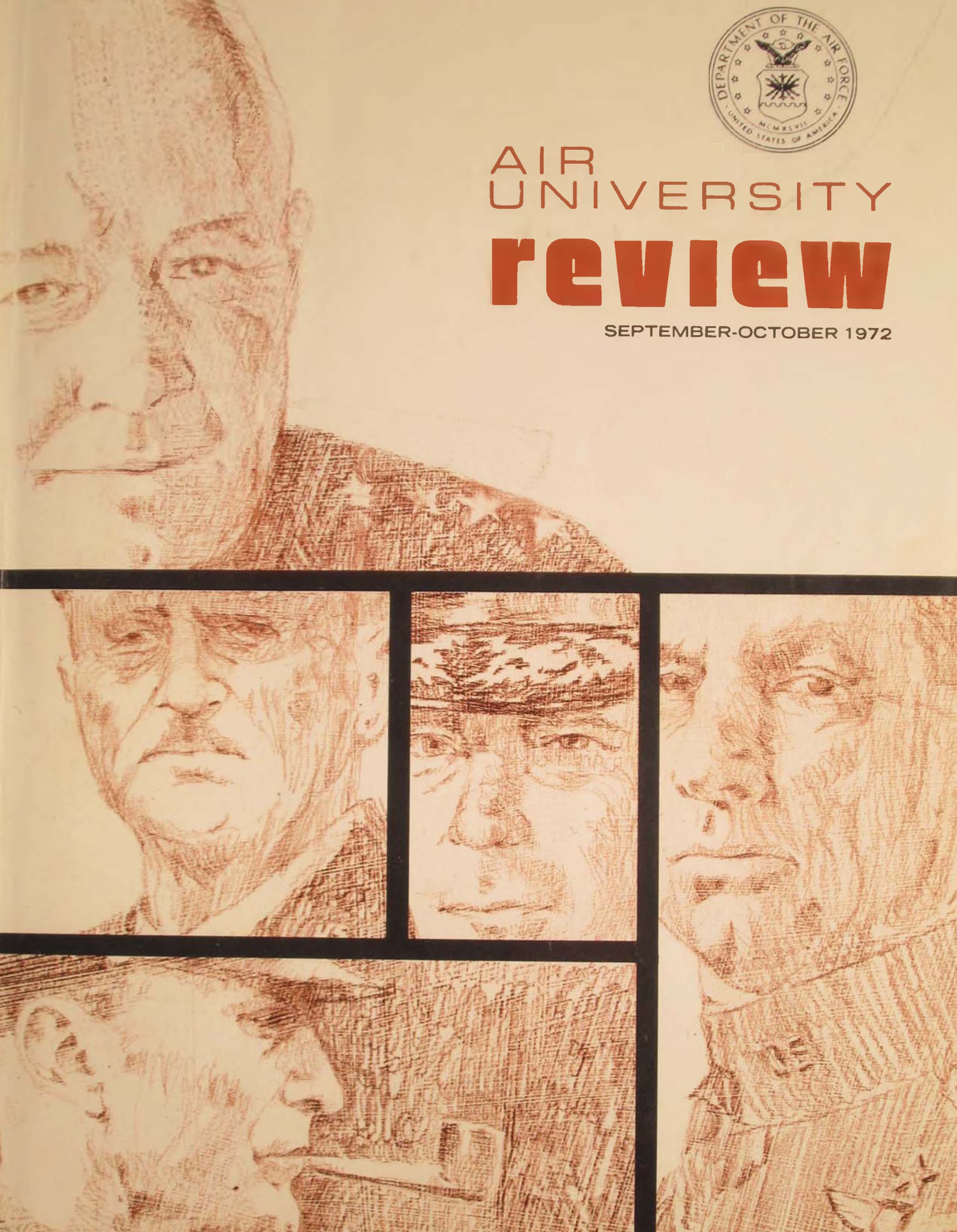

AIR UNIVERSITY review

SEPTEMBER-OCTOBER 1972

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review

THE PROFESSIONAL JOURNAL OF THE UNITED STATES AIR FORCE

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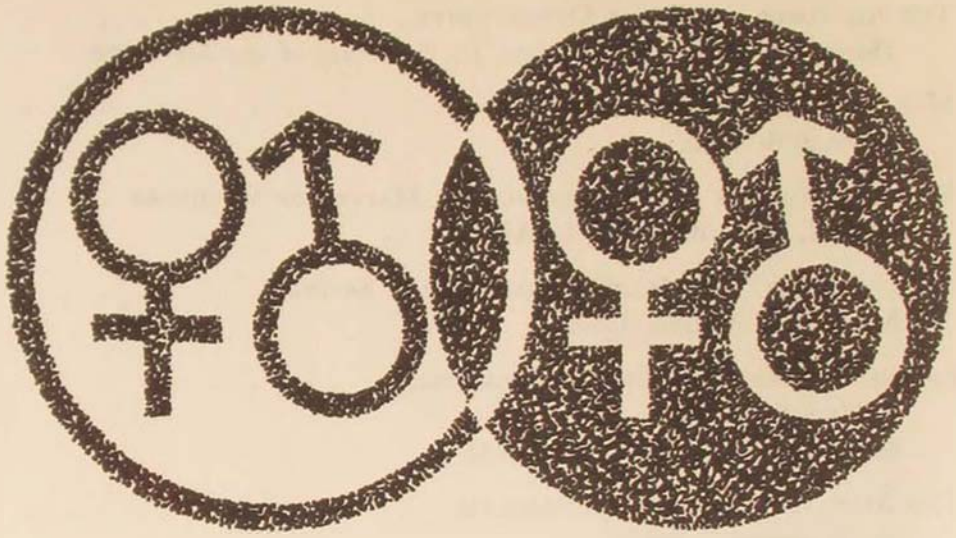
the cover

On 18 September 1972, the United States Air Force marks completion of its first quarter-century as an autonomous military service. In recognition of that milestone, *Air University Review* presents Herman S. Wolk's "Men Who Made the Air Force," a vivid narration of the vicissitudes and the dynamic leadership that culminated in separate identity for the air arm. Our cover singles out several of those leaders: General Henry H. Arnold, General Carl A. Spaatz, General Hoyt S. Vandenberg, Brigadier General William Mitchell, and Lieutenant General Ira C. Eaker.

THE AIR FORCE AND EQUAL OPPORTUNITY



HONORABLE ROBERT C. SEAMANS, JR.
Secretary of the Air Force

LATE IN APRIL, a predominantly white crowd of 400 high school girls gathered around the charred ruins of a house on Staten Island. It had taken them about an hour and a half to walk from their school to this quiet white suburban neighborhood. The girls were demonstrating their sympathy and concern for a classmate who is black. Her father, a native of the West Indies, recently had purchased this house and would have been the first black man to move into the neighborhood.

Neighbors who watched as the girls gathered around the ruins openly displayed their racial feelings toward them through bitter ridicule of the protestors. Such incidents are obvious evidence that much more needs to be done toward eliminating prejudice among our citizens.

Unfortunately, attitudes that harbor racial discrimination can be found in the Air Force as well as in civilian society. About a year ago at Travis AFB, near San Francisco, a series of incidents occurred

which increased racial tensions and polarized attitudes. Groups of black airmen charged that policies and conditions were discriminatory, and these airmen engaged in protest gatherings. Violence ensued, and the potential existed for many serious injuries and loss of life. Finally emotions were contained. The point is that we must move toward an environment where such episodes will not recur.

Most of us are quick to react to racial insult or slight, whether intended or not. But more is needed than simply avoiding negative reactions. We must assure that equal treatment exists for all of our people, whether this relates to job assignments, to matters of food, style of haircuts, or music in recreation centers.

Our goal is an Air Force in which racial differences are respected and all men and women are, in fact, given equal opportunity. This requires equal consideration in assignments and promotions, effective communication between the races regarding all aspects of the service environment, and improved education of all Air Force people in the area of human relations. In all areas, innovative and responsible leadership will be needed if we are to realize our goals.

We must be committed to the goal of *real* equal opportunity. We must insure that minority officers and airmen have ready access to the demanding, responsible jobs that are necessary for a successful career. The Air Force has tried to provide appropriate assignments for all its people, but the question is

sometimes raised as to whether members of minority groups receive fair treatment.

We have heard such phrases as "We do not practice discrimination in assignments" and "The needs of the service come first." We cannot allow such statements to be misused and serve as a smoke screen to hide injustice. We must continue to see that members of minority groups are being given the same honest opportunities for important assignments as everyone else by insuring that we allow no artificial barriers to equality. Unless we maintain a positive attitude in this regard, we will fail in our obligation to both the Air Force and our society.

To assure greater progress, we need common standards. We must be sure that the entire Air Force is going in the same direction, so that policies at every level are reinforcing. What is more, as with any resource management program, we need to know the status on which to base further actions. It should be clear, then, that well-understood standards and quality controls are essential.

For this reason, the Social Actions Division at Headquarters Air Force has reviewed the Air Force Personnel Plan in light of equal opportunity goals. From this review specific guidelines have been developed and issued to agencies and commands responsible for their implementation. Included is the requirement for detailed progress reports at specified intervals.

Minorities account for some 13.3 percent of airmen and 2.2 percent of the present officer force. The enlisted strengths are representative of the civilian population, but the Air Force objective will be to achieve a 5.6 percent proportion of officers at least by 1980. This represents the anticipated minority percentage among college graduates age 21–29, who form the manpower pool from which all officers are drawn. Production from Officer Training School will be tripled immediately to reach 6 percent, and ROTC will be producing more minority officers by 1974.

This summer more than fifty minority candidates entered a new two-month course which will augment the current nine-month curriculum at the Air Force Academy Preparatory School in Colorado. This course will help them qualify for the Air Force Academy.

On the job, officer and NCO supervisors may well find that lack of job satisfaction is a major contributor to frustration and potential charges of discrimination. Unequal workloads, changed requirements that have made a position essentially surplus, responsibility that is actually far less than an inflated job description indicates—all of these can contribute to dissatisfaction and unrest.

Good management and meaningful career opportunity require a thorough review of job requirements, responsibilities, and the appropriate grade level. If a man does not have a challenging job to do, he is not motivated to demonstrate his real ability, whether he is black or white, and consequently his potential for future advancement is not realized. This situation is undesirable in any circumstance, but a minority group member when denied such opportunity is likely to view it as a manifestation of racial bias.

Fortunately, progress has been made in assuring equal opportunity in promotions. Analysis of our airman promotion programs in the mid-1960s indicated an atmosphere that could allow inequitable factors—including racial prejudice—to hinder advancement. Since that time the Air Force has adopted the Weighted Airman Promotion System (WAPS). The effects, verified by analysis of the FY 72 cycle, are that white and black airmen receive equal treatment—and achieve essentially equal results—under this new system. Therefore, although racial prejudice was not necessarily a direct cause, it would appear that WAPS will serve to preclude discrimination in airman promotions.

In addition to standards for job assignment and promotions, we still need to work on such areas as off-base housing. As of De-

cember 31, 98.8 percent of all surveyed housing having five units or more and located near a USAF base had given us nondiscrimination assurances. The 1.2 percent that failed to do so—some 145 multiple-dwelling units—were placed on the USAF sanction list. This removes all military people from the potential rental market for these units.

Closely related to Air Force efforts to set standards is the need for accountability. The performance of our supervisors and commanders at every level must be evaluated in terms of policy support. Thus, the ability of our commanders and supervisors to promote equal opportunity will be indicated on their efficiency reports. Those whose performance fails to meet the established equal opportunity standards will not continue in leadership positions, and their promotion potential will suffer accordingly. The task of achieving equal opportunity cannot be handed to someone else; it takes personal involvement by those who lead the Air Force at all levels.

Our experience has shown that progress in promoting racial equality and harmony depends in large measure on effective communication, both formal and informal. This means that our commanders and supervisors at every level must seek frequent opportunities to talk with, listen to, and get to know their people, on duty and off duty.

Perhaps we need to recall that old truism: "The Open Door policy works best when it is the commander who walks through the door." Although a fundamental of management, it bears repeating that far more can be accomplished by visiting the men than by sitting in an office—whether the door is open or closed. Then too, the NCO supervisor cannot push aside *his* responsibility by saying, "Someone above has to give me guidance in each situation—it's just too sensitive." Commanders must look to the NCO, who is closer to the daily situation, but the NCO should not become a buffer between the commander and his men. By working together closely, we can indeed get to know our people and, together, lead them. Only in this way can we create a climate in which our people can live and work harmoniously and effectively.

In such an environment, those with grievances, large or small, can discuss them easily with commanders and supervisors and thereby gain respect for their leaders and confidence in the Air Force. Prompt examination of complaints to determine their validity and seek remedies can preclude disproportionate expansion of minor gripes simply because of frustration with the "system." Moreover, an open system is much more likely to identify the occasional attempts to stimulate unrest or unwarranted charges, and people will dismiss them as unworthy of support.

Several beneficial initiatives have been taken to assist in improving communication between the races. As a start, the Air Force has an Equal Opportunity Officer assigned to every major base. These officers are there to assist the commanders and are selected in large measure for their commitment and their ability to understand and communicate with minority members. Each Equal Opportunity Officer has direct access to the commander and participates in staff consideration of all major programs. A related effort to stimulate the flow of information involves informal sessions in which the commander meets with Airman, Noncommissioned Officer, and Junior Officer Councils, and these sessions have proven very useful. Also, the direct-access telephone call or hot line, available to anyone who seeks direct communication with the commander, has been of considerable help.

Another approach, taken by the cadets at the Air Force Academy, may have constructive application for other organizations as a means of improving communication and mutual understanding. A "Cadet Way of Life Committee" was established last year, as a result of concern about racial misunderstandings. One early recommendation was to hold a series of information seminars led by cadets

Continued on page 8

At the Defense Race Relations Institute, Patrick AFB, Florida, one means of achieving understanding is exchange role-playing in simulated situations that might be expected to produce misunderstanding. The white NCO and the black NCO (face to face) play reversed roles, each backed by two members of the opposite race, who offer advice on how to play the assumed role.

Human Relations Day at Zweibrücken Air Base, Germany, featured an address by Colonel Thomas E. Clifford, Commander of the 52d Tactical Fighter Wing stationed at Spangdahlem Air Base.

