He then enlists in the nearby army regiment and soon receives a commission as a provisional second lieutenant. This period included a telling apprenticeship under the senior Mowat. One of Farley Mowat's memories includes the "special consideration" he received from his father: "'You may be my son,' he told me one day after I had been especially sloppy on parade. 'In fact, I am fairly confident you are, but in this regiment you're another snotty-nosed little subaltern who has to be taught to change his diapers and respect his betters'!" The two Mowat men did not prove to be as competitive in the military arena as they were in the literary arena. New writings, returned transcripts, and critiques made up this amicable rivalry.

These "betters" are often the subject of relentless ridicule and satire by both junior and senior Mowat. Readers can derive humor and empathy from the frustration that Angus Mowat experiences when he deals with the homefront bureaucrats at Defence Headquarters. After seeing his request for books to send overseas repeatedly lost or mischanneled, he walks his "staff summary sheet" through the nine offices it takes to get to the brigadier. Writing about his betters, the senior staff, the senior Mowat expresses "mirth caused by the perfectly obvious fact that they were scared stiff of it [his request] and were squirming in terror lest someone would offer a motion committing them to agreement." Even discounting the Mowats' military experience, they were surely prophets when detailing the human nature behind military thinking.

Near midbook, Farley Mowat highlights the serious and touching side of their relationship. Included is the senior Mowat's motivational stanzas providing the necessary feedback for a soldier's doubts on the battlefield. "It's the soldiers raped of their spirit by war," claimed Angus Mowat, that were "the most unfortunate people. The beer parlours and the gutters are still full of them, poor bastards, and nobody understands." Farley Mowat is further counseled to keep "that little spark of something or other that's in you inviolate from war."

Over the war and Farley Mowat's time in Italy, the frequency of letters varies greatly. The quality of text here is not affected. Even under bombardment or when near the smell of death, the Mowat wit, maturing since 1940, remains unscathed: "Can't tell where we are or what we're up to. The matter is so hush-hush that I expect only the Germans know for sure." Even when the writers are withering away and feeble due to illness, the letters are still full of life. The triumphant spark will not die: "Mother, if this is a judgement in answer to one of your prayers, please lay off."

The spark that remained luminescent inside Farley Mowat was further fueled by his vivid memories and strong respect for the Canadian outdoors. These flashbacks or tangents are not distracting. Rather, they detail the full and melancholy perspective that keeps this soldier-poet sane among the muddy and morbid environs.

Even though Mowat's metamorphosis as a young man occurred in a very structured and orderly military world, he resisted it every step of the way. The freethinking (not dissenting) attitude of this artist was surely balanced by his patriotism and laudatory wartime service. This

balance also makes his slant on World War II life insightful and keeps the reading upbeat and amusing.

Lt Michel C. Escudie, USAF
Castle AFB, California

Fulcrum: A Top Gun Pilot's Escape from the Soviet Empire by Alexander Zuyev with Malcolm McConnell. Warner Books, Inc., 75 Rockefeller Plaza, New York 10020, 1992, 358 pages, $19.95.

The full title of *Fulcrum* might lead readers to believe that this book contains nothing more than descriptions of fast-paced air-to-air combat and stories of the "there I was" genre. Nothing could be farther from the truth. Although Alexander Zuyev does give us some fairly specific descriptions of flying, his assessment of Soviet culture and his condemnation of Soviet bureaucracy and graft make up the bulk of the book.

An especially disturbing manifestation of Soviet governmental corruption was the downing of Korean Airlines Flight 007 in 1983. Captain Zuyev appeared on TV's "60 Minutes" and "Good Morning America" to tell the truth about this tragedy. In *Fulcrum,* Zuyev explains this incident in depth and describes many other unfortunate and tragic events caused by the corruption and greed inherent in the Soviet political system. In fact, these aspects of the system comprise the main theme of the book. By following Zuyev through his childhood, school years, and military experience, we gain insight into the beliefs of the average Soviet citizen. Even more, we come to understand—as Zuyev finally does—how corrupt the old Soviet system was and how much the poor worker really suffered. Readers may at times find themselves depressed by the terrible living conditions and economic hardships the Soviet people .were/are forced to endure. Examples abound throughout the book: a Soviet general and his family live in a three-bedroom apartment; a retired lieutenant colonel must save a full 10 months of his retirement pension to buy a winter overcoat; and many of the lower-grade officers in the Soviet air force live with their families in apartments that don't even have working toilets or running water. It is sometimes hard for us to believe that living conditions in an "industrialized" country can be so different from (and in Zuyev's opinion, inferior to) those

in our own country, but *Fulcrum* leaves no doubt that this is indeed the case.

Although the book deals mainly with the poor state of Soviet society, there is still plenty of action and plenty of discussion about the technical side of aviation. Readers who are curious about Soviet aircraft capabilities and combat techniques will not be disappointed. Zuyev's picture of Soviet society is not entirely gloomy: there are scenes of loyalty and love, as well as pride and camaraderie.

Fulcrum is required reading for any Air Force officer who wants more information on what Soviet society was really like before the recent political upheaval. US pilots (especially those who have the notion that Soviet pilots are inferior and rely on ground controllers for guidance) will be interested in Zuyev's description of Soviet pilots and their aircraft. *Fulcrum* is a real eye-opener and will amaze its readers.

Capt Erick D. McCroskey, USAF
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EUROPEAN HISTORY

Bayonets before Bullets: The Imperial Russian Army, 1861–1914 by Bruce W. Menning. Indiana University Press, 601 N. Morton Street, Bloomington, Indiana 47404, 1992, 334 pages, $35.00.

With *Bayonets before Bullets,* Bruce Menning has produced an in-depth, thought-provoking look at the organization and military art of the Russian army from the start of D. A. Miliutin's term as war minister in 1861 to the eve of the First World War. Menning, currently an analyst for Slavic and East European military affairs at the US Army Command and General Staff College, has selected an excellent format for his book. Chapters discussing the changes facing the Russians in strategic and tactical thinking, organization, armament, and training come before—and complement nicely—the chapters that deal with the two wars the Russians fought in the period under scrutiny (the Russo-Turkish War in 1877–78 and the Russo-Japanese War in 1904–5). Only after establishing how the Russians prepared for war does Menning critique the performance of the Russian army. This format allows the reader to understand not only how the battles were fought but how the prewar decisions

of the Russian military thinkers sharply affected the outcome of both conflicts.

Menning gives much credit for the improvement of the Russian army after the Crimean debacle to Miliutin, the reform-minded minister of war. He suggests that the victory over the Turks was relatively easy because the Russian army of 1877 was larger, better organized, and better trained than its 1855 counterpart. Without Miliutin, such changes would have been problematic at best. Menning does point out that the Russian army of 1877 was still transitional in nature and that it needed more reform—especially in the areas of command and control and strategic and technical thinking—to make the Russian military the equal of the top European powers.

The main problem facing Russian military thinkers after 1878 was "the danger inherent in partial success" (page 85). Menning harshly criticizes the work of the leading figures of the period—Mikhail I. Dragomirov in tactical doctrine and G. A. Leer in strategic thinking. Dragomirov is rightly criticized for continuing to propose closed formations during an attack to ensure that a sufficient mass was maintained in the final assault. His thinking—as late as the tactical regulation of 1900—that a bayonet charge was the final goal of any attack was to have serious implications for Russian soldiers facing disciplined and concentrated Japanese rifle fire in 1904. Menning does point out that all modern armies of the period were struggling with the issue of mass versus concentration and that none were overly successful in finding the right answer. Dragomirov, however, clearly failed to move quickly enough to overcome traditional Russian reluctance to allow the ordinary soldier to operate in an open formation.