Brigadier General Lucius Theus, Special Assistant for Social Actions, and Major General John W. Roberts, Director of Personnel Plans, Hq USAF, review Air Force human relations programs.

Lamidi Fakeye, sculptor from Nigeria, Africa, demonstrated his woodcarving techniques at the U.S. Air Force Academy during the Cadet Wing's Festival of Black Culture held in January 1972.

in each of the squadrons. Candid exchanges between these groups of white and black cadets of similar age and experience demonstrated an effective way to improve understanding and reduce potential aggravations.

The cadets also planned and carried out a four-day festival of black culture this spring. Ranging from soul food to music and lectures, this impressive program was one example of the effort to achieve mutual understanding that we should encourage throughout the Air Force.

As a basis for all our equal opportunity efforts, we must emphasize education in human relations. Human relations skills are now taught in basic military training, our Air Force technical schools, undergraduate pilot and navigator training, academic instructor training, Officer Training School, ROTC, and at the Air Force Academy. Moreover, professional military courses, such as Air War College, Air Command and Staff College, and Squadron Officer School, include instruction in human relations.

A wing/base commanders' seminar is being conducted repeatedly at Air University to provide information and stimulate discussion on a variety of contemporary social issues, such as race, drugs, and changing youth values.

The Air Force also participates in the joint services Defense Race Relations Institute at Patrick AFB, Florida, which began training instructors last fall. This seven-week course is designed to give selected officers and noncommissioned officers the background and practical experience necessary to teach others the techniques of approaching race relations with open minds and principles of fairness to all.

In teaching these concepts at the local level, everyone in the Air Force will participate in small seminar-size classes for as much as eighteen hours annually. These classes will consider means to improve all human relationships and examine the background of racial prejudice in our society. As a practical exercise, they will view and discuss special films depicting racial and ethnic conflict in typical work situations. The result should be not just semantic generalities but lifelike experiences in recognizing and understanding racial problems.

IN SUMMARY, we have many good programs under way that will help us achieve our equal opportunity goals. As one important step, career opportunities must be equitable and appropriate for everyone. All our men and women must have the opportunity to contribute to the best of their individual abilities.

The Air Force has specific standards by which to judge its progress in providing opportunities for minority group members, and unit commanders will be held responsible for progress toward these standards. But success will depend to a great extent on the degree of mutual respect and understanding that we are able to develop among our people. This will require closer relationships between each supervisor and the members of his organization, new and imaginative educational projects at all our bases, and, especially, better communication between the races at all levels of command.

I am confident that the Air Force can maintain the positive attitude and continuing initiatives necessary for still greater progress toward our equal opportunity goals.

Office of the Secretary of the Air Force

MEN WHO MADE THE AIR FORCE

HERMAN S. WOLK

SEPTEMBER 18, 1947. For so long, it had all been directed toward that ultimate aim, to that one act signifying single identity, separation —and triumph. Why? To the air leaders—some had been active in World War I—an independent Air Force was what they had dreamed, planned, and aimed at for decades. Above all, it had been an act of faith.

To airmen who had participated in the long struggle, autonomy meant *recognition*. It meant that their vision and hard work had mattered, had paid dividends. Above all, air had a mission distinct from ground support. Autonomy equaled legitimacy for the strategic bombing mission. It was long-range bombing of the enemy's vitals that set air apart. The European and Pacific bombing offensives of World War II made a powerful case for independence, and now strategic bombing held the promise of capturing the power of decision in modern conflict.

The air leaders also recognized that the atomic bomb was the crucial new element. Others, military and civilian, disagreed, and the American public was not certain. Leading airmen thought the bomb solidified the hold of the strategic bomber as the major delivery instrument. War had become total. This was the awesome fact. Even before the war ended, General Henry H. ("Hap") Arnold, Commanding General, Army Air Forces, was convinced that a force in-being was necessary because no longer would there be sufficient time to mobilize. The era of come-from-behind victories was over. World War II was the last of its kind.

Arnold, General Carl A. ("Tooey") Spaatz (who would become Commanding General, Army Air Forces, in February 1946), and Stuart Symington (to become Assistant Secretary of War for Air in January 1946) were largely confident that citizens and politicians would agree and lend their support. This meant—based on recommendations by Major General Curtis E. LeMay and others—structuring an atomic striking force. It would not be easy. Involved was a combination of public understanding and support along with technical, organizational, and command skills. Despite the atomic experience of the 509th Composite Group against Japan, at war's end the AAF was far short of having the requisite atomic expertise required to train large numbers of personnel and build major facilities. In addition, few B-29s had been modified to deliver the bomb.

There was also the Navy. The AAF would have to fight for independence and its 70-group program—approved by Lieutenant General Ira C. Eaker, Deputy Commanding General, AAF, on August 29, 1945, and by the Joint Chiefs on September 27, 1945—for the resources needed for the atomic force, and for pre-eminence in the strategic mission. Anticipating the end of the war, Robert A. Lovett, Assistant Secretary of War for Air, had observed in March 1945, "Our planning has been well done on the whole, but we must be prepared for a bitter struggle with the High Command and particularly with the Navy in getting the post-war set-up properly made so that airpower is recognized as a co-equal arm." [1] The Navy had come out of World War II convinced that in large measure its future was tied to the carrier task force. This called for larger carriers—flush-deck supercarriers—capable of accommodating heavier planes able to carry the atomic weapon.

Meanwhile, with the war in its final, decisive phase, President Truman supported unification and an independent air service. He therefore performed a role not unlike that of Winston Churchill, who as Secretary for War and Air backed Major General Hugh ("Boom") Trenchard after World War I when the Royal Air Force's independence was threatened by Army and Navy leaders. Truman strongly supported creation of a separate American air service; Churchill acted to save the RAF.

The President had long before been persuaded of the merits of unification and the necessity for air "parity" with the other services. Pearl Harbor was yet another indication —an especially direct and tragic example— that the American government had been stricken by organizational arthritis, causing debilitation of command and control arteries.

Planning for the postwar air organization started before the end of the war. Army Chief

of Staff General George C. Marshall felt that the AAF's performance had earned it a place as a separate service, and he and Arnold agreed that planning for the postwar air arm should be based on a force in-being. The Initial Postwar Air Force (IPWAF) plan, completed in February 1944, called for 105 air groups (87 to be bomber and fighter escort) and one million men. Marshall considered this unrealistic, and the second postwar plan described a 75-group force to be ready three years after Japan's defeat. In the spring of 1945 another plan formulated an Interim Air Force of 78 groups and 638,286 men. During the summer, the size of the Interim Air Force was cut down, but an air force of 75 groups remained the AAF objective until 1948. In July 1945 still another plan ("V–J Plan") called for 78 groups at the end of demobilization.

In August 1945, Truman directed the services to present their postwar organizational plans. Lieutenant General Ira C. Eaker, Deputy Commanding General of the AAF, Lieutenant General Hoyt S. Vandenberg, and Major General Lauris Norstad directed AAF planning, and on August 29, 1945, Eaker approved 70 air groups as the permanent force objective. In September the Joint Chiefs approved this figure, to be reached by July 1, 1946. On March 21, 1946—based on planning done by the Air Staff and discussions between Spaatz (who had replaced Arnold as Commanding General in February) and General Dwight D. Eisenhower (who had replaced Marshall as Chief of Staff of the Army)—the AAF was organized into the Strategic, Tactical, and Air Defense Commands, Eisenhower having made the point that the postwar air organization include a separate Tactical Air Command.

Arnold and Spaatz

General Spaatz came naturally to the top post in February 1946. He had flown combat missions in World War I, served under Arnold during the lean decades between the wars, and commanded U.S. Strategic Air Forces in the European and Pacific theaters in World War II. In 1940 Arnold sent Spaatz to London to report on the RAF-Luftwaffe air war. Subsequently, commanding the Northwest African Strategic Air Force, he refined strategy and tactics. In December 1943, when Arnold sent Eaker to command the newly formed Mediterranean Allied Air Forces, he brought Spaatz back to England to command the U.S. Strategic Air Forces in Europe, under the Allied air commander, Air Chief Marshal Arthur William Tedder, and the Supreme Commander for "Overlord," General Dwight D. Eisenhower.

Arnold appreciated Spaatz's loyalty and competence; he could rely on him. And Spaatz vindicated his mentor's judgment. A master of strategic planning, Spaatz directed the decisive phase of the American bombing offensive against Germany. He displayed a knack for getting along with the British, who implicitly trusted him. Churchill had argued that destruction of Germany's industry would not be sufficient to bring victory, and the RAF Bomber Command under Air Chief Marshal Arthur Harris pursued general area bombing without wavering. But Spaatz proved adept at singling out the enemy's vulnerable industries and destroying them. His insistence that German oil production be systematically attacked and that the Luftwaffe's fighters be flushed out paid handsome dividends. Arnold was confident that Spaatz, with his leadership capacity, could direct the air arm to autonomy in the crucial postwar period.

As Chief of Staff and successor to the almost legendary Arnold, Spaatz's first priority was to achieve the long-sought-after autonomy. Arnold had seen Brigadier General William Mitchell destroyed and had himself been exiled because of his views. But he had learned well; biding his time, he laid plans, met industrialists, and built forces as best he could during lean, difficult years and thus had his hands on the levers when in September 1938 Presi-

General Henry H. ("Hap") Arnold while a lieutenant colonel in the early thirties

dent Franklin D. Roosevelt called for substantial air expansion. Then, during the war, Arnold had cooperated with General George C. Marshall, who agreed that the AAF would be given much latitude (semiautonomy, really) in wartime and independence after the war.

Arnold and Marshall developed a relationship based on mutual respect and confidence. This camaraderie began when they met in the Philippines in 1914. In 1938, after Arnold became Chief of the Air Corps, he set about educating the Army Chief of Staff in the nuances of air power, what it could accomplish under varying circumstances. He later wrote that Marshall had an extraordinary ability to comprehend and "make it part of as strong a body of military genius as I have ever known." [2] General Marshall admired Arnold's loyalty and became a powerful backer of the air arm. "I tried to give Arnold all the power I could," said Marshall. "I tried to make him as nearly as I could Chief of Staff of the Air without any restraint although he was very subordinate. And he was very appreciative of this." [3*]

With his vision now a blend of restraint and flexibility, General Hap Arnold became the architect of modern American air power. When the determination of others flagged, his conviction that the bombing offensive eventually would be decisive spelled the difference. Not an especially acute strategical thinker, he always emphasized the principle of concentrating massive power at the critical point—

Lieutenant General Ira C. Eaker

* When Arnold wrote Marshall, it was always "Dear General." When Marshall wrote Arnold it was "Dear Arnold." Interview, Dr. Murray Green, Office of Air Force History, with General Carl A. Spaatz, August 8, 1969.

General Arnold, Commanding General, Army Air Forces, General Carl Spaatz, Commanding General, U.S. Strategic Air Forces in Europe, and Major General Hoyt S. Vandenberg, Commanding General, Ninth Air Force, arrive at a U.S. base in 1945 to present awards to members of the Ninth Air Force.

General Arnold turns over command of the Army Air Forces to General "Tooey" Spaatz.

thus his displeasure when he concluded that commanders, despite perhaps insurmountable problems, should be sending out more bombers. Fortunately, he had a fair measure of the diplomat's touch and understood politics in the broad sense; consequently the Allied cause had an ideal man for its demanding task.

Arnold was a superb administrative leader, toughened—as Allen Andrews put it—"in the back rooms of war." Deceptively unassuming and lacking creative imagination, he had an extraordinary ability to grasp and clarify an idea and drive it through seemingly interminable channels to fruition. Through the long, unfulfilled prewar years and then during the global conflict, his knowledge of American industry and his rapport with its captains proved invaluable. Ever the consummate manager and unusually competent in the scientific and technical aspects of aviation, Arnold apparently never allowed personalities or sentimentality to muddle his decisions. Despite being in poor health during the war—he suffered several heart attacks—he drove himself, and it can be said that more than any other airman he shaped the air arm and set the example with his faith, determination, and industry.

Spaatz superbly complemented Arnold, who had not seen combat in the First World War and bitterly regretted it. After commanding the First Wing of the GHQ Air Force, March Field, California, Arnold moved to Washington in 1936, became Chief of the Air Corps in 1938 upon the death of Major General Oscar Westover, and did not leave until after the war ended. He was not an innovative strategist and did not pretend to be. By contrast, Spaatz in 1918 had left his command of the Issoudun flying schools in central France and raced to the front, where in three weeks of hard combat flying he downed several planes and won the respect and admiration of young pilots serving under him. Arnold knew Spaatz to have a good grasp of strategy, of what aircraft could do and of what was required to get a tough job done. Where the Chief was a technician and logistician, Spaatz was a hard-driving operational commander and a strategist; where one was almost irascible, the other was even-tempered.

Over the years they cultivated a special rapport, often had long sessions of chess together, Spaatz learning the advantages of adaptability from Arnold. But if he could be tactful, Spaatz had also shown in 1944–45 an uncommon intransigence of purpose when it was badly needed. In 1946, he knew that the times called for extraordinary drive, stamina, and singlemindedness of purpose—all to be concentrated on the effort for independence. Arnold had turned over the reins of the Army Air Forces that he himself had largely built. Independence would be gained and the strategic mission nailed down. Based on wartime "lessons," the two were inseparable.

Although he knew well the crucial importance that the strategic function would play, Spaatz found that Eisenhower's support had been purchased at the price of establishing a tactical command in the postwar air organization. The former Supreme Commander, having replaced Marshall as War Department Chief of Staff, had not wavered in his support for unification. Arnold's old friend, General Marshall, also had been a staunch supporter. So, with the reorganization of March 1946, instead of a single combat command, three functional commands were established—strategic, tactical, and air defense.

The close relationships among the top commanders of World War II were not alone shown by Arnold's closeness to Marshall and Spaatz but also appeared between Spaatz and Eisenhower. Having ably served Eisenhower in North Africa and then in the decisive phase of the European war, Spaatz had won the unqualified respect of the War Department Chief. Eisenhower had brought Spaatz along, had nurtured his capabilities, had always called for him, and in fact had come to think of him as his air commander.

Although singlemindedly occupied with the autonomy issue, by early 1946 Arnold's successor had come to believe that the strategic atomic force held the nation's best hope for deterring a major war and insuring a peaceful world.