Also detrimental to the Russians was General Leer's "devotion to Napoleon" (page 126) and his Jominian desire for a climactic battle which would encompass several days, a 60-kilometer front, and million-men armies. By advocating such simplistic thinking, Leer gave Russian opponents a great advantage in flexibility on theater and operational levels. The Japanese carefully exploited this advantage by outmaneuvering the Russians at the Battle of Mukden.

One of the strengths of this book is that Menning understands the nature of the change the Russian army underwent after it lost the Crimean War. Even when the reformers held power in the Ministry of War (and this was only until 1881), the change in thinking was of an evolu-

tionary—not revolutionary—nature. Such change, even if diligently pressed, was not enough to overcome several problems inherent in the Russian military experience. The army did improve after 1861, but the type and pace of the change was not enough to forestall disaster in the First World War.

One problem with *Bayonets before Bullets* is that the chapters dealing with the wars of the period are written exclusively from the Russian point of view. At least some inkling of how the Japanese and Turkish armies viewed the fighting would have been helpful.

Nevertheless, *Bayonets before Bullets* is thoroughly enjoyable, and its excellent notes and lengthy bibliography attest to its having been carefully researched. The book gives the reader insight into the wars fought by the Russians between 1861 and 1914, as well as various changes in Russian thinking and organization. Any specialist in military or Russian affairs would do well to read this book.

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GULF WAR

The Gulf War Assessed by John Pimlott and Stephen Badsey, editors. Sterling Publishing Company, 387 Park Avenue, New York 10016-8810, 1992, 287 pages, $27.50.

The Gulf War Assessed chronicles the events and associated details of the Gulf War. Each chapter covers one major aspect of the war in detail: Saddam Hussein and the Iraqi army, world politics, doctrines of the coalition forces, the logistics buildup, the air war, the naval war, the land war, the failure of Iraqi forces, international ramifications, the media war, environmental impacts, and a conclusion. The book ends with a chronology of the major events of the war from August 1990 through January 1992. While each chapter is written by a different author (all members of the Department of War Studies, Royal Military Academy, Sandhurst), the book retains a high degree of continuity in style and flow.

The book begins with a very brief background history of the Iraqi state beginning in the early twentieth century. It outlines Saddam Hussein's rise to power and highlights the state's overall

weakness as a prime reason for Saddam's ascendancy. The net result of his war with Iran, other than insignificant territorial gains, was to leave Iraq with a huge debt and a very large army. Iraq's territorial claims to Kuwait, while not new, are dismissed in favor of more immediate reasons like the massive debt caused by the Iranian war. The American-led political activity up to the coalition attack is assessed in two ways. First, it is acclaimed as an American triumph, leaving Iraq so isolated as to virtually guarantee victory in the eventual war. The other view sees the United States as being more concerned with exercising power than with maintaining peace in order to exorcise the ghost of Vietnam or to flex the muscles it was denied during the cold war.

The chapter on the coalition doctrine concentrates on the evolution of the American AirLand Battle doctrine. While making brief mention of the doctrines of Britain, France, Israel, Syria, and Egypt, it concludes that the real US challenge was fashioning a form of war and strategy that would exploit the strengths of each member. The book then provides a brief recounting of the US strategic airlift and sea-lift operations with a short synopsis of the British deployment efforts.

The air war is covered next in very broad-brush fashion. The chapter addresses the coalition air defense, the air balance, air war planning, and air tasking during the war. However, the chapter's focus is on the four main phases of the air war: gaining air supremacy, hitting strategic targets, conducting air interdiction, and performing close air support.

The vital role that the naval forces played in the Gulf War is examined next. The US Navy is credited with providing the first deterrent to Iraqi aggression, effectively enforcing the trade embargo, shipping 95 percent of all stores used to fight the war, providing 30 percent of the air assets, and posing a credible seaward flank and threat to the Iraqis among others. The ground war is seen as the result of excellent planning, training, maneuver, and overall operational superiority. It was also the beneficiary of the effective air campaign. In discussing the failure of the Iraqi forces, the point is raised that since the Iraqi army was so totally outclassed in every aspect of operational warfare, why did the West so completely overestimate the capabilities of these forces?

The chapter on the international ramifications focuses on President George Bush's four strands of postwar aspirations: the future security of the Gulf region, control of weapons of mass destruction, creation of a regional development bank for the Middle East, and an end to the Arab-Israeli conflict. Most of its attention is on the attempts made, with mixed results, to work an Arab-Israeli settlement. In recounting the media war, the author underscores the mutual mistrust between the military and the media. He makes the point that, on the whole, the military in the Gulf War demonstrated a better understanding of the media rather than the other way around. In evaluating the environmental effects of the Gulf War, the author describes the damage to the environment according to the global catastrophe (extremist) theory and the local effects (conservative) theory. Not surprisingly, the extremists were predominantly antiwar, and the conservatives were prowar. While discussing the much publicized oil slicks and burning oil wells, the author also devotes a section to the environmental damage in Iraq, highlighting the acute clean drinking water problem. The conclusion attempts to place the war in perspective against the new world order, the future of Middle East relations, and the nature of future warfare.

Overall, the book provides a good basic recounting of the war and surrounding events from a wide range of perspectives. It serves more as a faithful history rather than as an assessment or analysis. Its tone is evenhanded, and it presents both sides of contentious issues, often raising more points for further research and analysis than it answers. The organization of the book is excellent, with each chapter flowing logically into the next, but each being able to stand on its own. The entire book is very readable and should appeal to the general public as well as to those more versed in political-military affairs.

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Maj Wayne Davidson, USAF
Maxwell AFB, Alabama

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HISTORICAL

The American Military Tradition from Colonial Times to the Present edited by John M. Carroll and Colin F. Baxter. SR Books, 104 Greenhill Avenue, Wilmington, Delaware 19805-1897, 1993, 246 pages, $15.95.

T. S. Eliot wrote that "tradition by itself is not enough." That maxim is clearly understood by John Carroll and Colin Baxter, editors of *The American Military Tradition*. They have collected 11 original

essays that broadly trace "issues and events" in American military history from colonial days to 1992. Their aim is to provide college students a supplementary text on the US military. Carroll and Baxter hit their mark by accurately—and sometimes vividly—recounting major events, along with discussing the evolution of American warriors from citizen-soldiers to professional soldiers. They also provide a brief history of the racial composition of our combat forces.

Attempting to cover the entire history of the American military in one volume has its drawbacks. Although the book is not brief enough to be called an abridgment, neither is it expansive. For example, the Battle of Midway is fought in two paragraphs, and Gettysburg in five. Truthfully, the same material has been handled better by Russell F. Weigley in his *The American Way of War: A History of United States Military Strategy and Policy.* Indeed, almost half of the contributors to *American Military Tradition* include Weigley's book in their "Sources and Suggested Readings."

Although Carroll and Baxter encouraged their contributors to "express opinions and take stands on critical issues," there is little evidence of their having done so. The essays shed almost no new light and provide little in the way of historical analysis. The reader yearns for fresh insights into famous battles, but most of the writers only serve up such offerings as "bloody" narratives of the US Civil War and references to "godless communism."

The writing varies from a staid recitation of Civil War casualties to a brilliant explication of strategic doctrine. In the latter essay, Joseph Cernik traces the continuity of such doctrine from massive retaliation to "Star Wars" defenses. His contribution and a few others in the same vein make *The American Military Tradition* worth keeping—or, at least, worth sending to a college-bound friend.

Lt Col Louis W. Buckner, USAF
Offutt AFB, Nebraska

LEADERSHIP, MANAGEMENT, TOTAL QUALITY, PERSONAL AFFAIRS

The Confident Decision Maker: How to Make the Right Business and Personal Decisions Every Time by Roger Dawson. W. W. Morrow, 105 Madison Avenue, New York 10016, 1993, 180 pages, $20.00.

The Confident Decision Maker provides a tool to identify personal decision-making styles and how to make the best decisions. Roger Dawson is well known in the business world as an expert in the art of negotiating and is a full-time professional speaker on the topics of negotiating, persuasion, and decision making. This book is part of the Nightingale-Conant program, which publishes personal development and self-improvement programs.

Roger Dawson attempts to show the reader how to consistently make better decisions. He attempts to change the reader's perception of decision making from typically focusing on the decision to focusing on the decision-making process. What's important—the decision itself or making the best possible decision? He believes that once a person relies on the decision-making process, he or she will be confident of always making the best choice.

He starts with some interesting points. After having interviewed successful business people, he found that almost nobody understands how they make decisions. He also quotes an American Management Association survey that states that business people only make the right decisions 50 percent of the time. His book goes on to present the characteristics of a good decision maker and the nine traits he has found in great decision makers whom he has studied.

Does a decision need to be made? Emphasizing the importance of apportioning time based on the significance of the decision, he offers methods for sorting types of decisions and their consequences. First he presents processes to determine if a decision needs to be made, and the majority of the book then presents a variety of decision-making processes. His examples go from scientific approaches such as reaction tables utilizing theories of probabilities and decision trees to techniques for improving intuition. Dawson believes that people have lost the ability to successfully use their intuition, which he blames on two factors: the first is the information age brought in by the computer, and the second is the move in business to larger corporations that want facts and reasons to back up decisions.

Naturally there are obstacles to decision making. He discusses these barriers and proposes ways to overcome them.

Dawson's fast reading style presents systematic approaches to decision making that make this book worthwhile. Using many real-world examples to illustrate the importance of right decisions, he emphasizes that the particular decision is not as important as the key factor in the decision-making process that led to that decision.

Capt David Nissen, USAF
Tinker AFB, Oklahoma

LITERATURE AND THE ARTS

The **Warriors of God** by William Christie. Lyford Books (Presidio Press), 505B San Marin Drive, Suite 300, Novato, California 94945-1340, 1992, 272 pages, $19.95.

William Christie makes a noble attempt at writing a technothriller with his first novel, *Warriors of God*. He has a good feel for dialogue and technical details, and his research is excellent.

In the spirit of Tom Clancy adventures, *Warriors of God* focuses on a frustrated and heroic protagonist, Richard Welsh. This model is old and tired—and isn't presented with much spice. In fact, the description of Welsh bears more than a passing similarity to Christie himself. Neither is the theme (old guard won't listen to maverick bureaucrat) anything new. You'd think the old guard would have gotten smarter by now.

In Christie's world, the Iranians are upset because, after the recent war with Iraq, the US has made itself a permanent presence in the Persian Gulf. In that regard, *Warriors of God* is surprisingly relevant. The Iranians respond to our hegemonic presence with a late-night sneak attack on one of our ships anchored near Dubai, and we respond by bombing Kharg island. Does this lead to an intricate plan for a terrorist attack in Washington, D.C. (not that it's predictable)?

Christie's strength isn't in complexity of plot or in making the plot believable but in spinning a good yarn. Even if the story is simplistic, it keeps the reader's interest. Christie has a commendable feel for action and pacing. Further, anybody who has worked in the Pentagon will enjoy his fine command of detail. Pentagon life is just one of many areas where Christie has done his homework, including the intricacies of Middle East politics and the stereotypes of D. C. policymakers. The author also knows his weapon systems and goes to extraordinary lengths to

prove his knowledge. I really liked the fact that in *Warriors of God*, high-tech gizmos don't work all the time, as other books in this genre would lead us to believe.

Readers looking for good political-military fiction will certainly get their money's worth from *Warriors of God*. More importantly, I think there's a new voice on the scene. No doubt, Christie's book is the first of many, and I'd wager that his next one will be a best-seller.

1st Lt Tim Kane, USAF
Yokoto AB, Japan

Aggressor by Nick Cook. St. Martin's Press, 175 Fifth Avenue, New York 10010, 1993, 322 pages, $19.95.

The Middle East during the post–Gulf War period is the central setting for this novel. The Russian minister of gas-petrochemical industrialization and his staff are visiting Syria to tour a natural gas pumping station, which was engineered and built with the aid of the Russians. While they are at the station, it is attacked and destroyed and the minister and his staff are kidnapped. Next, an airliner is hijacked from Dubai International Airport. Among the airline passengers are the US ambassador to Saudi Arabia and his staff, who are involved in the Gulf peace initiatives. Two common threads link these two terrorist events: both groups of hostages vanish without a trace, and no terrorist organization claims responsibility for the kidnappings. Western intelligence agencies are without a clue as to who committed these terrorist acts and where the hostages are being held.

A British weekly magazine publishes a story identifying the perpetrators as a group previously unknown to Western intelligence agencies. The group, calling themselves the "Angels of Judgement," has power and plans unlike anything seen in the Middle East before. The leader of the group is an individual known as "the Sword." As the world attempts to determine the identity of the Sword and the Angels of Judgement and their cause and motivation, the British weekly news magazine's Middle Eastern correspondent who had identified the Angels of Judgement disappears from Cairo.

Thrust into this tenuous situation are three different men. First, Col Elliot Ulm, commander of "the Pathfinders," a US Air Force special op-

erations counterterrorist unit. Second, Col Roman Makhmadzhanovich Sabanov, commander of an elite Russian Spetsnaz special antiterrorist squad. These two men command units that are brought together by a secret high-level agreement known as the Romeo Protocol. Their mission is to rescue the hostages and punish the terrorists. To accomplish this task, the commanders and their men must overcome decades of animosity and distrust to build the cohesion required to successfully execute a rescue. The third man thrust into the situation is Tom Girling, the science and technology correspondent for the British news magazine that identified the Angels of Judgement. Girling's past is linked with that of the missing Middle Eastern correspondent and with terrorist incidents of other fanatical groups. He must overcome his past to assist the missing correspondent and to characterize, understand, and locate the Angels of Judgement and the Sword. His drive and determination ultimately lead his path to cross the paths of Ulm, Sabanov, the Angels of Judgement, and the Sword.

Nick Cook constructs a story with numerous plot twists and turns that captivate, tempt, and surprise the reader. From the training camps of the special counterterrorist forces to the cockpits of high-tech fighters and helicopters, Cook puts the reader in the combat boots of the military specialist.

The story is extremely entertaining; however, I was disappointed in the ending, which reinforces the timeworn East-West conflict ideology. I also perceived a technical flaw in the application of military hardware to the story line. Given these negatives, I still highly recommend this novel for its entertainment value.

<div align="right">
Maj David K. Swafford, USAF
Kirtland AFB, New Mexico
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Scorpion Strike by John L. Nance. Crown Publishers, Inc., 201 East 50th Street, New York 10022, 1992, 317 pages, $21.00.