Spaatz's views on strategic air followed the historical development of the Trenchard-Mitchell-Arnold school: *Prolonged ground wars of attrition must be avoided at all costs.* "Attritional war," said Spaatz shortly after succeeding Arnold, "might last years . . . would cost wealth that centuries alone could repay and . . . would take untold millions of lives." [4] The lessons of World War II were writ clear:

> Strategic bombing is thus the first war instrument of history capable of stopping the heart mechanism of a great industrialized enemy. It paralyzes his military power at the core. It has a strategy and tactic of mobility and flexibility which are peculiar to its own medium, *the third dimension.*[5]

For the future, Spaatz was convinced that another war would be decided by strategic air power before the surface forces came into play. Consequently, we would have to build a strategic striking force in-being that would be ready to go "in the first crucial moment." To Spaatz, this was the "supreme military lesson of our period in history." [6]

The Cold War Heats Up

In 1945–1947, the airmen's decisive fight for autonomy was set against the beginnings of the cold war. The roots of Soviet–American suspicion went back to the origins of the Bolshevik Revolution and the concomitant U.S. distrust of the revolutionary regime; America's refusal to recognize the Soviet government until 1933; and distrust engendered by wartime relationships and the personal traits of Stalin himself. Prior to the Allied invasion of the European continent, Stalin had berated the Western Allies— and Churchill personally —for continually postponing the massive assault. Then, despite the successful invasion and $9½ billion in lend-lease sent to Russia, the Soviet dictator never lost his conviction that the Allies held off the invasion in the hope that Germany and Russia would exhaust —if not finish off—each other.

Subsequently, negotiations at Potsdam and Yalta frayed the wartime alliance. And when the Soviets established control over Eastern Europe, attempted to overthrow the Iranian government, gain control of the Dardanelles, and rejected the Baruch plan for international atomic control, American hopes for a satisfactory relationship with the Soviets—within and outside the United Nations—were dashed. Also in early 1946 the U.S. government became deeply concerned over the revelation that a Soviet spy ring operating in Canada had obtained American atomic secrets. Further, after the war civil strife had erupted in China. An interim agreement between the Chinese Nationalists and Communists, worked out by General Marshall, broke down in April 1946, and by mid-1947 Chiang Kai-shek's governmental structure was collapsing. Too, in Korea the U.S. and the Soviet Union confronted each other. Japanese troops had been disarmed north of the 38th parallel by the Russians and south of that line by American forces. Neither side was willing to gamble on a unified Korea.

Meanwhile, demobilization continued, and the U.S. military establishment that had triumphed in the war no longer existed. Not only did skilled personnel leave but aircraft and equipment fell into disrepair. Marshall, Secretary of War Henry L. Stimson, and Navy Secretary James V. Forrestal (among others) had warned against a rapid, massive military drawdown, but public and Congressional pressures understandably were too great to be resisted.

In 1947 a number of factors indicated to the airmen a historic confluence of events that

General Curtis E. LeMay while a major general

could catapult the fledgling USAF to a paramount position in the national military establishment: formulation of the Truman Doctrine and the Marshall Plan, the President's feeling that the Soviets must be dealt with firmly—they respected strength and would take advantage of weakness—acceptance in high governmental echelons of the idea of a national commitment to a strategic deterrent (to be formalized with the promulgation of NSC-20 in 1948), and signing of the National Security Act in July 1947. As important to them as was the country's acceptance of the proposition that possession of the atomic bomb and the means of delivery provided the best avenue to deter war, the prerequisite was autonomy, coequal status with the Army and Navy.

The commanding generals of the reorganized Army Air Forces in March 1946: standing, Lt Gen Nathan F. Twining, Maj Gen Donald Wilson, Maj Gen Muir S. Fairchild; seated, Lt Gen John K. Cannon, Gen George C. Kenney, Gen Carl Spaatz, Lt Gen Harold L. George, Lt Gen George E. Stratemeyer, and Maj Gen Elwood R. Quesada.

The movement of foreign affairs gave the airmen no breather. They would have to move rapidly to prevent the Navy from encroaching on the strategic mission. Autonomy was an end and a beginning. Although it climaxed the long struggle for independence begun by Mitchell after the First World War, it also marked the beginning of another battle for resources to build a premier air force during a period of retrenchment. Decisions lay ahead that would determine the shape of the Air Force for years to come.

Symington Becomes Secretary of the Air Force

On January 31, 1946, Stuart Symington was appointed Assistant Secretary of War for Air. He had served as an Army second lieutenant in World War I and after the war earned a degree at Yale and began a successful business career. After World War II President Truman, impressed by his record as a businessman and administrator, offered him a choice of three posts: Assistant Secretary of War for Air, Assistant Secretary of the Navy, or Assistant Secretary of State. He chose the first and aided passage of the Unification Act through Congress. In September 1947 he became the first Secretary of the Air Force. He had already worked with General Spaatz and had come to admire his ability in technical and strategic matters. To Symington, Spaatz was "a wonderful person." [7]

As Secretary of the Air Force, Symington immediately began an intensive campaign for 70 air groups. The role of chief advocate for the new service fit him well. A deep believer in air power, he was convinced it was the *sine qua non* of national security. Knowledgeable in air matters, managerial techniques, and Congressional relations, he immediately took command of the drive to steer Air Force requirements through Congress. "My theory in functioning as a good Secretary," he recalled, "was for them [the military] to make the balls and I'd roll them." As an advocate, Symington was determined "to get as much of the pie as I could for the Air Force." [8] The keys were the 70 groups and the strategic mission.

The First Secretary of Defense

James V. Forrestal, the first Secretary of Defense, firmly believed that foreign relations could not be conducted successfully without strong military forces. After World War II, he was one of the first in the United States to recognize the Soviet threat and call for a stronger military. In early 1947 he observed that "if we are going to have a run for our side in the competition between the Soviet system and our own, we shall have to harness all the talent and brains in this country just as we had to do during the war." [9] Forrestal was a former naval officer and Secretary of the Navy, who had distinguished himself in these roles and who brought to his new position a predominantly navy-oriented staff. There was little question in the minds of leading airmen that Forrestal and his staff would attempt to block them at every turn. Had not the Secretary of Defense for a long time opposed unification and coequal status for the air service? Symington and Spaatz would have to marshal all their resources to compete against what they thought basically a "reactionary" view in the Office of the Secretary of Defense.[10]

Having gained independence and with a clear view of their own objectives, the air leaders debated tactics. "As with any rigorous organization freed from onerous restraint," observed Major General Hugh J. Knerr, Secretary-General of the Air Board, "there is danger of its feeling its oats and lashing out at all obstacles at the very beginning. Such action would be a great mistake, for we simply do not have the muscle on our bones to carry through with such desires." [11] But the Congress and citizenry had to be convinced that

General Dwight D. Eisenhower and government officials visit Perrin Field, Texas, 13 May 1946.

The Honorable Stuart Symington, first Secretary of the Air Force, and General Spaatz, first Chief of Staff, United States Air Force, announce new organization for the Department of the Air Force at a press conference on 1 October 1947.

President Harry S. Truman signs a proclamation designating 1 August 1946 as Air Force Day—39th anniversary of the inception of the Aeronautical Division by the U.S. Army Signal Corps, which was the earliest progenitor of the United States Air Force. Witnesses are General Spaatz and Lieutenant General Eaker, Commander and Deputy Commander of Army Air Forces.

U.S. security depended on the 70-group program. Congressmen were impressed with the record of air power in World War II. Despite postwar pressure for tax relief, they were reluctant—so soon after Pearl Harbor—to risk not voting for adequate defense.

Support came from the War Department Policies and Programs Review Board, which had been meeting since February 1947. In August its final report noted that the nation faced an "undeclared emergency," brought about by the onset of cold war, a "situation other than traditional 'peacetime' but short of an immediate threat of war." As a result of this extraordinary situation, a partial mobilization was required. The report concluded

> in light of the international situation, the traditional concepts of mobilization or conversion from a "peacetime" army to a "wartime" army were not applicable to the existing military establishment nor to the military establishment we will require in the foreseeable future.[12]

The Board's view of the kind of air power required could hardly have been more pleasing to airmen. It noted that the "favorable psychological effect of air power in being and the adverse psychological effect of the lack of air power are factors of much greater importance before the initiation of hostilities than are the state of readiness or the existence of other types of forces." [13]

Nonetheless, despite the evolution of the cold war along with postwar occupation duties, the military could not expect carte blanche when it came to the budget. After all, a global war had just ended, and insistent pressure for stringent economy was therefore not unexpected. Though Congressmen did not want to be charged with neglecting national security, they were determined to scrutinize military appropriations carefully. According to one observer, with the possible exception of 1939, Congressmen "had never explored the connections between military and foreign policies so extensively in the decade and a half after 1932 as they did in 1947." [14]

Militating against pressure to cut the military completely to the bone were the facts that there was no agreement on peace terms for which the war had been waged and that a Congressional consensus held that the U.S.S.R. constituted a real threat. Moreover, there existed substantial backing for a strong air arm, which many Congressmen felt would be decisive in any war and which some saw as an attractive alternative to a large draft to support universal military training (UMT).

The Soviet Threat

Increasingly, Russia's menacing behavior reinforced the air leaders' opinion that the Soviet Union was *the* threat. The airmen viewed the Russians through realistic eyes: they had dealt with them during the war. When building shuttle bases, negotiating in Moscow for an Anglo-American air presence in the Caucasus, or arranging for lend-lease shipments, American air leaders found the Russians extremely difficult. After the war they had felt, like most Americans, that a lasting peace might be achieved, based on an amicable relationship between the two nations. Now that things were breaking down, pessimism and foreboding increased. Among military and government officials, the talk was of grave differences between America and Russia. Ire had mounted over the Soviets' international intrigues; particularly galling was what appeared to be their unethical action within the United States in attempting to undermine U.S. institutions. The Russians did not play by the rules.[15]

The feeling of betrayal was strong. Had the Soviets ever manifested a true spirit of cooperation during the war? It was doubtful. We had gotten along because of necessity. The Russians were uncompromising. Their policy never deviated. For them, the war had not ended. Since world domination was the Communist objective, a general war was probable sometime in the next 10 to 15 years. Though the Soviets probably were not planning to attack immediately, an incident involving a satellite country might well spread to a general conflagration at any time.[16]

Interestingly, the Soviets had mounted a postwar public campaign calling nuclear weapons militarily insignificant. According to the Russians, atomic bombing could not force any government to surrender. Also, this was in line with their view that the Allies' World War II strategic air offensives had accomplished little and that the Japanese surrender had been forced by the Soviet entry into the Far Eastern war. Nevertheless, during the war the U.S.S.R. asked for B–17s and never re-

turned three B–29s that they interned in Siberia in 1944. Several years later, the Russians went into production with a copy of the B–29.

Meanwhile, what of a *Pax Americana?* An article by one U.S. air officer mentioned "the mission of manning, training, and deploying our air strength so that it is capable 'of defending the integrity of the United States . . . and enforcing the United States foreign policy . . . .' " [17] Another airman (this one middle

General Hoyt S. Vandenberg takes oath of office as the second Chief of Staff, United States Air Force, administered by Chief Justice Fred Vinson on 30 April 1948 in the presence of The Honorable James V. Forrestal, Secretary of Defense, General Spaatz, and Secretary Symington.

echelon) thought this force ought to "guarantee" we could win a war quickly, thus enabling the U.S. to "impose" terms. Lieutenant Colonel Frank R. Pancake, on the faculty of the Air Command and Staff School, wrote:

> . . . we have come to the realization that if we are to have peace in our time it will have to be a Pax Americana. There has been further awakening to the fact that the instrument of Pax Americana must be Air Power, just as the instrument of Pax Britannica a century ago was sea power.[18]

There was talk of destroying Soviet industry and decimating her manpower. How? What price would have to be paid? If ever raised, these questions seem never to have been answered.

Men Who Made the Air Force

What was the cast of mind of these airmen? They were idealists as well as practical men, dreamers as well as technologists. Their idealism was rooted essentially in the belief that there existed rational, structured solutions to the difficult problems of the postwar world. To the charge that their view was self-serving, they might have replied that their belief in air power was not recent, that its contribution to the victory over the Axis was substantial, and that their opinion of its postwar role remained an eminently positive one—peace mainly through air strength.

Nor was this vibrant idealism rooted in a parochialism divorced from global concerns. Forgotten in the mists of the past is their record of support for the United Nations organization and their belief that it could succeed and deserved a chance to structure a feasible framework for a peaceful world order. Among the reasons given in Army Air Forces letter 47–32, June 17, 1946, why "an adequate Air Force in being is vital to the future peace and security of the United States" were these:

—To defend the U.S. and its territory with an alert force.
—To support the United Nations with adequate and effective air contingents.
—To preserve the peace until the international organization succeeds.
—To stimulate a continuing program of research and development.
—To further public understanding of air power.
—To avoid the cost of war by insuring peace.

Although a United Nations military force—including air units—was never established, this rationale for air power reflected an interesting strain in the American tradition. Throughout our history some have argued that America has a special world mission or destiny. The air leaders were not only convinced that air machines held the power of decision in modern conflict; they believed that with a strong Air Force there need not be war. With their belief in what air power could accomplish—"winning the peace," deterring war, and making the U.N. credible by an international military force—the airmen were undoubtedly among this nation's premier idealists.

Arnold, Spaatz, Symington, Eaker, Vandenberg, LeMay and all the rest—theirs was "a whole new military philosophy." They were "the revolutionists" of their time, as Colonel Kenneth F. Gantz, USAF (Ret), observed.[19] They lived at a historic crossroads. World War II was unique; it would never be repeated. The period 1945–47 was also singular; it would not recur. The airmen clearly foresaw that the critical mixture of air power was the long-range bomber and the atomic weapon. Were they sure of themselves, their conception of what was required for postwar security? In general, they were, but they also recognized that they would have to contend for missions and money.

Forces in-being would be absolutely necessary, replacing the American peacetime tradi-

tion against a standing military force. But a capacity to deter aggression was required. Peace through deterrence. Peace through strength.

Silver Spring, Maryland

Notes

1. Ltr, Robert A. Lovett, Assistant Secretary of War for Air, to General Carl A. Spaatz, CG, USAFE, March 25, 1945, in General Carl A. Spaatz Collection, Library of Congress, box 21 (file March 1945 personal).
2. General Henry H. Arnold, *Global Mission*, cited in Forrest C. Pogue, *George C. Marshall: Ordeal and Hope, 1939–1942*, vol. II (New York: Viking Press, 1966), p. 85.
3. Quoted in Pogue, vol. II, p. 290.
4. General Carl A. Spaatz, "Strategic Air Power," *Foreign Affairs*, April 1946, p. 385.
5. *Ibid.*, pp. 388–89.
6. *Ibid.*, p. 396.
7. Flora Lewis, "The Education of a Senator," *Atlantic*, December 1971, p. 56.
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9. Warner R. Schilling, Paul Y. Hammond, and Glenn H. Snyder, *Strategy, Politics and Defense Budgets* (New York: Columbia University Press, 1962), p. 142.
10. Air Force Plans Review, June 11, 1953, "A Short Summary of the Development of U.S. Air Power Since the End of World War II," OPD 373 (January 4, 1951), Modern Military Records Center, National Archives.
11. Statement by Major General Hugh J. Knerr, Secretary-General to the Air Board September 9, 1947, in RG 340 (SAF), Air Board Interim Reports and Working Papers, file 4, box 24, Modern Military Records Center, National Archives.
12. Final Report of the War Department Policies and Programs Review Board, Washington, D.C., August 11, 1947, in RG 340 (SAF), Air Board Interim Reports and Working Papers, 1946–1948, file 2, box 22, Modern Military Records Center, National Archives.
13. *Ibid.*
14. Elias Huzar, *The Purse and the Sword: Control of the Army by Congress through Military Appropriations 1933–1950* (Ithaca: Cornell University Press, 1950), p. 171.
15. Presentation by the Army Staff (Chamberlain, Lincoln, Park, Trichel) to the Army Chief of Staff on postwar military establishment, September 5, 1946, in OSAF files, 1j (2), 1949, Defensive and Offensive Plans for Fighting War, Modern Military Records Center, National Archives.
16. Presentation by the Army Staff, September 5, 1946.
17. Colonel Thomas E. Moore, "Employment of Strategic Air Power," *Air University Quarterly Review*, I, 4 (Spring 1948), 61.
18. Lieutenant Colonel Frank R. Pancake, "The Strategic Striking Force," *Air University Quarterly Review*, II, 2 (Fall 1948), 48.
19. Interview, Thomas A. Sturm and Herman S. Wolk with Colonel Kenneth F. Gantz, USAF (Ret), Maxwell Air Force Base, Alabama, February 16, 1972.

Because of the necessity to focus on a very few, the author has not meant to ignore the very many who contributed so much over the decades to the making of the United States Air Force.

DEFENSE DOLLARS FOR DETERRENCE

A Matter of Priorities

LIEUTENANT COLONEL EDWARD STELLINI

Deterrence now means something as a strategic policy only when we are fairly confident that the retaliatory instrument upon which it relies will not be called upon to function at all. Nevertheless, that instrument has to be maintained at a high pitch of efficiency and readiness and constantly improved, which can be done only at high cost to the community and great dedication on the part of the personnel directly involved. In short, we expect the system to be always ready to spring while going permanently unused.[1]

BERNARD BRODIE, 1959

IN the past decade the "retaliatory instrument" of strategic policy that provided a high level of deterrence and security for this nation has somewhat eroded. Whereas in 1960 we spent about 10 percent of the gross national product for defense, the fiscal year 1972 budget represents only 6.8 percent of the GNP, the lowest percentage since 1951. At the same time that we are spending proportionally less on defense, the balance of military power is "shifting from the West to the East, and the world order sustained by dominant American power is fading away."[2]

During this period there have been many changes in the world environment that have altered the free world versus Communist balance of power.

The Communists have made some significant gains. The Soviets have moved their naval squadron into the Mediterranean and

Caribbean seas and the Indian Ocean and have gained footholds in Africa, the Middle East, and North and South America, primarily by providing military and economic aid. The People's Republic of China (PRC) has gained increased stature throughout the world and has replaced the Republic of China (ROC) in the United Nations.

The free world, on the other hand, has managed to avoid World War III and has held the line in Europe, Korea, and the Taiwan Strait. In Southeast Asia and the Middle East, however, the situation is less certain. Although U.S. military forces have not been directly involved in the Middle East, the outcome of the situation there will have a lasting impact on the world balance of power.

In regard to technology and military capability, the Communists have been moving forward at an ever increasing rate with respect to the free world. For example, the Soviets, although they have not landed a man on the moon, have proven that they are not out of the space competition. They have landed a robot vehicle on the moon, developed a fractional orbital bombardment system (FOBS), and orbited a space laboratory around the earth. This latter accomplishment is probably most important from the military standpoint, since the lab's orbit took it over the U.S. 15 times a day. In defense- and space-related research and development funding, the Soviets now are spending more than the U.S.—$16–17 billion compared to $13–14 billion in 1970.[3]

In spite of this potentially ominous trend, a large segment of the American public has been led to believe that peace will prevail if only we would withdraw our forces from foreign soil, if only we would unilaterally disarm, and if only we would divert more federal expenditures to improving the "quality of life."

Our current national security strategy called "realistic deterrence" is designed so that we will be as strong as is necessary to meet our military commitments and protect our national interests. Given the realities of today's world and the fact that our national strategy has always been one form of deterrence or another, the term "realistic deterrence" seems quite appropriate. But where should we put our dwindling defense dollars, and on what defense programs?

In our future planning, it will become more important than ever to relate our analysis and planning of our force structure to our national strategy of deterrence. Thus, this article will try to establish a useful and understandable basis for thinking about this problem. First, we will discuss the nature of deterrence. Then, we will relate deterrence to decisions on defense programs. And finally, we will establish some general criteria for measuring the deterrent capability of defense programs and discuss the relative deterrence of some of these programs.

The Nature of Deterrence

Over the past 18 years, since the advent of the thermonuclear bomb, much thought has been given to the nature of deterrence by national leaders, military planners, and intellectuals in the academic community and in defense research organizations such as the Hudson Institute, the RAND Corporation, and the Institute for Defense Analysis. Numerous books and articles have been written on this subject, which has permeated the thinking of officials at all levels of government, and it has in fact become our national strategy to look upon deterrence as the main goal of our military establishment.

When one begins to consider seriously the nature of deterrence, he quickly realizes that the formulation of a policy for deterrence is fraught with intangibles and uncertainties. The nature of these unknowns is well stated by Dr. Thomas C. Schelling. Writing on assumptions about enemy behavior as a prerequisite for doing analysis on alternative weapon systems, he says that we *must* face uncertainty

and that one of the many sources of uncertainty is the enemy himself. We do not know, for example, the state of the enemy's technology, the cohesiveness of his alliances, or how he might perform in combat. Among these uncertainties, Schelling says, are some that are particularly intriguing because they involve *decisions the enemy is going to make, what he knows or guesses about what we can do*, and the *decisions that we are going to make.*

> There are . . . certain decisions that we and the enemy make in which we are trying to outguess each other and to avoid being outguessed, and trying to adapt to the decisions and choices that each of us has already made and to forecast the choices or decisions that each of us is going to be led to.

Schelling goes on to warn the analyst that because of these uncertainties, he must deal with intangibles. He must deal not only with the enemy's capabilities but also with his expectations—not just regarding future events but also regarding what the enemy expects about what we are expecting of him.

> This may be an uncomfortable kind of analysis to get engaged in, but there is no comfortable alternative. If we make the optimistic assumption that we can guess what the enemy is actually going to do, or that whatever we do he will be caught doing exactly what we want him to do, we shall be resting our whole strategy on the precarious assumption that our enemy is foolish. If we go to the other extreme and make the conservative assumption that whatever we choose to do the enemy will always have outguessed us in advance, we are not only being pessimistic and perhaps missing some opportunities, but we are supposing that the enemy knows what decisions we are going to reach before we have reached them. Either of these two extremes is so unsatisfactory that, whether we enjoy it or not, we have to devise some means for coping with the intangibles.[4]

ingredients of deterrence

After further thinking about the nature of deterrence, one usually realizes that four basic, interrelated ingredients are involved. In general, these are the *capabilities* and *intentions* of the side doing the deterring and the *capabilities* and *intentions* of the other side. For the sake of simplicity, let's assume that the side doing the deterring consists of the free world nations (U.S. and its allies) and the other side is the Communist bloc (U.S.S.R., China, and other Communist countries that are potential aggressors). Further, let's refer to these two sides as Blue and Red, respectively.

Now let's define what we mean by capabilities and intentions:

- *Capabilities* are measured by

—the forces (weapon systems, munitions, manpower, command and control systems, etc.) available in active and reserve status;

—the war-fighting capability inherent in those forces (readiness, firepower, mobility, etc.);

—the degree to which these forces can be made less susceptible to damage or destruction (dispersal, hardness, etc.);

—the geographic deployment of forces with respect to the other side (based forward or in rear areas);

—the logistics base, including length of supply routes, location of war reserve stocks, and the capability to move forces and supplies;

—the research and development effort and state of military technology;

—the industrial capacity and ability to convert to wartime production.

- *Intentions* are conditioned by

—short- and long-term national and international goals and vital interests;

—acceptability by one's own populace of the above goals and interests;

—assessment of the other side's capabilities and intentions with respect to one's own capabilities and intentions;

—expectation of what the other side's short- and long-term goals and interests are;

—expectation of what political and military

actions the other side may take to achieve its goals and the reaction one might expect as a result of one's own actions.

The capabilities described above would be measured in terms of *how many* and *how effective*. If answers can be found to the first question, they certainly are less evident with respect to the second question. The best each side can do is guess on the basis of information made available by overt as well as covert means. Even if one could tally up all the capabilities the other side possesses, he would be hard pressed to find a single common denominator that would be useful. He would have to make all conversions in terms of two potentials: war-fighting capability and deterrence against a first strike; they are not necessarily the same thing.

The intentions of one side with respect to the other side quite obviously defy accurate measurement. Unlike capabilities, intentions cannot be thought of in terms of *how many* and *how effective*. It is the combination of Red's capabilities and intentions and his assessment of Blue's capabilities and intentions that will lead Red to risk an attack on Blue. On the other hand, it is Blue's assessment of Red's capabilities and intentions that will cause Blue to acquire the capability he feels is necessary to deter Red from attacking.

In general, we can say that Red's *intentions* are based on his own capabilities and Blue's capabilities and intentions. Conversely, Blue's *capability* is based on his own intentions and Red's capabilities and intentions. In other words, the situation of Red versus Blue is not symmetric. The goals of the two sides are not the same, and their respective foreign policies have borne this out.

During the past decade there have been many examples that must have imbedded in the minds of the leaders on each side the true nature of the other side's intentions. The invasion of Czechoslovakia in 1968 has certainly convinced the free world that the Soviets are not particularly concerned about world opinion when they feel that the achievement of their goals is at stake. The U.S., on the other hand, has often reacted to world opinion, as in halting the bombing of North Vietnam in March 1968, for example.

In terms of intentions being based on the acceptability of one side's foreign policy to its own citizenry, there is also a lack of symmetry in the deterrence equation.

The fact that we have little to go on in assessing the acceptance by Communist citizens of their government's foreign policies attests to the tight controls placed on these people. Because of censorship and control of the media in Communist nations, we know very little about how much support Communist leaders would have for a pre-emptive attack on the free world. As for the Communist countries' knowledge of our intentions, their information is at least as good as our own. They have only to read our newspapers and watch our television programs. What must they think when they learn that, in a recent nationwide poll, 46 percent of Americans interviewed feel that war is an outmoded way of settling differences between nations, and only 43 percent feel that wars are sometimes necessary to settle differences (with a significant proportion specifying "when our survival is at stake")?[5] Do they interpret this to mean that most of the population of the U.S. would not support our involvement in the defense of Europe?

Now that we have defined the ingredients of deterrence as the interaction of Red's and Blue's capabilities and intentions and have discussed the uncertainty involved in the enemy's intentions, let us now relate deterrence to defense program decision-making.

Deterrence and Dollars for Defense Programs

The overriding concern of the defense decision-maker at all levels—service, Joint Chiefs of Staff (JCS), Office of the Secretary of De-

fense (OSD), National Security Council (NSC), and Congress—in making choices regarding the expenditure of defense dollars should be that each dollar buys the most military worth possible. To make these choices, each decision-maker must have in mind some concept of military worth—some idea of what utility is to be derived from the expenditure of money for defense. More often than not, one person's concept will be different from another's, and often this concept will be colored by the individual's position in the Defense hierarchy. The services have frequently been accused of making decisions on the basis of vested, or parochial, interests. And there have been suspicions that some so-called "purple suiters" in JCS and OSD have drifted toward specific programs or concepts of force employment reflecting personally held philosophies.

Until recent years, decisions regarding defense programs were often made with little doubt that the money would be forthcoming. As a result, some duplication was accepted as desirable, to an extent, and high-risk programs were common. But now the situation has changed, and we can no longer expect to begin *many* new development programs merely because we feel there *may* be some useful fallout from a *few* of them. Now, before development of a new program begins, certain guidelines must be met: (i) there must be a definite, logical need in terms of increasing military worth; (ii) the program must be economically feasible; (iii) it must represent the best possible way of filling the need; and (iv) the program must be timely. Critical questions then include "What do we mean by military worth?" and "How do we translate the concept of military worth into defense programs?"

concept of military worth

To address the question of military worth, we must establish the national policy goals and strategy that our defense establishment must support. For the answer to the policy question, we can go to President Nixon's 1970 foreign policy statement to the Congress:

> The overriding purpose of our strategic posture is political and defensive: to deny other countries the ability to impose their will on the United States and its allies under the weight of strategic military superiority. We must insure that all potential aggressors see unacceptable risks in contemplating a nuclear attack, or nuclear blackmail, or acts which could escalate to strategic nuclear war, such as a Soviet conventional attack in Europe.[6]

In an effort to harmonize "doctrine and capability," the President, with the NSC, has chosen the "1½ war" strategy as the basis for our conventional posture. This means that "adequate peacetime general purpose forces will be maintained for simultaneously meeting a major Communist attack in either Europe or Asia, assisting allies against non-Chinese threats in Asia, and contending with a contingency elsewhere." [7]

Also, in his February 1970 statement to Congress, the President enunciated a policy of peace and what is needed to achieve it. Based on the principles of partnership with friendly nations, strength in relation to the strength of others, and willingness to negotiate with the Communist countries, this policy "underlies and guides our new National Security Strategy of Realistic Deterrence." [8]

In his statement before the House Armed Services Committee on the fiscal year 1972–76 Defense Program and the 1972 Defense budget, Secretary of Defense Melvin R. Laird further elaborated on this strategy:

> The Strategy of Realistic Deterrence seeks to further the goal of peace by deterrence of armed conflict at all levels. I have always tried to be a realist in fulfilling my responsibilities, whether as a Member of Congress or as Secretary of Defense. I believe the strategy we are advancing is realistic for three reasons:
>
> *First,* it is based on a sober and clear view of the multiple threats to peace which exist

in today's world. It neither exaggerates nor underestimates those threats.