Scorpion Strike is a novel about post–Desert Storm Iraq and the attempt to neutralize biological weapons not discovered until after the ceasefire. Dr Shakir Abbas, Iraqi scientist in charge of the program, escapes from Iraq in an attempt to warn the West of the terrible potential of this weapon and Saddam Hussein's plans to use it against the Kurds, Israelis, or coalition members. His defection leads to a special operations mission to destroy the biological agents and the Iraqi laboratory. However, a special operations low-level C-141 crashes, and most of the specially trained crew members die or are injured. Col Will Westermann, mission planner, must then fly the mission with an untrained and uninitiated crew.

All goes well for the mission until the discovery that two canisters of the deadly virus are missing from the laboratory. Dr Abbas bolts from the Special Forces team and escapes into the desert in hopes of finding the two missing canisters before they can be unleashed on the world. He finds the first with relative ease and buries it in the desert for lack of a suitable facility to destroy it.

On takeoff after the raid, the C-141 suffers damage when a wingtip impacts the ground. Limping into the air, the C-141 catches fire and must crash-land in the desert. While the surviving special operations team members escape in their vehicles, the two pilots, a female flight engineer, and an injured loadmaster head south toward freedom and safety. As they make their way, they miraculously find a broken-down military truck that they are able to repair and a single-engined observation plane. By coincidence, Sandra, the flight engineer, also happens to be a private pilot and is able to take the plane and the injured loadmaster to safety. The two C-141 pilots are not so lucky and are captured within sight of allied lines and returned to Baghdad for interrogation.

Dr Abbas soon finds the Iraqi general who was about to employ the weapon, believing it to be of little harm other than to make people sick. Upon hearing the truth, the general quickly changes allegiances and supplies Dr Abbas with safe-passage papers to try to rescue the two captured pilots. Dr Abbas rescues the two pilots and, en route to pick up his family in Baghdad, comes across two Hind helicopters. Despite the fact that neither of the pilots has had any experience in flying helicopters, the two quickly formulate a plan to steal them and fly to safety. Once aboard the helicopters, and even though unable to read any of the switches or dials, they get the aircraft started just as Dr Abbas and his family arrive, followed by Iraqi soldiers. With great difficulty, they manage to get the aircraft airborne, and shortly thereafter are proficient enough to shoot down a pursuing MiG-21 in a

dogfight. Losing their ability once more, they have trouble landing the helicopter.

Much of the action throughout the book is melodramatic and the dialog contrived and moralistic. The author, a reserve C-141 pilot and civilian airline pilot, loves using jargon from both worlds, but explaining it as he goes along distracts from the story line. Other than the author's experience in C-141s, there is insufficient reason given for using C-141s instead of MC-130s, which are designed for this type of mission. John Nance pushes too hard to create technical accuracy and stretches the reader's imagination to the breaking point with too many coincidences, strokes of luck, and improbable skills of his heroes. While generally entertaining and easy reading, *Scorpion Strike* fails to live up to its potential.

Maj James Marshall, USAF
San Antonio, Texas

Forgotten Warriors: Combat Art from Vietnam by Dennis L. Noble. Praeger Publishers, 88 Post Road West, Westport, Connecticut 06881, 1992, 198 pages, $29.95.

Dennis Noble's study of the "grunt," or the soldier in the field, redefines the Vietnam conflict using combat art, letters from the field, poetry, and anecdotes from American service members. For these Americans, the conflict was much different than the war that was edited and televised to the family back home, many miles from the action. For the grunts, the war meant dealing with harsh, extreme conditions, confusing alliances, and the realization that the ultimate sacrifice on the field meant little to the American public. They were forgotten warriors, and Americans were all but content to forget the conflict and the service members who participated in it.

After four years of denial, 1973–1977, unanswered concerns surfaced via the medium most associated with American society—the Hollywood film. Noble includes an appendix written by William Palmer that discusses the plethora of Vietnam war films that came out after 1977. "Though they did not always accurately portray Vietnam . . . or the war fought there, they did catch the attention of American culture and convince the American people that it was finally

time to reconsider the war in all its dimensions" (page 176).

Noble sets out to make some distinctions between the fantasy of these Hollywood productions and the reality of battlefield sketches drawn by combat artists actually working on location in Vietnam. Noble uses this artwork to help show the effects of extended combat and maneuvers in the field, the effects of combat on the soldiers, and the sense of close companionship that developed between service members.

Artwork in the first three chapters depicts scenes of the lone warrior on patrol, soldiers working in support positions, and combatants dealing with the terrain and weather conditions. A common thread runs throughout these pictures: the pervasive loneliness.

Noble has included the pencil sketches of Henry C. Casselli, Jr., which demand attention for their powerful focus on the lone marine. Few faces are emphasized, and figures are nonspecific players within a larger scenario. The artist's narrative, then, becomes part of the appeal of these paintings and drawings.

Noble has also included reproductions that are highly emotive portraits of individual soldiers. These paintings do not focus on the setting but rather on the mood of the individual subject and on faces that show the effects of combat on young men who are no longer young. There is a stoic resignation to the confusion and chaos of war that is evident in many of these portraits.

Mood is also created by depictions of actual battle scenes. These compositions make the viewer aware of an underlying tension. Like the soldiers in these environments, viewers cannot be comfortable.

Powerful visual expression is not only relegated to human portraiture. The author satisfies the American public's fascination with the machinery of war by including a generous collection of reproductions of paintings of the aircraft, tanks, and naval vessels in action in Vietnam. Noble reserves a special place for art that depicts the helicopter, the aircraft most often associated with the Vietnam conflict.

Another special feature is the chapter containing art that depicts the Vietnamese people, culture, and country. A diverse presentation of drawings of architecture, religious shrines, and street scenes gives further insight into the alienation felt by US service members in Vietnam. Several beautiful pictures of the children of

Vietnam are portrayed by combat artist Trella Koczwara, one of the two female combat artists in Vietnam.

The serious and profound role of the combat artist becomes the main point of Noble's book. Combat art provides society with a visual record of war from a unique perspective. Noble has accomplished an admirable task with this book. Not only has he provided an insightful account of combat art during the Vietnam era, but he has done so in a way that does not trivialize the artwork represented.

If we are ever to fully reconcile ourselves to our country's role in the Vietnam conflict, Americans must first be willing to let go of the myths and try to understand some of the realities of this undeclared war that, unlike any other singular event in contemporary history, divided and fragmented American society. Noble's book visually shapes some of these realities in an important volume that is totally engaging.

Capt Pamela J. Chadick, USAF
Colorado Springs, Colorado

The Blue Deep by Layne Heath. William Morrow and Co., Inc., 1350 Avenue of the Americas, New York 10019, 1993, 382 pages, $20.00.

Layne Heath's *The Blue Deep* is a refreshing story about American military involvement in Indochina. What makes the book fresh and exciting is the fact that Heath sets the stage for American participation in 1954 Vietnam, when the French government requests increased US military assistance for aircraft and supplies to fight Ho Chi Minh and General Giap for control of North Vietnam.

The basis of the book is France's military actions before the battle for Dien Bien Phu, the corruption of the Colonial French Vietnam government, and the untold reality that France is slowly losing control of its pre–World War II colonial empire. Heath brings out the despair of tired French military personnel, the expatriates living in Vietnam, and the ethnic Vietnamese of Hanoi.