Second, it provides for the maintenance of a strong Free World military capability as the essential foundation of deterrence. It rejects the view that peace is well served if our military power is unilaterally weakened.

Third, it takes account of the strategic, fiscal, manpower and political realities while steering a prudent middle course between two policy extremes—world policeman or new isolationism.

The Strategy of Realistic Deterrence is new. Those who would dismiss it as a mere continuation of past policies in new packaging would be quite mistaken. Past policy was responsive and reactive. Our new Strategy is positive and active. Past policy focused on containment and accommodation. The new Strategy emphasizes measured, meaningful involvement and vigorous negotiation from a position of strength.

The Strategy of Realistic Deterrence will provide through sufficient strength and full partnership the indispensable and realistic basis for effective Free World negotiation. Most importantly, it is designed not to manage crises but to prevent wars.[9]

The above declarations give us a clear, though broad, indication of what our national policy and military strategy are. The strategy is to deter nuclear and conventional war and, if deterrence fails, to be prepared to retaliate.

On the basis of policy and strategy, then, the concept of military worth emerges with the dual meaning of maximizing our deterrent posture while at the same time insuring our war-fighting capability, both limited by resource constraints imposed by the budget. Hence, the military worth of securing a military item must be judged according to these two objectives.

translating military worth into defense programs

Unfortunately, the two objectives—deterrence and war-fighting capability—are not necessarily the same in terms of what decisions to make regarding research, development, procurement, and deployment of forces and weapons.

According to Dr. Brodie:

> . . . deterrence philosophies and win-the-war philosophies may diverge in important respects. We can say in advance that they are likely to diverge in terms of priority. The objective of erecting a high degree of deterrence takes a higher priority than the objective of assuring ourselves of a win-the-war capability, if for no other reason than the first is likely to be prerequisite to the second anyway. It is likely also to be a good deal more feasible to attain, especially for a country which has rejected preventive war. We are also likely to feel a divergence between the two philosophies when it comes to considering alternative military policies in terms of comparative degrees of provocativeness. For the sake of deterrence we want usually to choose the less provocative of two security policies, even where it might mean some sacrifice of efficiency. But if we were in fact interested primarily in winning and only secondarily in deterrence, we should be extremely loath to make any such sacrifices.[10]

As an example in this divergence between deterrent and war-fighting capabilities, suppose that we decide, in the budgetary process, to cut expenditures for air munitions to the point that our tactical fighter forces could be supplied with only enough ordnance to fight for a few weeks. If instead we spent the money earmarked for munitions on additional aircraft, we would improve our deterrent capability. Since aircraft parked on the ramp are visible and imply war-fighting capability, deterrence is explicit. In this example we would improve our deterrent capability by degrading our war-fighting capability.

The reverse may also be true. Consider the decision to spend more on design, development, procurement, and peacetime stockpiling of conventional weapons with improved effectiveness, at the expense of aircraft procurement. The fact that we could have weapons

in the theater stockpiles whose accuracy and destructiveness improved our overall war-fighting capability would probably have little if any effect on any decision by the Warsaw Pact to attack NATO. The implied value of increased weapons effectiveness is in the reduced sortie effort and aircraft losses that might result from the use of improved weapons. In this sense, we would consider an improved weapon stockpile to be an implied, rather than a visible, deterrent.

In his concept of military worth, the decision-maker must decide which is a more appropriate goal—maximizing deterrent capability or maximizing war-fighting capability. In most decisions regarding choice of forces or weapon systems, we would probably find that both, or all, competing programs will add some measure of improvement to both capabilities.

In view of the fact that our primary military strategy *is* deterrence, it is reasonable to expect that when alternative programs (forces or weapon systems) are being considered, the decision should be in favor of the program that will provide the most deterrence while hopefully improving or at least not degrading our war-fighting capability.

But how does the decision-maker know which program provides more deterrence than another competing for the same dollars? Logically, he should have some basis for making his decision, some criteria against which to evaluate alternatives.

IN THE REMAINDER of this article, we will propose a general framework for assisting in making defense decisions in terms of achieving improved deterrence capabilities. As an illustrative application of these criteria, we will then discuss the relative deterrent capability of two programs—fighter wings and aircraft carriers—in terms of a European scenario.

The framework is not intended to provide the answer to all questions regarding decisions of choice. Instead, it is proposed only as a basic set of criteria for illuminating the attributes of a specific program or complementary programs (e.g., forces and ordnance stockpiles) that improve deterrent capability.

Obviously, there are many other factors involved in making defense decisions which the stated set of criteria cannot address. For instance, most decisions on defense programs are constrained by the inertia of previous years' decisions. Consequently, most changes in force structure are made only at the margin, and the defense posture is changed only on an incremental (year-to-year) basis. Furthermore, many decisions are made on the basis of political or economic considerations (e.g., closing bases and letting contracts).

Criteria for Deterrence

Before discussing criteria, we should have a clear understanding of what we are evaluating against the criteria. So far we have referred to making decisions on programs—forces and weapon systems. By "forces" we mean major mission forces such as tactical fighter wings, carrier task forces, and armored divisions. By "weapon systems" we mean items such as tactical fighters, aircraft carriers, and tanks.

Each of the above programs involves many *subelements* which are acquired in some ratio to the program through the expenditure of defense dollars. For example, for each tactical fighter wing a specific number of each type of ordnance must be bought and stockpiled. There must also be some quantity of spare fuel pumps, tires, etc., and some ratio of aircrews assigned. The actual amount of each of these *subelements* is based on past experience and projected activity rates.

The *mix of weapon systems* in a force is generally standardized; however, the *optimum mix of various forces* in a theater has been the subject of numerous service and joint studies. For example, the number of wings,

divisions, and naval task forces required to implement contingency plans will vary from one theater to another and from one type of operation to another within a theater. A vast amount of analysis and judgment is involved and accomplished at all applicable levels, from theater level through the service, JCS, and OSD levels. In the strategic area, the number of weapon systems and forces necessary to meet the damage limiting and assured destruction criteria and the interservice combination of these are generally agreed upon. In the tactical area, however, because of the uncertainty and complexity of theater conflict situations, the force mix problem is vastly more complicated, especially when defense dollars are in short supply. There is often much heated debate among the services, between the services and OSD, and in Congress. For this reason it is imperative that decisions on the choice of programs be made wisely and in such a manner that our primary military strategy—deterrence—is achieved at the lowest cost.

the criteria

Now let us consider our proposed set of criteria for evaluating the deterrent capability of a program—a force or a single weapon system. Figure 1 shows four separate criteria against which the attributes of the Blue forces may be evaluated. Each of the criteria is a continuous scale on which the top attribute describes the most deterrence and the bottom describes the least. One should keep in mind that the attributes shown have meaning only in terms of Red's assessment of the proposed program's military worth. Consequently, the adjectives "significant," "extensive," "minimal," etc., are subjective judgments which we think the Red strategist would make with respect to Blue's force posture and capabilities vis-à-vis his own. The term "unknown" means that Red intelligence is unable to satisfactorily make either a qualitative or a quantitative estimate. On this point it should be noted that opposing forces often take strong measures to keep information from each other, especially concerning deficiencies in capability or readiness. On the other hand, each side also, through design, publicizes or "leaks" information to the other side for its deterrent effect. For example, in the last five years the Soviet armed forces have carried out four major military exercises. Two of these exercises (Dnieper in 1967 and Dvina in 1969) involved land forces, and two others (Sever in 1968 and Okeana in 1970) involved sea forces. These exercises were well publicized in the Soviet press, television, and theaters.[11] We learned something about Soviet operations from these exercises, and we also became aware of their increasing capabilities.

The main object of the set of criteria shown in Figure 1 is to provide some visibility on the attributes of various programs that improve their deterrent capability. Since most competing programs are not perfect substitutes, it may not be appropriate to make direct comparisons using the criteria shown. In some instances, however, two programs competing for the same dollars may be considered in terms of these criteria for the purpose of making judgments as to which program is inherently superior, or inferior, in deterrent capability.

If one agrees that in spending limited funds "first things should come first," he might use these criteria to help decide what "things" should be considered "first." For example, in our discussion of deterrence versus war-fighting capability, we looked at two programs that are complementary and that also compete for the same dollars. Ideally, we would want to strike the proper balance between forces and ordnance; but an acceptable definition of what we mean by "proper" is not easy to come by. It has been suggested, however, that we could reduce the present fighter force, put the dollar savings into improved ordnance, and at the same time have the proper balance and increase our war-fighting

Criterion 1	*Criterion 2*	*Criterion 3*	*Criterion 4*
Quantitative Measure	**Effectiveness Measure**	**Acquisition Measure**	**Vulnerability Measure**
Potential to mass forces and replenish losses	Potential to bring firepower to bear on Red forces	Ability to acquire with available sensors	Ability to destroy with available forces and weapons
Quantity of items is known and considered significantly large. Quantity of items is unknown but is estimated to be significantly large. Quantity of items is unknown but is estimated to be insignificant. Quantity of items is known and is considered insignificant.	Direct threat (significant). Within striking range, high firepower potential, high state of readiness, and high degree of mobility and flexibility. Direct threat (insignificant). Within striking range, low firepower potential, low state of readiness, and/or limited mobility or flexibility. Nature of threat is unknown. Unknown location, firepower potential, and/or state of readiness. Indirect threat. Reaction/closure time extensive due to distance or low firepower potential.	Acquisition problem is severe. Small-size, highly mobile, well-concealed, and well-dispersed deployment. Acquisition problem is moderate. One or more of the following: —Large size —Fixed or slow-moving —Difficult to conceal —Concentrated deployment. Acquisition problem is minimal. All of the following: —Large size —Fixed or slow-moving —Difficult to conceal —Concentrated deployment.	Highly invulnerable. Requires extensive force effort to destroy a significant quantity of targets. Vulnerability is unknown. Insufficient intelligence available to determine force effort required to destroy targets. Highly vulnerable. Requires minimal force effort to destroy a significant quantity of these targets.

Figure 1. Criteria for evaluating deterrent capability of Blue forces or weapon systems

potential. A reduced force means decreased "visible" deterrence as well as decreased mobility and flexibility of firepower; and while an improved ordnance stockpile may provide more target-kill potential, it only "implies" added deterrent capability. The point is that a "reduced force level" operates *against* deterrence to a greater degree than an "improved ordnance stockpile" operates *for* deterrence.

deterring the Warsaw Pact: where to put our money

To understand the *illustrative application* of the proposed criteria, let's compare two programs that overlap to a certain extent and therefore compete for some of the same general purpose forces dollars. These programs are tactical fighter wings and aircraft carriers.

Over the past few years, numerous studies within the Air Force, Navy, and OSD have attempted to solve the land-based versus sea-based tactical air problem, i.e., to determine which is the more cost-effective to operate, an Air Force fighter wing or a carrier task force. These studies generally imply that the war-fighting effectiveness of both is about the same in a given conflict theater. Consequently, the question to be decided has been which force

would cost less. The fact that these two forces are not entirely comparable, plus the lack of agreement on what subsystems and support should be included in the cost of each force, has resulted in a wide range of cost ratios. For example, Air Force studies showed sea-based tactical aviation to be 4 to 7 times as costly as land-based; a Navy study showed costs to be about even; and an OSD-requested USN/USAF ad hoc study showed that for the period 1962–69 land-based tactical air had cost, on the average, 1.2 times as much per wing as sea-based.[12]

We will not be so heroic as to try to develop a convincing argument in favor of land-based forces on the basis of costs, because our files are full of studies that have traveled that ground. Nor will we try to "prove conclusively" that we should buy more fighter wings at the expense of carriers. Instead, we will try to point up one aspect of the problem which may have been neglected in the many analyses on this subject—i.e., the relative deterrent capability inherent in fighter wings and carriers.

Since these programs relate for the most part to general purpose forces, let's begin with the President's Foreign Policy report to Congress in February 1971, as it pertains to theater conventional forces for deterrence.

> The primary role of our general purpose forces is to deter and, if necessary, cope with external aggression. If aggression occurs, the use of our forces will be determined by our interests, the needs of our allies, and their defense capabilities, which we are seeking to improve. It is clear, however, that the Soviet Union's strong and balanced conventional capability enables it to project its military power to areas heretofore beyond its reach. This requires us to maintain balanced and mobile ground, sea, and air forces capable of meeting challenges to our worldwide interests.[13]

Elaborating on the President's remarks, Secretary Laird made the following statement before the House Armed Services Committee:

> We plan our general purpose forces in peacetime to be adequate for simultaneously meeting together with our allies a major Communist attack in either Europe or Asia, assisting allies against non-Chinese threats in Asia, and contending with a minor contingency elsewhere. In planning our capabilities, we maintain the full range of air, sea, and ground forces needed to meet our planning goals.
>
> *The situation which is most demanding, of course, is in NATO.* Our general purpose theater force requirements are largely determined by planning for U.S. and allied conventional forces, which, *after a period of warning and of mobilization* will be able to defend NATO Europe against a conventional Warsaw Pact attack. We and our allies also must insure our ability to sustain our deployed forces and those of our allies through *control of the air and sea lanes.* (Emphasis added.)[14]

Speaking on the deployment capabilities of fiscal year 1972 tactical air power, Secretary Laird noted that in the European area some 600 U.S. fighter and attack aircraft are currently deployed and that this level could be increased substantially as reinforcements, including both active and reserve aircraft, arrived from the U.S. The total aircraft available "would include deployments of an aircraft carrier and their tactical aircraft for the primary task of protecting the essential sea lines of communication and for the support of land forces if required." [15]

We do not know if the Warsaw Pact will ever attack in NATO Europe, nor do we know whether our present deployment of forces has served as a credible deterrent and, if it has, to what degree. If it has served to some degree, we do not know what our deterrent capability will be in the future vis-à-vis Red capability and intentions. Of equal importance, we do not know if we will have strategic or only tactical warning if deterrence fails and the Pact does attack. Although our planning assumption is that there will be a period of warning and mobilization, we must not forget

that in 1968 Czechoslovakia was invaded by 20 East bloc divisions that were supposedly on large-scale maneuvers.[16]

When defense program decisions are being made, some questions must be considered explicitly: • Are the forces and logistics support presently in place sufficient to counter a no-notice attack should deterrence fail? • Even more important, are in-place forces and support sufficient to provide an effective war-fighting capability after an intensive and massive surprise attack? • If the Pact does in fact use its highly mobile land forces and large air forces to try for extensive territorial gains in the initial days of conflict, how much can we depend on forces we plan to deploy after D-day and supplies we plan to sealift?

An assumption of strategic warning would dictate the need for fewer forces and support deployed forward and greater reliance on the deployment of forces and on air and sealift of support. On the other hand, an assumption of only tactical warning would require sufficient forces and support in place (i) to be able to mass enough force to blunt the enemy attack and (ii) to have adequate residual force and support to compensate for losses accruing from a potential massive air attack on NATO bases and logistics storage sites.

Deploying greater forces and support forward would require increased expenditures on programs such as tactical fighter wings and air munitions and on measures that can be taken to protect these assets, e.g., sheltering and dispersing aircraft, hardening and dispersing munitions storage, and increasing air base defenses.

It is apparent from Figure 1 that by putting our money into the kinds of programs mentioned we could move up the scale for all four criteria. By adding a fighter wing to NATO, we move to a higher position on criterion 1, and after buying more ordnance we move higher on criterion 2, i.e., greater flexibility and increased firepower potential within striking range. By sheltering and dispersing aircraft, by hardening and dispersing ordnance stockpiles, and by increasing air base defenses, we move up on criteria 3 and 4.

Now let's consider the potential for increasing our deterrent capability by putting our money instead in an additional carrier (refer again to Figure 1). Playing the role of Red strategist, we would have to relate an additional aircraft carrier to the lower portion of at least two criterion scales, i.e., indirect threat (due to reaction/closure time) and minimal acquisition problem (as has been demonstrated by Soviet flyover of our carriers). Additional expenditures of money can do little to improve these factors. However, additional expenditures on carrier defenses could decrease its vulnerability, and we could move up on criterion 4.

But fighter wings and aircraft carriers are not like items, and additional factors must be considered. The primary purpose of the fighter wing is to deter war by providing a visible show of force and, if deterrence fails, to respond to an immediate threat. The *carrier's primary purpose* is to maintain the necessary flow of supplies across exposed sea lanes so that NATO can survive long enough to be reinforced; or, put another way, to insure that convoys can deliver the material needed for an initial defense of Europe. According to Admiral Elmo Zumwalt, Chief of Naval Operations, the threat to our sea lanes is the country's "most serious threat," and the *next priority for the carrier* is to project air power ashore, in a subsidiary role in Europe.[17]

Whether the aircraft carrier—prepared to protect our convoys in the event of a war in Europe—can also be considered a credible deterrent to war, and whether the threat to our sea lanes is in fact the country's "most serious threat," are questions for each decision-maker to decide for himself.

If we assume that a Pact attack would come after "a period of warning and of mobilization," we would have some amount of time (depending on the period of warning) to

deploy forces and begin sealift of logistics support. If hostilities should begin after adequate forces are deployed (adequate in the sense that we have sufficient fighters in theater to conduct a meaningful counterair campaign, which studies conducted by the Air Staff indicate is the first order of business for our tactical air forces), we are still faced with the possibility of losing a large portion of our air forces and ordnance stockpiles as a result of attacks on our airfields (especially if we have an inadequate shelter level) and munition storage sites. Furthermore, if the attack is conducted in blitzkrieg fashion, there is some doubt whether our sealift pipeline (being protected by carriers on the high seas) would be filled before the conflict either escalated to tactical nuclear warfare or ended with an unfavorable political settlement. This is to say that if the war is extended, Pact submarine strength would indeed be a menace to sealift. However, if the war is short, then naval action is unlikely to be dominant; the outcome will be decided in the air and on land.

As we said earlier, we do not know if our present force deployment is a credible deterrent to a Pact attack on NATO and, if it is not, whether the Pact would attack *after* some period of warning. Only the Pact strategists and planners know the answers to these questions. Furthermore, if deterrence fails, we do not know, nor does the Pact, whether the war will be extended or short.

Since our national military strategy is to deter war along the entire spectrum of conflict, we should put our defense dollars, which are getting harder and harder to come by, into those programs that will buy us the most deterrence. If in the process we buy more war-fighting capability (or more war-sustaining capability), so much the better.

Of course, we need both tactical fighter wings and aircraft carriers—the question is one of "balanced forces" in terms of meeting our national strategy. If we feel that our deterrent strategy is best served by convincing the enemy that our sea lanes are well protected, then we should spend more dollars on carriers and carrier support. If, on the other hand, we are convinced that a larger and more lethal, hardened, and dispersed fighter force would provide a more credible and visible deterrent, then more dollars should go toward achieving that goal.

The addition to our land-based air forces in theater would certainly provide a more credible and visible deterrent than the addition of sea-based air forces on the high seas, out of range of the likely area of conflict. Air forces based in Europe deter best because they deter the blitzkrieg, against which carrier-based air forces offer little deterrence. When we consider the size of the Red air force and past Red policy (Czechoslovakia 1968), we cannot discount the blitzkrieg.

The point is that any lack of capability on the part of the deterrent force that operates to lessen the risks to the potential aggressor tends to degrade the credibility of the deterrent force in the mind of the aggressor and operates *against* deterrence. Conversely, any capability that increases the risk to the aggressor increases the credibility of the deterrent force and operates *for* deterrence.

IN THIS ARTICLE we have discussed what we call the ingredients of deterrence—the capabilities and intentions of blocs of nations whose political ideologies conflict. We have tried to show that the concept of military worth should mean maximizing our deterrent posture while insuring our war-fighting capability, and that these objectives are not necessarily the same. We then proposed some criteria against which decisions regarding alternative defense programs might be evaluated. And finally, we discussed the relative deterrent capability of tactical fighter wings and aircraft carriers in a European scenario. In this example we posed some serious questions regarding the warning time that might be

available in the event deterrence failed and the possible conflict duration.

In conclusion, we believe that balanced forces are necessary to meet our national strategy. And when trying to decide where to put our defense dollars, we must constantly remind ourselves that our strategy is to deter war the best we can—by buying forces and weapon systems that provide the highest level of explicit deterrence.

Hq United States Air Force

Notes

1. Bernard Brodie, *Strategy in the Missile Age* (Princeton, New Jersey: Princeton University Press, 1959), pp. 272–73.
2. See *The Shifting Balance of Military Power*, a "Supplemental Statement to Report of Blue Ribbon Defense Panel," submitted to the President and the Secretary of Defense (Washington, D.C.: Government Printing Office, 1970), pp. 7–8.
3. James D. Hessman, "Countdown to Crises," *Armed Forces Journal*, July 4, 1970, p. 18.
4. E. S. Quade, ed., *Analysis for Military Decisions* (Chicago, Illinois: Rand McNally and Co., 1966), pp. 199–200.
5. George Gallup, "War Seen Outmoded by 43% [*sic*] of U.S. Public," *Washington Post*, July 25, 1971, p. A4.
6. U.S. President, *U.S. Foreign Policy for the 1970's, A New Strategy for Peace*, a report to the Congress (Washington, D.C.: Government Printing Office, February 1970), p. 122.
7. *Ibid.*, p. 129.
8. Statement of Secretary of Defense Melvin R. Laird before the House Armed Services Committee on the FY 1972–1976 Defense Program and the 1972 Defense Budget, *Toward a National Security Strategy of Realistic Deterrence* (Washington, D.C.: Government Printing Office, March 9, 1971), p. 11. Hereafter referred to as *Laird Report*.
9. *Ibid.*, pp. 1–2.
10. Brodie, pp. 278–79.
11. "Soviet Exercises: Publicity Plays a Part," *Armed Forces Journal*, May 3, 1971, pp. 20–21.
12. "CVAN-70: 'Don't Assume It's in the Bag,'" *Armed Forces Journal*, July 4, 1970, p. 7.
13. U.S. President, *U.S. Foreign Policy for the 1970's, Building for Peace*, a report to the Congress (Washington, D.C.: Government Printing Office, February 1971), p. 181.
14. *Laird Report*, pp. 76–77.
15. *Ibid.*, p. 83.
16. Hessman, p. 18.
17. The *Journal* Staff, "CNO Zumwalt Presses to Retain 15 Carriers," *Armed Forces Journal*, December 7, 1970, pp. 26–27.

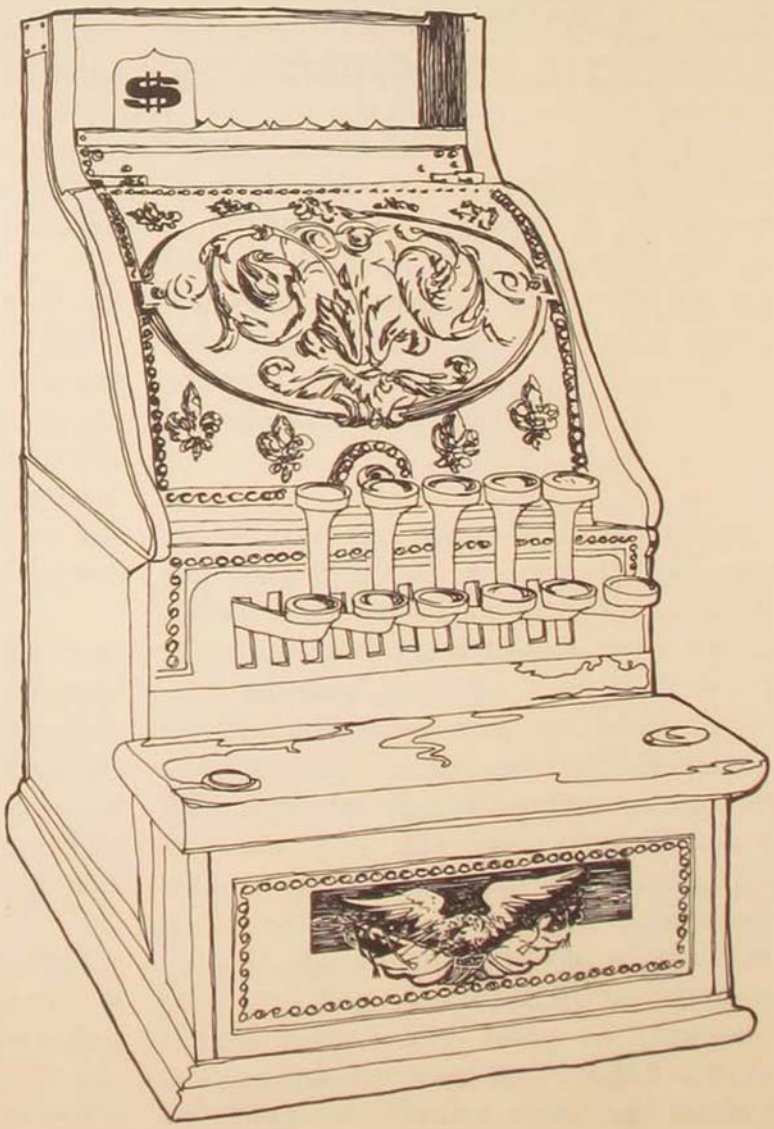
"SHOULD COST"

A Multimillion-Dollar Savings

MAJOR DAVID N. BURT

SINCE the end of World War II, the defense industry has experienced significant increases in both technological and organizational complexity. Defense systems costs have increased manyfold. The government's responsibility to assess and analyze these costs accurately has increased at a commensurate rate. Management reviews of contractors were begun in the early 1960s to supplement the traditional cost analysis performed by the government. Despite these efforts, traditional analysis sometimes fails to supply the scope and detail required to evaluate a contractor's proposal accurately.

The "Should Cost" approach is one attempt to supply the required scope and detail. Should Cost is a procedure used to determine what



a system *ought to cost,* assuming reasonably attainable economy and efficiency in the contractor's operation. It differs from traditional pricing methods in two ways: the depth of analysis and the purposeful challenging of inefficiencies in the contractor's operation. Its objective is to provide the government with a more supportable negotiation position. But the benefits of the method extend beyond this. In addition to the short-term benefit of better pricing of current requirements, there is the long-term benefit of more efficient contractor performance on future requirements.

The Should Cost review is performed by a team of specialists who conduct a comprehensive, detailed analysis at the contractor's facility. The review may take as long as six months, and its scope presents cost and staffing problems that limit its use to high-dollar, major programs. However, some of the techniques of Should Cost can be used to strengthen traditional analysis methods. This use, coupled with Should Cost effectiveness in analyzing major programs, provides a stronger base for detailed analysis over the cost evaluation spectrum.

background

The principles underlying Should Cost were used by the Air Force in the early 1960s, but Should Cost as we know it today did not emerge until 1967. At that time a forty-man team spent five months reviewing cost growth under a large letter contract for jet engines. The team approached its objective by determining what the engine "should cost" if produced under optimal conditions. This effort resulted in estimated savings of approximately $100 million and stimulated interest by both the Department of Defense and the General Accounting Office. These organizations are currently planning or conducting Should Cost analyses, and Congress is watching closely.

In the following pages I shall briefly examine the evolution of the highly technical pricing environment from which the Should Cost method sprang. A brief discussion of traditional pricing methods is included to provide a basis for comparison. The Should Cost philosophy, objective, and technique are discussed, and several of the Should Cost efforts to date are reviewed. Finally, the advantages and limitations of the method are examined, and conclusions are drawn as to the method's effectiveness.