The author sets the stage for US military support with a double-edged sword. On one edge, the novel's main character, Army major Marsh McCall, arrives in Vietnam to train French pilots to fly American OH-13 medivac helicopters. Once McCall and his team arrive in Vietnam,

people behind the scenes have other ideas. The other edge of the sword is Major McCall's real mission—to expose the black marketeers peddling US materials intended for the French military. Heath skillfully twists the two missions together, creating a novel full of anticipation. What comes out is that personal greed and ignorance were the downfall of Colonial French Vietnam rather than the lack of military power against the Vietminh forces.

The characters begin to come alive and through their relationships, Heath creates one of the major themes of the book: the realization that the gray world can be stronger than the realities of a black and white world. The gray world is the reality of politics, power, and the strength and weakness of friendships. Hanoi is the center for this world in *The Blue Deep*. The author uses the mystique of Colonial French Hanoi to draw out the intrigue of the novel, the relationships between the characters, and the locations of deals and decisions. He paints a vivid picture of three locations where the power of French Hanoi resides: the neutral cafe and bar, where enemies hang their hats; Lam Du, the French air base where American Army aviators and black marketeering are found; and the seedy Blue Deep dogfight arena, where deals determine the real fate of French Vietnam.

Another theme Heath brings out is the parallels between the French and American involvement in maintaining the status quo in Indochina. An aspect of this theme involves decision makers who weave their plans without consideration for the young men who have to make the sacrifices. In line with this is the traditional ingenuity of the American warrior, who survives by being dedicated, keeping the faith, and continuing with a mission, even when the chances of success are slim. The tactics used by the Vietminh against the French army embody another interesting parallel because these tactics are repeated a decade later against the American military.

The Blue Deep is a winner. Layne Heath provides the action and suspense of a mystery, while giving the reader a detailed account of Army helicopter use early on in Vietnam. I recommend this book to anyone who enjoys an action-packed military novel without hi-tech toys and Rambos. This is one novel you'll want to finish.

Maj Thomas A. Torgerson, USAF
Peterson AFB, Colorado

SPECIALIZED INTEREST

Space Age by William J. Walter. Random House, 201 East 50th Street, New York 10022, 1992, 333 pages, $30.00.

> Man will not always remain on Earth. The pursuit of light and space will lead him to penetrate the bounds of the atmosphere, timidly at first, but in the end to conquer the entire solar system.
>
> —K. E. Tsiolkovsky, 1911

You probably would agree that such a statement in 1911 would have seemed quite bold for the time. However, it is such a smattering of anecdotes and quotes that makes *Space Age* a somewhat interesting read despite its "mile-wide, inch-deep" treatment of the subject. Author William Walter presents the companion book to the Public Broadcasting System (PBS) television series bearing the same name. The book faithfully parallels the six-part series closely with six chapters and an epilogue. Walter, whom the book flap describes as a journalist and filmmaker, "takes readers on an exciting and unexpected journey into the past and maps out strange and amazing possibilities for the future."

The book begins by telling the stories of some early space pioneers, including Konstantin Tsiolkovsky, Robert Goddard, and Hermann Oberth. Tsiolkovsky, was a deaf, small-town Russian schoolteacher who in 1898 first calculated how to launch a rocket beyond earth. By the end of his life in the early 1900s, he had predicted space stations, multistage rockets, space suits, and artificial gravity. Considering the times, when many thought a trip to the moon was pure lunacy (no pun intended), Tsiolkovsky's predictions were rather mind-boggling. Walter further tells how some of Robert Goddard's work was met with great skepticism. After being painted by the media as a modern-day Jules Verne, Goddard was flooded with offers by adventure seekers who wanted to fly on one of Goddard's machines. One brave soul, a captain in the Army Air Corps during World War I, volunteered to not only fly to the moon but to Mars as well, so long as Goddard provided a $10,000 life insurance policy. In the 1920s, Oberth was a Transylvanian high school math teacher who was commissioned to build a space rocket for an early German science fiction movie entitled *The Woman in the Moon*. Oberth's attempt failed, but his effort revealed a model rocket strikingly similar to a number of space launch vehicles used today. Perhaps more interesting, Oberth gave a teenager named Wernher von Braun his first job in the art of rocketry.

If there is any chapter that shows the broadbrush treatment of the subject by the author, it is chapter 2. Entitled "The Explorers," the chapter takes the reader rapidly from V-2 rockets to nuclear weapons to Apollo and finally to a discussion of innovative space propulsion systems. If one is looking for a serious history of space, this is not the chapter to read. Filled with nearly 40 pictures, the chapter causes one to wonder whether it was meant to be visually exciting or informative. However, the reader must keep in mind that the book is meant to be a companion to a television series as he or she rapidly turns the pages looking for something new that has not been said about the subject elsewhere.

Perhaps the finest parts of *Space Age* are the two chapters entitled "Mission to Planet Earth" and "Celestial Sentinels." They are more representative of the journeyman approach to space exploration, which uses space to explore earth rather than the other way around. "Mission to Planet Earth" is *Space Age*'s attempt to make the reader more environmentally aware. The author uses photos of earth taken from space that relate the blight man can inflict on his home through pollution and abuse of the earth's resources. But as the author is quick to point out, it is man who is the danger, not the earth. It is we who need the earth and not the other way around. And we can use space to help improve the human condition on earth. In "Celestial Sentinels," Walter relates the growth in the number of satellites and how they have come to service the communication and information needs of man. From spy satellites to navigation to communication satellites, the book asserts that space technology has helped make the world become more of a global community than any other technology. When one considers the global resources of news networks such as the Cable News Network (CNN), perhaps the author makes a valid point.

Overall, *Space Age* meets the requirement for a companion book. It closely parallels the television series without diverging from the latter's message. The book, however, only scratches the surface if the reader is looking for more historical depth. That is not a criticism; it is an observation. Like all television series companion books, Space Age is meant to faithfully mimic the television series in book form. The book offers the reader an opportunity to revisit a topic he or she

found interesting on the show. But if you are looking for a more in-depth treatment of the topic, you must continue to read elsewhere.

Maj Roger C. Hunter, USAF
Washington, D.C.

STRATEGY, POLICY, AND INTERNATIONAL AFFAIRS

The Russian View of U.S. Strategy: Its Past, Its Future by Jonathan Samuel Lockwood and Kathleen O'Brien Lockwood. Transaction Publishers, Rutgers—The State University, New Brunswick, New Jersey 08903, 1993, 233 pages, $28.95.

With their respective skills in military intelligence and military history, Jonathan and Kathleen Lockwood analyze the strategic perceptions of former Soviet leaders and their contemporary Russian counterparts. In doing so, they update and expand Mr Lockwood's 1983 work, *The Soviet View of US Strategic Doctrine: Implications for Decisionmaking,* in which he supported the US Strategic Defense Initiative as a vital impetus for change in Soviet military strategy. Now the Lockwoods trace evolving superpower strategies over the past four decades to reaffirm their compelling case for ballistic missile defense (BMD).

The authors first review major benchmarks in US and Soviet strategic doctrine from 1954 to the aftermath of Operation Desert Storm. They compare key changes in US strategy against the development of strategic concepts in the former Soviet Union and the new Commonwealth of Independent States (CIS). Two appendices support the Lockwoods' comparison of competing superpower strategies, while a third argues the impact of BMD on operational warfare.