Insight into this "new" pricing method begins with an understanding of the environment out of which it evolved. Innovation and technological advancement since World War II have been great, by any standard. The defense industry has been a leader in this rapidly changing environment. Pushed by government demands for increasingly more sophisticated defense systems, the defense industry has developed a highly complex and intricate technology. New defense systems have ceased to be simple improvements to existing ones. They are new in concept, design, and function.

This increasing complexity has not been limited to defense systems alone. Technology has forced intricate tasks to be broken down into smaller and smaller subtasks that are more capable of being managed. The completed elements are then assembled into an integrated whole. The impact of technology and the subsequent specialization within the defense industry have resulted in a longer time span from project beginning to project end, increased capital requirements, less flexibility in commitment of time and money, more requirements for specialized manpower, more complex business organizations, and more emphasis on planning. It is reasonable to expect continued changes in these areas as technological growth continues to accelerate.

Increases in technological and organizational complexity have resulted in significant increases in the costs of government procurements. This in turn has placed an increasingly heavier burden on the government to assess and analyze costs accurately when procuring new defense systems. The government's meth-

ods of cost evaluation must be capable of intricacy in analysis that is parallel to the intricacy of the system being analyzed.

evolution

In 1960 the Air Force recognized the need for more detailed analysis of a contractor's organization and management. Industrial Management Surveys—later called Program Management Evaluations—were introduced. These reviews provided a detailed examination of the contractor's organization and management of engineering, contract management, production and quality control, logistics, and materiel management. Contractors were selected for review based on their efforts under current and future Air Force programs, dollar backlog of defense contracts, and history of performance. These surveys, usually performed by a staff of from ten to fifteen individuals, took about three weeks and were directed toward the contractor's management of a program or contract. The contractor was encouraged to correct any deficiencies noted, and the Air Force maintained a follow-up system until the deficiencies were corrected. These reviews were intended to be an evaluation of the contractor's management, with the understanding that the results were to be treated confidentially and that the data were not intended for use in future negotiations.

To date, the bulk of government analysis in procurement has been limited to cost analysis of a contractor's proposal. This is the traditional government preaward review. The Armed Services Procurement Regulation (ASPR) defines cost analysis as follows:

> Cost analysis is the review and evaluation of a contractor's cost or pricing data . . . and of the judgemental factors applied in projecting from the data to the estimated costs, in order to form an opinion on the degree to which the contractor's proposed costs represent what performance of the contract should cost, assuming reasonable economy and efficiency. It includes the appropriate verification of cost data, the evaluation of specific elements of costs . . ., and the projection of these data to determine the effect on prices of such factors as:
>
> (i) the necessity for certain costs,
> (ii) the reasonableness of amounts estimated for the necessary costs,
> (iii) allowances for contingencies,
> (iv) the basis used for allocation of overhead costs, and
> (v) the appropriateness of allocations of particular overhead costs to the proposed contract.[1]

The ASPR then goes on to say that proposed costs should be compared with previous costs for similar items and with current cost estimates from other sources. It also emphasizes the importance of forecasting future cost trends from historical cost experience.

The traditional cost analysis is generally performed by a number of field pricing teams. These teams include the pricing analysts, responsible for developing a field pricing objective; the technical specialists, responsible for technical review of the contractor's proposal (engineering, quality control, production, etc.); and the Defense Contract Audit Agency, responsible for analyzing the contractor's accounting records to determine the acceptability of incurred or estimated costs, with emphasis on labor and overhead rates. The effectiveness of the traditional method depends on close cooperation and communication between these teams.

This traditional approach is conceptually sound. Unfortunately, the method has not proved fully effective for several reasons: the time allowed for the pricing review may not always be sufficient, the scope of a pricing review is often limited, and coordination between the procuring contracting officer and the field teams is not always effective.

an alternative approach

A clear understanding of the Should Cost approach begins with a definition. Should Cost

is a concept used to determine what a defense system *ought to cost*, assuming reasonable economy and efficiency in the contractor's operation. Raymond E. Harris, Chief of Pricing, Procurement Policy Division, Army Materiel Command, offers a more thorough definition:

> "Should Cost" describes a coordinated analysis of a contractor's business management, cost estimating, and production engineering procedures in connection with the evaluation of a major non-competitive proposal. This approach assumes that the inefficiencies associated with non-competitive procurement may be identified through the coordinated effort of a government cost estimating, business management and production engineering evaluation team, and that the cost impact of these inefficiencies may be eliminated during contract negotiations.[2]

The philosophy of Should Cost has been well expressed in a government letter printed in *The Federal Accountant*:

> The Should Cost method of pricing must not be construed as an attempt on the part of the Government to tell a contractor how to conduct his operation. If, for example, a contractor wishes to conduct a potentially inefficient operation, with excess indirect employees, poor estimating, labor that consistently fails to meet standards, lack of proper competitive subcontracting, abnormal spoilage and rework, etc., that is his business. It is the Government's responsibility, however, not to pay taxpayers' money for demonstrable inefficiencies in the manufacturing process of a sole-source supplier regardless of the quality of the ultimate product.[3]

The ultimate objective of the Should Cost approach is to provide the government with a more supportable negotiation position. This goal is accomplished by providing the government with an in-depth analysis and by challenging inefficiencies in the contractor's operation. The actual methodology consists of a five-phase program: Planning, Data Acquisition, Analysis, Report, and Negotiation.

The Planning Phase begins with the identification of a candidate for a review. The general criteria for selection are found in the following questions: (1) Is the program a major, ongoing program of high dollar value? (2) Does the contractor have substantial amounts of negotiated government sales? (3) Has the contractor been operating in a sole-source atmosphere or another environment that is not conducive to effective cost control? (4) Has there been substantial cost growth associated with the item being procured? (5) Will there be a significant number of follow-on production contracts? (6) Does the planned award date allow adequate time for the review? (7) And, finally, is there reasonable assumption on the part of the project manager that the type of effort that goes into a major Should Cost analysis will pay off?

Selecting the team members is the next step in the Planning Phase. The size of the team will vary with the magnitude of the effort. Ideally, the team will have ten to thirty highly capable members. Great care must be taken during selection to insure that the proper balance of talent is obtained. The skills required generally include those of industrial engineers, design engineers, production specialists, statisticians, accountants, cost analysts, management analysts, and any additional specialists required to analyze the company's product line (e.g., nuclear engineers, aerospace engineers, computer specialists). The Planning Phase concludes after the work has been apportioned to the team members and a master schedule has been established.

Phase two, the Data Acquisition Phase, takes from one to four months. This is the actual on-site investigation of the contractor's operation. Before the investigation begins, however, the contractor must be briefed on the goals of the analysis, to insure his cooperation in the team's gaining access to required information. Then every aspect of the contractor's operation is reviewed by the appropriate team members, including plant layout,

machine capacity and utilization, production scheduling and control, labor standards, make or buy policy, industrial engineering standards, quality control, general and administrative expenses, cost estimating, tooling labor, production engineering, design engineering, engineering overhead, manufacturing overhead, and any other areas that are vital to efficient operations. These evaluations must be completely coordinated to ensure that all pertinent facts are gathered without duplication of effort.

Analysis, the third phase, overlaps both the preceding and following phases. During this period the team members discuss and integrate their findings.

The Report Phase is the realization of the team's efforts. Team reports may be either combined or individually incorporated into the price negotiation memorandum. The reports will be the basis for the government's position during negotiations. The reports consist of five parts: Introduction, Plan Used in Study, Summary Report, Detailed Report, and Lessons Learned. The third and fourth parts comprise the heart of the reports. The Summary Report contains suggested primary and alternative negotiation positions, findings, and recommendations. The Detailed Report contains the supportive data to back up the information in the Summary Report.

The Negotiation Phase is the finale of the effort. The team reports provide a sound basis for negotiations. The reports contain the basis for challenging contractor methods as well as contractor costs. During negotiations the government is concerned with areas such as more efficient plant layout, better inspection and sampling techniques, and improved material purchasing practices, as well as the actual costs proposed for these elements. Individual team members are utilized during these negotiations to provide expertise in the area which they have evaluated.

If the Should Cost method is successful, the benefits are twofold: the short-term benefit of better pricing on the current requirement and the long-term benefit of more efficient contractor performance on future requirements.

As a measure of the method's success or effectiveness, let us briefly examine several of the Should Cost studies conducted to date.

• The first study was conducted by the Navy in late 1967. A forty-member team spent five months at Pratt & Whitney analyzing costs on the TF-30 engine for the F-111 aircraft. The team performed an extensive analysis and found the following weaknesses: (1) lack of adequate labor standards, (2) high employee turnover, (3) inefficient plant layout, (4) idle machine capacity, (5) noncompetitive procurement practices, (6) excessive spoilage, (7) poor production scheduling and control, and (8) improper costs incurred in the overhead and general and administrative expense accounts. After heated negotiations, a $100 million reduction was negotiated in the $1.2 billion contract, and the ground work was laid for long-range management improvements at Pratt & Whitney.

• The next use of the concept was in 1970 when the Army received a $90 million proposal from the Raytheon Company for 600 Hawk missiles. The Army sent a thirty-man team to Raytheon to perform a Should Cost analysis. In addition to the government specialists, the Army retained two civilian consultants. The results: a price reduction of $17 million plus a possible additional savings of $14 million over the next two years if suggested management improvements were carried out.[4]

• The Army's second effort in 1970, at Bell Helicopter, was on a smaller scale. A twenty-man team spent twenty weeks reviewing a $60 million contract. The review resulted in a $6 million cost reduction. The Army attributed a significant portion of the reduction to the Should Cost effort.[5]

• During the past year the Air Force has completed two major Should Cost analy-

ses at General Electric–Valley Forge and Boeing–Seattle. These two efforts have had a significantly favorable impact on expenditures under the two contracts. The long-run potential savings are even greater. It is anticipated that improved operating procedures resulting from the two Should Cost reviews will benefit the Air Force on future work at these two locations.

observations

At this point it appears reasonable to ask if there is a difference in *concept* between Should Cost and the traditional method of developing a negotiating position. The traditional method, through the various contract administration agencies and activities, has always been interested in the full spectrum of contractor operations. So is Should Cost. The difference is in the *implementation*. Should Cost takes an integrated team approach to a comprehensive evaluation. Rather than having several small field pricing teams working independently and then submitting their findings to another team for consolidation, Should Cost gathers all the specialists into one coordinated team that integrates its own findings. Rather than performing cost analyses and management analyses separately, Should Cost performs them simultaneously. Rather than having one government specialist to evaluate several major areas in the contractor's operation, Should Cost provides for a highly qualified specialist in each area.

The primary advantages in the Should Cost approach are found within the framework of this different methodology. Performance of the cost and management analyses simultaneously makes the impact of the contractor's management on the program costs more readily apparent. The use of highly qualified specialists enables a more detailed review of specific areas of the contractor's operation. This increases our ability to locate problem areas in the operation. The coordinated team effort enables better integration of the detailed information gathered by the specialists. The end result is a detailed, comprehensive negotiation tool that should not only improve contract pricing but also provide leverage to encourage the contractor to correct deficiencies noted in his operation.

Methodology is also the source of the major limitations of Should Cost. The first problem encountered is in staffing. Initially, a number of qualified specialists must be located. This in itself is a difficult task. Since the individuals selected are highly competent, they will be performing important functions in their regular job. Who, then, replaces these men while they are serving on an ad hoc Should Cost team for several weeks?

The most obvious limitation is cost. Deploying a team of high-level, skilled specialists to a contractor's plant for several weeks can cost a great deal of money. Added to that are the implicit costs of finding and training personnel to replace the specialists selected for the team, the lower productivity of the replacements, and the specialists' reduced productivity upon returning to the job. These cost and staffing considerations force the price so high as to restrict the use of Should Cost analysis to major high dollar procurements.

The Should Cost method was born out of a need for detail in analysis of complex major defense systems which the traditional method failed to supply. The Should Cost method has all the capabilities of traditional analysis plus several unique advantages of its own. Despite these advantages, the method is not the complete answer to better procurement. A detailed and comprehensive analysis is also needed in many programs of a magnitude too small to warrant a Should Cost review. Such an analysis may also be appropriate for any procurement where full and adequate competition is absent. Perhaps one answer is to apply, to a lesser degree, some of the techniques of the Should Cost concept to traditional pricing methods. Audit and administra-

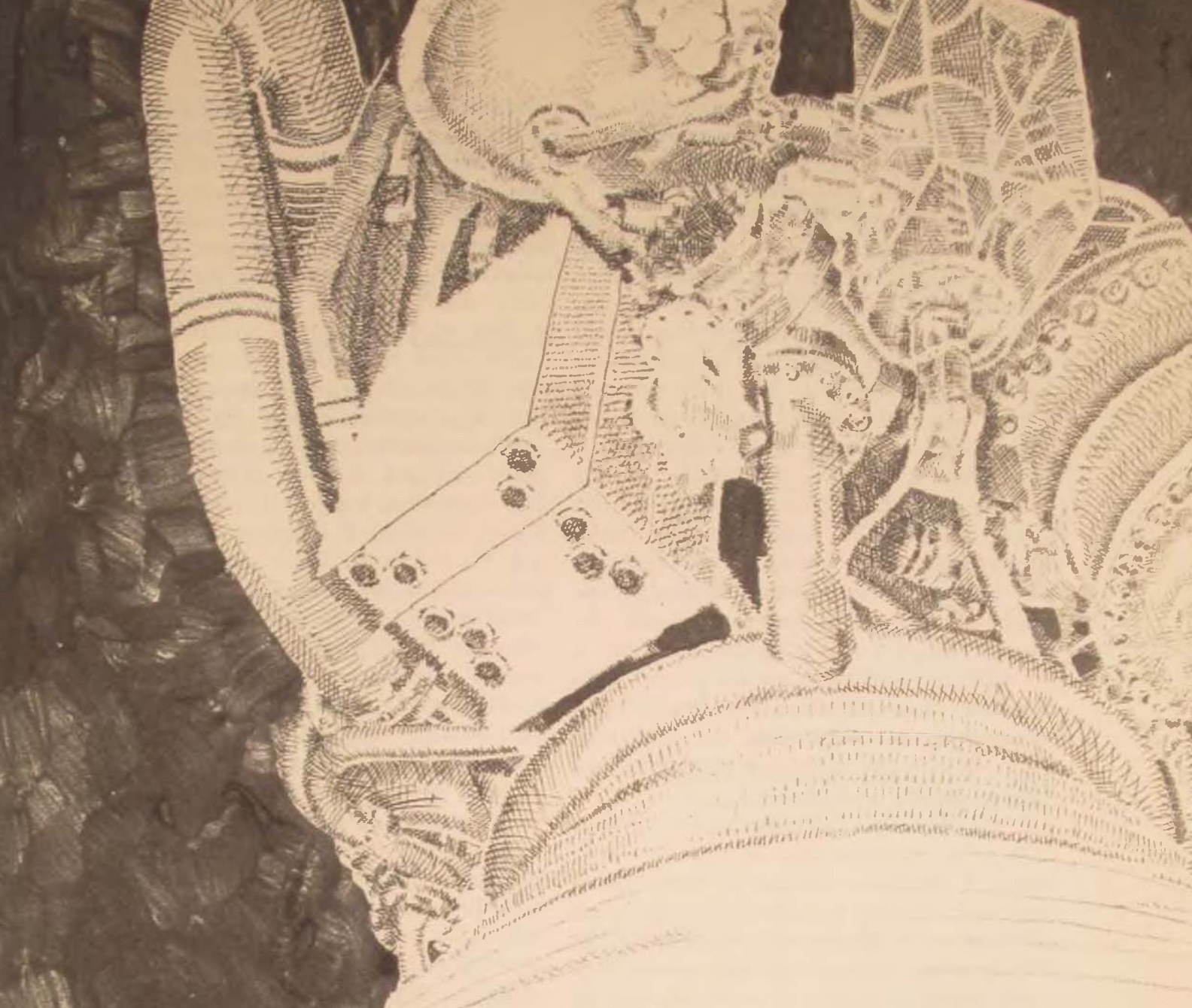
tion activities could be strengthened with additional specialists. More attention could be given to the problems of coordinating and integrating field team reports. In other words, give these activities the capability for a more detailed analysis on smaller major programs.