Their comparative analysis clearly distinguishes two sides of the issue in a long-term perspective. On one hand, they describe ersatz views articulated under a "declaratory deterrence strategy to mislead Western analysts." On the other hand, they detail the actual views of former Soviet authorities from Joseph Stalin through Mikhail Gorbachev as evidenced through foreign policy behavior and military programs. Understanding these views in the post–Soviet era, the Lockwoods contend, is "vitally important in predicting the likely attitudes and behavior of the separate republics toward nuclear weapons and

their political utility." Four scenarios illustrate how Russia and other newly independent states may interact in the future on issues of economic development, national sovereignty, and nuclear weapons. As a bottom line, the authors postulate that "the main threat to US security in the 1990s and early 21st century will be the attempted nuclear coercion of US policy" by independent nuclear powers both within and outside the CIS. For this reason, the Lockwoods build a strong case for strategic defense, power projection, and phased arms control as the key components of future US strategic doctrine.

For all its good qualities, the book effectively bypasses an issue of importance to both US and Russian strategists in the post–cold war era. The process of compromise and consensus-building in the US policy-making community will influence long-term US strategy as much in the future as it did in the past. Russian reformists will increasingly face a similar process where policymakers are openly beholden to competing constituencies. To achieve a viable consensus as a prelude to developing associated strategic capabilities, US policymakers will find themselves in the unenviable position of a boxer who must telegraph his punches, or a chess master who must publish his game plan before playing his opening gambit. US strategy, open as it is to public scrutiny, can be as much a product of marketing as of military expertise. Future Russian strategy, unlike its Soviet precursor, will likely be subject to similar influence.

The Lockwoods' arguments represent a corollary to this on the US side in terms of how a greater understanding of foreign views might influence the development of US strategy. Surprisingly, they do not reference debates over the 1982 work in which former Chief of the Soviet General Staff N. V. Ogarkov prefigured the high-tech battlefield of Desert Storm. Neither do they reference associated Soviet and Russian debates on lessons to be learned from the US experience in the Persian Gulf.

Overall, though, their points are well taken. If the essence of our strategy is to deter attack, then perceptions on the part of potential foes can be nearly as crucial as those of domestic constituents. The feasibility of our strategy is negotiated at home, but its efficacy is proven abroad. Moreover, balancing domestic concerns against foreign perceptions was difficult enough when we faced one hostile superpower and its supporting alliance system. But we now face an even greater challenge in the form of a much-diffused threat environment; and US strategy cannot be all things to all people. As the Lockwoods

point out, however, "What is convincing . . . is whether there is a concerted effort to match capability to doctrine, and not mere sham declarations of a change in strategy."

Maj L. Keith Haney, USAF
Maxwell AFB, Alabama

VIETNAM

Riverine: A Brown-Water Sailor in the Delta, 1967 by Don Sheppard. Presidio Press, 505 San Marin Drive, Suite 300B, Novato, California 94945-1309, 1992, 326 pages, $22.95.

In 1966 the US Navy established a force (code-named Operation Game Warden) whose purpose was to deny the use of the Bassac River and Mekong River to the Vietcong. Game Warden's boats—31-foot, dark green, fiberglass, civilian cabin cruisers—were armed with twin .50-caliber machine guns forward and a single .50-caliber machine gun aft. Powered by two high-performance 220-horsepower General Motors truck diesels driving Jacuzzi jet water pumps, these unarmored patrol boats depended on their speed and firepower for survival.

Riverine is not just another entry in the seemingly endless series of memoirs about the Vietnam War. It is the first account from a member of the brown-water Navy. This tale gives the reader much more than just a glimpse into the life and thoughts of a man who is entering the first combat of his life. It captures the essence of what it's like to be a combat commander. Don Sheppard, the commander of River Division 51 on the Bassac River from February 1967 to January 1968, reveals his agonies of command, his doubts about his courage, and his often miserable existence on the river.

Riverine recounts the development of a combat commander, beginning with the thoughts of an eager, blue-water sailor who wants to make his mark: "The navy never let me get close to the Korean War, so they owed me this one. I hoped that I could measure up to my envisioned standard."

Arriving on the Bassac, Sheppard finds that his predecessors "have only one doctrine . . . and that is to stay in the middle of the river, keep out of trouble, and don't get your men hurt or your boats damaged." Needless to say, in his opinion, their efforts at interdicting the Vietcong were lacking. Pursuing his vision of the American warrior, Sheppard leads his force into the canals and onto the islands of the area. These operations evidently hurt the Vietcong's supply efforts—witness the fact that they reportedly offer a 25,000-piaster reward for Sheppard's head.

In this intensely personal story, the author shares his thoughts and fears of command, decision making, death, and courage:

> The man who said that command is a lonely profession knew what he was talking about. Sometimes I became so lonely for a friend that I could scream with the pain. . . .

> I found out what war is: responsibility—a grinding, constant, day in and day out responsibility that just didn't go away. A responsibility that ate at my self-confidence like a cancer, making me question every decision, every action I contemplated, exhausting me to the very marrow of my bones.

To tell this story, Sheppard takes the reader not only through the fear, confusion, and blood of combat, but also through the daily grind of routine patrols, sampan searches, and the oppressive, inescapable heat and humidity. He describes his first uneventful patrols, his building "obsession with getting into a firefight," his fear that he would not live up to his self-imposed standard once he did get into combat, and his development of the tactics which got him nicknamed "interdictor" by his commander.

A fast-paced, first-person account, this book is a quick read, easily flowing through the events of the author's year in Vietnam. Told in a conversational style, *Riverine* gives us a glimpse of just what it was like to fight on the Bassac. Sheppard's book is not blindly patriotic; it tells what the war was like—warts and all. I recommend it not only for the view it provides of a little-known part of the Vietnam War, but also for its insight into the heart and mind of a man who, under fire, learns what it means to command men in combat.

Maj Michael J. Petersen, USAF
Maxwell AFB, Alabama

WORLD WAR II

Flying the Hump: Memories of an Air War by Otha C. Spencer. Texas A&M University Press, Drawer C, College Station, Texas 77843, 1992, 240 pages, $24.50.

If you like your military history spiced with lots of war stories, this book is for you. It is full of interesting vignettes, each attributed to a specific source, that bring the history alive by letting the reader share in the experiences of the people who actually lived it. The author, professor emeritus of journalism at East Texas University, was perfectly suited to write this story since for over a year he flew B-25 weather reconnaissance missions over the Bay of Bengal and across the Hump into China. He also flew C-46 and C-47 missions taking supplies, equipment, and personnel to weather stations throughout China, Burma, and India.

Probably to most people, the World War II China, Burma, India (CBI) theater of operations brings to mind Gen Claire Lee Chennault's Flying Tigers or Gen Frank D. Merrill's Marauders. But the exploits of these well-known and genuinely deserving heroes, would not have been possible if it had not been for the brave crews of the Air Transport Command and others who challenged the Himalayas to bring personnel and supplies to the war front. Indeed, they paved an "aluminum trail" at the cost of over 3,000 deaths and 500 bailouts. As Spencer puts it, "The inexperienced Allied Hump pilots, flying untested aircraft, with uncertain leadership, paid a heavy toll. Japanese Zeros shot them out of the sky, the violent weather brought them down, or their planes crashed for unknown reasons, and they parachuted into headhunter country. Still the planes kept flying from India to China and back to India for another load of vital war supplies."

While focusing on the personal, human side of flying the Hump, this book is also about leadership. By the summer of 1943, the Hump had become "a purgatory for military commanders." After a series of investigations, Col (later Brig Gen) Thomas O. Hardin took command of the Hump operations. Colonel Hardin "brought order to the loose operations of the airlift, pushed Hump crews to their limits, and dramatically increased the flow of supplies to China," but his success came at a high price in terms of men and aircraft lost and lower morale. His "There is no weather over the Hump" edict is often cited as the primary cause for weather-related accidents, including "Black Friday," when at least 18 aircraft and 42 crewmen and passengers were lost during the worst storm in Hump history. Nevertheless, Colonel Hardin was genuinely liked by his airmen, who at the end of his tour staged "Tom Hardin Day" during which they set a record for Hump flights in one 24-hour period.

Brig Gen William H. Tunner, who replaced Colonel Hardin and served as the Hump commander until the end of the war, was initially troubled by this assignment and felt it was the "equivalent to military exile." Overcoming these personal concerns, he quickly moved to rescind the "no-weather" rule and institute other changes to reduce the accident rate. Demanding that his airmen "live like Americans and be proud they were Americans," he ordered a general cleanup of living conditions and daily full-dress inspections. While these and other directives (such as "Production Line Maintenance") were initially unpopular, morale and the efficiency of Hump operations soon improved. Interested readers should note that General Tunner has captured his airlift experiences during the Hump operations and afterward (in the Berlin airlift, in Korea, in the United States Air Forces in Europe [USAFE], and in the Military Air Transport Service [MATS] in a book titled *Over the Hump*, which was reprinted by the Office of Air Force History in 1985).

As insightful as the leadership lessons are, the most interesting parts of this book are the vignettes that illustrate each aspect of the Hump being discussed. Some of my favorite involved the different types of cargo being flown. While most of the cargo was directly war-related, flights also carried "whiskey (ten thousand pounds of Canadian whiskey zealously guarded by the British), mules (four mules per plane with four Chinese 'cowboys'), a load of catsup for the fighter squadrons in Kweilin, and money, bales and bales of Chinese paper money, printed by the American Bank Note Company." On three successive flights in a C-47, pilot Robert B. L. Taylor carried first a load of grain in burlap bags that leaked, then a load of goats, and finally a load of Chinese soldiers who couldn't figure out how to use the relief tube. As a result, he states, "So, now, we have fermenting grain, goat do-do, and Chinese wee-wee, all in the belly of the ship. The old Gooney was ready for the depot for sure."

Was the Hump worth the sacrifice? The author contends that even if the experts say it failed in relationship to the overall war effort, it was a success on a personal level. "If war is inevitable, as it seems to be; if men must fight, as they always have; then it was best that young men, and women, who were called on to fight the war and fly the missions of supply were

taught a skill [regular air travel] that would help mankind, and themselves, in future years of peace." While this book cannot be considered a definitive history of the Hump, it is a valuable addition to Hump-related literature and is worth reading.

Lt Col William F. Furr, USAF, Retired
Montgomery, Alabama

The Conduct of the Air War in the Second World War: An International Comparison edited by Horst Boog. Berg Publishers, 165 Taber Avenue, Providence, Rhode Island 02906, 1992, 784 pages, $79.95.

Encyclopedic in scope and exhaustive in detail, *The Conduct of the Air War in the Second World War* is a major contribution to air power history in English. The text contains the proceedings of the first international conference of historians held in Freiburg, Germany, from 29 August to 2 September 1988. Under the able leadership of Horst Boog, the former senior director of research at the Militärgeschichtliches Forschungsamt, the Freiburg conference gathered together a veritable who's who of air power historians, 34 of whom presented papers and commentaries on air warfare from 1914 to 1945. (The title of this volume is a misnomer in that the role of air power in the interwar years receives extensive coverage.) As a result, the text is the third major collection of essays on air warfare now available in English. Eugene Emme, former professor of international politics at Air University, first edited *The Impact of Air Power: National Security and World Politics* (1959), a seminal cold war survey that focuses on the history of air power, its revolutionary impact on modern warfare, and the role it plays as an instrument of national policy. The survey includes 118 brief essays that focus on historical and policy-oriented themes to include the Soviet aerial threat, the balance of terror, and the indivisibility of aerospace power. As a result, *The Impact of Air Power* is a comprehensive collection of authoritative readings, but it also reflects the biases and assumptions of a rigid bipolar world.

Equal in scope is *Air Power and Warfare: The Proceedings of the 8th Military History Symposium* (1978), the USAF Academy's proceedings of the Eighth Military History Symposium. It, too, is an important compendium of papers, panel discussions, and commentaries on air power from

its inception up through the Vietnam War. The volume, edited by Alfred Hurley and Robert Ehrhart, provides a transnational analysis of air power vis-à-vis doctrine, leadership, organization, and technology. But like the previous text, *Air Power and Warfare* reflects the biases and assumptions of a particular age to include those of American airmen. (The latter defend the air strategy and tactics they used in Vietnam and reassert the continued validity of US strategic bombardment doctrine.)

In contrast, *The Conduct of the Air War in the Second World War* is a dispassionate work of genuine scholarship. Boog organizes its contents under the following rubrics: "Air Warfare and Modernity"; "The Air Forces and the Armaments Industry"; "The Military, Research, Technology"; "Doctrine, Technology, Logistics"; "Air Warfare and Humanity"; "Tactical and Strategic Air Warfare"; "Intelligence and Air Warfare"; and "Airpower, Air Policy, High Command." Each section contains thought-provoking essays and commentaries that both challenge and reaffirm previous interpretations of air warfare during World War II. R. J. Overy, for example, reminds us that Allied air power was largely a tactical tool used in combined arms operations. Its primary focus was to defeat enemy forces in the field, not to destroy civilian morale or an enemy's infrastructure. Overy further argues that the success of Allied air operations depended on various factors that remain important today. These factors include a nation's strategic conceptions, its economic strength and capacity for scientific and technological mobilization, its political and social receptivity to air power, and the combat effectiveness of its air forces. John Morrow subsequently demonstrates that disinterest, ineptitude, or misplaced priorities in any one of these areas can lead to disaster. The Allied air forces, for example, won a war of materiel in part because their leaders had a commercial, "productivist" vision of warfare. In contrast, technologically conservative Nazi bureaucrats generated more intrigue than aircraft, and the results were fatal. (World War II occurred at a historical point where the mass production of airplanes was technologically possible and therefore important; a war fought five years sooner would have resembled the limited air combat of World War I, while a war fought 10 years later would have produced aircraft too complex and expensive for large-scale use.) Lastly, the legal and moral thinking of the time failed to delimit the impact of "productivism" on air warfare. As W. Hays Parks illustrates, law and morality were often one and the same thing to Allied air leaders, and the

state of international law, particularly in relation to strategic bombing, was largely chaotic. Aside from vague prohibitions against indiscriminate bombardment, there were no rules then in force that applied to air warfare and thus none that applied to the issue of noncombatant immunity. Mr Parks's essay is an early version of his monumental "Air War and the Law of War," a 225-page article that appeared in *The Air Force Law Review* in 1990. The article should be required reading for any officer interested in the legal/moral dimensions of air warfare. Further, it is shameful that the US Air Force has not produced an authority equal to Mr Parks, a colonel in the Marine Corps Reserve!

The above themes are but a minute sample of those raised in *The Conduct of the Air War in the Second World War.* The volume also covers topics that still receive short shrift in English: the Italian air arm and aircraft industry; French air policy in the interwar period; the role of Japanese air forces, and so forth. However, there are small problems. The book is overwhelmingly Eurocentric and, as one would expect, some essays are more original and exhaustively documented than others. Gerhard Krebs's essay on Japanese air forces, for example, is too brief, while Manfred Messerschmidt's piece on strategic air war and international law pales in comparison with Parks's essay. These observations are mere quibbles, however. Given the intellectual treasure found in *The Conduct of the Air War in the Second World War,* the volume is worth the mouth-dropping price.

Maj Pete Faber, USAF
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Adlib: Flying the B-24 Liberator in World War II by William Carigan. Sunflower University Press, 1531 Yuma, Box 1009, Manhattan, Kansas 66502-4228, 1988, 100 pages, $17.00.

Ever wondered about how to preflight a B-24 or what it was like to fly this aircraft? These subjects are covered in *Adlib* by William Carigan, a man who had extensive experience as a B-24 instructor and who completed 50 combat missions as a member of the Fifteenth Air Force in 1944. Most of the book's information and checklists are derived from Technical Order AN 01-5EE, "Pilot's Operating Instructions for B-24G, H, and J" (30 November 1944) and from the *Pilot Training Manual for the Liberator, B-24* (1944). However, Carigan's advice about dealing with the B-24's quirks is based on his firsthand experience, supplemented by advice from people who helped him master the big bomber.

Besides giving the reader a wealth of detail on B-24 flying characteristics and technical advice on checklist interpretation, Carigan spends considerable time on the responsibilities of various crew members from preflight to postmission shutdown. The book provides a two-page photo of the cockpit, but—because of the emphasis on checklists—blowups of the cockpit's instrumentation would have been more helpful.

In any case, the most interesting part of the book is the last chapter, where Carigan discusses his own views of the responsibilities of an aircraft commander, the value of crew interchangeability, and the importance of courage. He also comments on combat flying in World War II but spends fewer than 10 pages doing so.

Carigan passes up the opportunity to compare the B-24 to the B-17, although making such a comparison was not his intention. Had he—a pilot with considerable experience in both aircraft—done this, the book would be much more appealing. Carigan's passing comments (see pages 73 and 96) lead me to believe that he preferred the Liberator.

If you ever want to get a sense of what it might have been like to preflight a B-24 or fly one in combat, *Adlib* may be just the book to read.

Lt Col Ricardo G. Cuadros, USAF
Norfolk, Virginia

Lightning Strikes: The 475th Fighter Group in the Pacific War, 1943–1945 by Ronald W. Yoshino. Sunflower University Press, 1531 Yuma, Manhattan, Kansas 66502-4228, 1992, 164 pages, $22.95.

Not only is *Lightning Strikes* the combat account of the highly successful P-38 unit that destroyed 594 Japanese enemy aircraft, it also chronicles triumph over numerous adversities. The latter include the fact that the group was formed in Australia at the distant end of US logistics and was never fully equipped or adequately supplied. Further, it was manned by malnourished airmen who frequently suffered from fever and disease. To make things worse, the group relocated a dozen times to miserable, desolate locations in Australia, New Guinea, and the Philippines. More pilots lost their lives because of bad weather than air combat (33 versus 27).

Ronald W. Yoshino's very readable chronology of the birth, maturation, and combat prowess of the 475th makes for a good, historical story that is spiced with anecdotes (but not heavy on statistics). He opens with an exciting account of a sortie flown by Capt Thomas B. ("Mac") McGuire, Jr., on 26 December 1943, when McGuire shot down four Japanese bombers. Having gained the reader's attention, Yoshino craftily outlines the 475th's role in theater and campaign strategy but is careful not to dwell on the high-level decisions of Gen Douglas MacArthur, Adm Chester Nimitz, and the Pentagon.

Yoshino's account of the 475th also includes a skillful comparison of the P-38 and Japanese fighter aircraft. Although the P-38 had long-range, high-speed, and high-altitude capabilities—as well as massive firepower and twin-engine survivability—its size prevented it from turning inside the flight path of the smaller, more nimble Japanese Zero. Yoshino then turns to the tactics of air combat, especially the Zero's high-speed, slashing, dive-and-run gun attack.

Yoshino expands on several interesting aspects of the 475th's combat history—for example, the group's relationship with legendary civilian pilot Charles A. Lindbergh. Originally dispatched to the Pacific as a factory liaison for F-4U Corsairs, Lindbergh not only increased the 475th's effectiveness by training its pilots in long-range cruise techniques but actually shot down a Japanese fighter in aerial combat. Also carefully chronicled are the exploits and ultimate demise of Mac McGuire, who at the time of his death was the group's leading ace with 38 aerial kills.

Finally, three factors contribute to Yoshino's effectiveness. First, he develops a sense of "being there" by not succumbing to "politically correct" English (e.g., he writes of "officers and men"). Second, he provides vivid accounts of suffering, struggles, and victories. Third, he refrains from filling the gaps in current research with subjective personal conclusions even though he probably was tempted to do so.

Lt Col Dion W. Johnson, USAF, Retired
Lebanon, New Jersey

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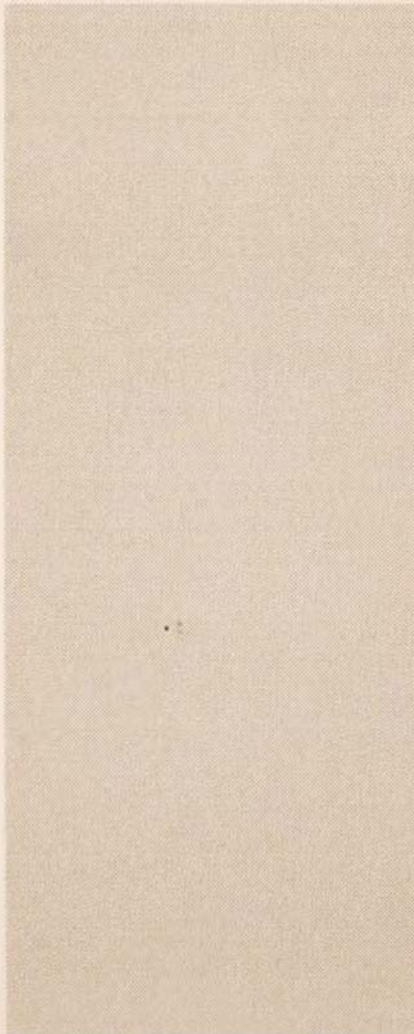
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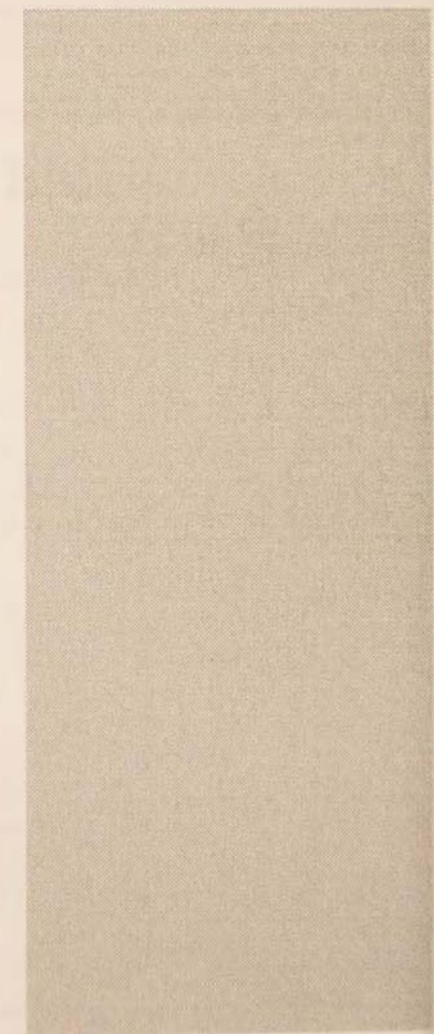
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