WHILE Should Cost is not a panacea, it has proven its effectiveness in analysis of high-dollar, major programs. As the method is further refined, its effectiveness should increase. The use of Should Cost principles to strengthen traditional analysis, coupled with the Should Cost review of selected major programs, will make detailed analysis more effective.

Air Force Institute of Technology

Notes

1. Armed Services Procurement Regulation 3–807.2(C), Department of Defense, 1969.
2. Raymond E. Harris, "Should Cost," briefing presented at 1970 DCAS Pricing Conference Proceedings, October 1970.
3. "Recent Developments and Future Trends in Government Contract Accounting," *The Federal Accountant*, XIX, 3 (September 1970), 26.
4. "Should Cost Is the New Weapons Test," *Business Week*, May 30, 1970, pp. 48–49.
5. Dr. Fred W. Forman, lecture notes on Should Cost used in Defense Weapon Systems Management Course, Wright-Patterson AFB, Ohio.



ENGINE CONCEPTS FOR SPACE APPLICATIONS

WILLIAM G. HOLDER

MAJOR WILLIAM D. SIURU, JR.

IN SEPTEMBER 1969 an elite group of men headed by Vice President Agnew presented President Nixon the results of an investigation that may well set the course for exploration and the use of space during the next two decades. The Space Task Group (STG) proposed the direction for future space endeavors, the goals for future space vehicles, and finally the vehicle concepts that would satisfy these goals. According to the group's report to the President, our space program should attack the space frontier for many reasons: practical benefits to mankind, advancement of science, exploration of the universe, maintenance of national pride and prestige, and, finally, national security. Since our national budget for space is and probably will continue to be severely limited, these space tasks must be completed with the greatest efficiency and economy. The keys to this efficiency and economy for future space operations and explorations are reusability and commonality of components and the availability of effective advanced propulsion system technology.

A reusable Space Transportation System (STS) was recommended by the STG as a means of decreasing the cost of space operations and allowing exploitation of the space environment for the benefit of mankind. The STS as proposed would include a two-stage space shuttle, consisting of a booster and an orbiter, that would operate between the earth and low-altitude orbits for delivering and returning passengers, supplies, equipment, and spacecrafts. A second element of the STS is a high-energy upper stage, the orbit-to-orbit shuttle or space tug, which would transfer payloads from low earth orbits to high-energy orbits. A nuclear-powered upper stage could be considered that would be used for carrying crews and equipment into lunar orbit and into deep space.

An advanced propulsion system—the high-pressure staged combustion rocket engine—is currently being developed to support the space shuttle. The nuclear rocket is being developed as a potential propulsion system for interplanetary applications. A third propulsion system, the composite rocket/air-breathing engine, while not currently under development, has shown promise as a potential replacement for pure rocket engines sometime in the future.

current rocket technology

The 1960s saw a tremendous advancement in large liquid-rocket engines. These ranged in size from the 205,000-pound-thrust H-1 engines used in a cluster of eight to power the first stage of the Saturn 1B to the five 1.5-million-pound-thrust F-1 engines used on the Saturn V's first stage. While both these engines use liquid-oxygen/kerosene type propellants, equal strides have been made with the more energetic liquid-oxygen/liquid-hydrogen propellant combination. These range from the 15,000-pound-thrust RL-10 engine used in the Centaur stage to the 230,000-pound-thrust J-2 used so successfully in the upper stages of both the Saturn 1B and Saturn V.

Although these space engines have proved to be highly reliable and extremely efficient, engineers have for some time been looking for ways to improve them. It is reasonably certain now, as it was in the 1960s, that the near-future propulsion systems, like those for the shuttle, will be derived from today's chemical-rocket technology.

It was realized a number of years ago that one of the best methods of "getting more" from chemical-fueled engines was to design them to operate at higher chamber pressures. (High chamber pressure means more thrust per pound of propellant expended.) To obtain this increase in chamber pressure, it is necessary to transfer the propellants from storage tanks to the combustion chamber under a much higher pressure. This, of course, means more complex and sophisticated plumbing and turbine-driven fuel and oxidizer pumps. In light of the space shuttle application, high-

pressure turbopump technology was examined to determine what problems might exist and what if any new technology would be required. It was concluded that there do not appear to be any insurmountable problems in pumping cryogenic propellants at pressures even several times higher than those found in today's high-pressure engines. Since 1961, over $100 million has been spent by both industry and the government on high-pressure engine technology. The Air Force high-pressure technology XLR-129 engine program provided the base for the shuttle engine development. Probably no other engine development has ever started with such a strong technical base as the engine to be developed for the space shuttle.

The engine proposed for the shuttle's upper, or orbiter, stage will use an advanced concept known as "staged combustion." Staged combustion is very similar to that of a turbojet equipped with an afterburner; that is to say, there are two different stages of combustion. Whereas in the turbojet the first combustion occurs in the main chamber, the shuttle engine's first burning is in the gas generator or preburner. The purpose of the gas generator in the shuttle engine is identical to that of any other pump-fed rocket engine—to provide the gases that turn the turbine(s) that turn the fuel and oxydizer pumps. However, there is a difference in this engine's operation. In the normal engine, the gas generator gases are ported overboard after driving the turbine. The shuttle engine will use them again. Thus there is little energy lost in the cycle, and a significant increase in efficiency can be realized.

Unlike the current expendable launch vehicles, the shuttle will be used many times, thus cutting costs to the bone. These many reuses will cause stringent requirements on the orbiter's rocket engines, for they too must be reusable to keep the costs down.

The high-pressure engine currently being designed for the shuttle's orbiter stage will

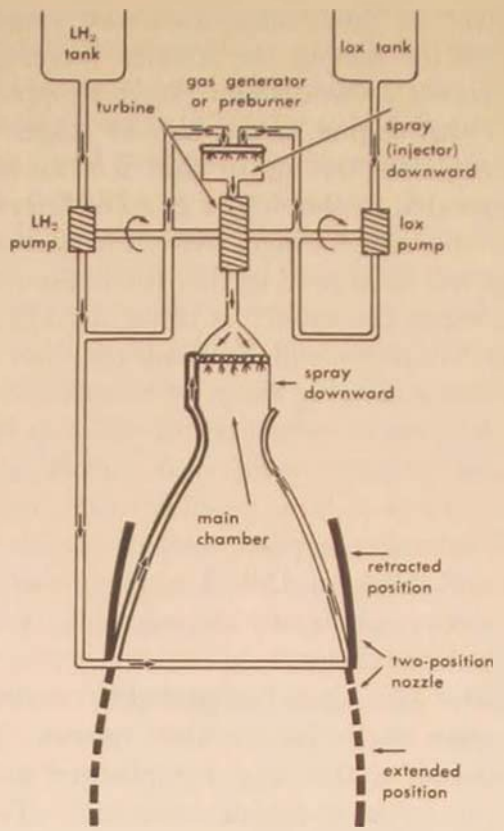


Figure 1. A high-pressure engine that is presently under development for the space shuttle

probably be the most advanced rocket engine ever built. Developing well over 400,000 pounds of thrust, it will be slightly less than one-third as powerful as the F-1 engine. But its chamber pressure will be about 3000 pounds per square inch, or about three times that of the F-1. And since it must be usable for many flights, it must survive many firings, which will accumulate hours of total operation. After a certain specified time period, the engine will be overhauled and then start a new life on the shuttle.

The shuttle engine will use a conventional bell-shaped nozzle incorporating a "two-position" extension; that is to say, there will be two distinct parts to the nozzle. The upper portion of the nozzle, which will be the most

effective at low altitudes, was originally planned for use on the booster stage. However, recent NASA decisions have dropped the use of this engine in the booster stage. This, however, does not mean that it may not be incorporated in the shuttle at some later time.

For the orbiter stage, the lower part of the nozzle will be stowed during the booster burn. Then when the orbiter is brought to life, the nozzle extension will be deployed into position, thus increasing the nozzle's exit area and providing better engine performance at higher altitudes. With only the basic nozzle, an expansion ratio of 60 is possible, while with the nozzle extension in place the expansion ratio is increased to about 150. The engine will also have the capability to throttle down to one-half the rated thrust.

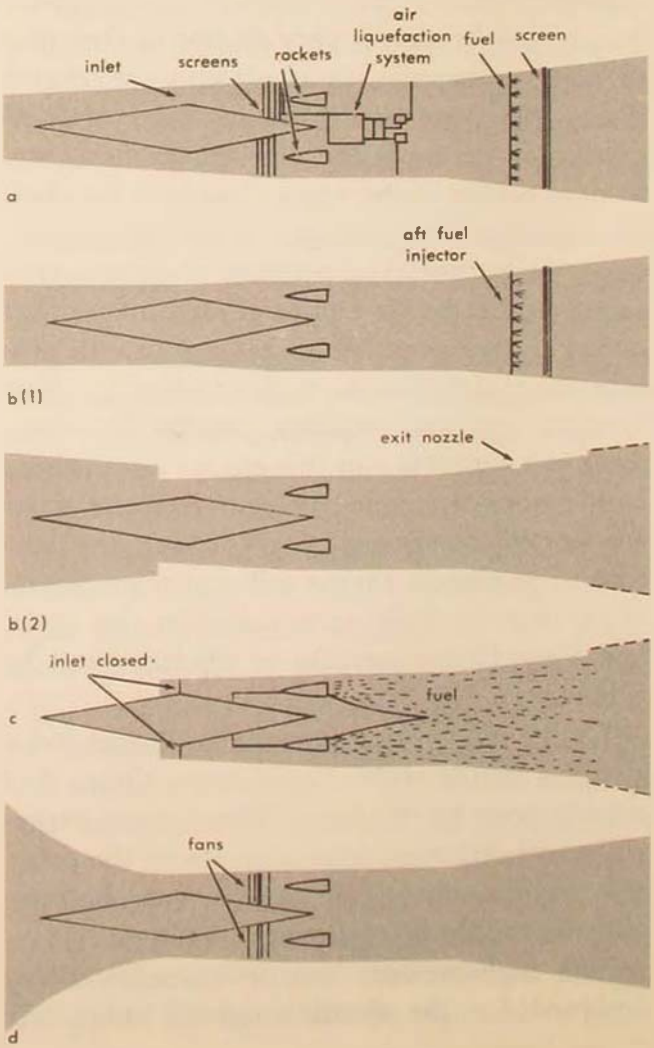
All this discussion has probably created the impression that the shuttle's orbiter engine will be one of the most complicated and sophisticated rocket engines ever built. The requirements placed upon this engine will be severalfold greater than those placed on any previous engine. It will have to operate efficiently and reliably, since it may well be the only new launch vehicle propulsion system for the next decade.

composite engine concept

An advanced concept for space propulsion which may offer certain advantages is the composite engine. This engine is in reality a combination of several different types of propulsion systems. In the composite concept, each engine type would be utilized in that part of the trajectory where it could perform most efficiently. Let's break down a typical space vehicle's flight to and from orbit into several phases and look at the individual engines that do the best job for each phase.

First of all, the vehicle must be lifted off the ground. A rocket does this job best, since it provides the high thrust required to start the fully loaded vehicle on its way. After the vehicle is moving sufficiently fast, a very efficient ramjet can be used. Since the ramjet uses air to oxidize the fuel, the vehicle need draw only fuel from its tanks. Up to a vehicle velocity of about 3500 to 4000 miles per hour, the burning of the propellants in the combustion chamber can be done at subsonic speeds. In other words, although the vehicle will be flying supersonically, the airflow through the engine itself will be reduced to subsonic speed. However, after the vehicle is moving at speeds above 3500 to 4000 miles per hour, the air-

Figure 2. Composite engine operating modes: (a) Lift-off and initial flight—rocket operating with help from fan and ramjet . . . (b) Flight in atmosphere—(1) ramjet operating, (2) scramjet operating . . . (c) Flight to orbit and in space—operation as a pure rocket . . . (d) Return to base—fan operation.
(Courtesy North American Rockwell)



flow cannot be reduced to subsonic speeds, and the burning of the fuel must occur at supersonic speeds. The result is a supersonic combustion ramjet, or what is popularly called a SCRAMJET.

The SCRAMJET would operate at speeds of about 7000 to 10,000 miles per hour. By this time the vehicle has reached such an altitude that the atmosphere is extremely thin, without enough air to burn the propellants. Now a rocket engine, with its self-contained oxidizer as well as fuel supply, must be used. The rocket would power the vehicle the rest of the way to orbit.

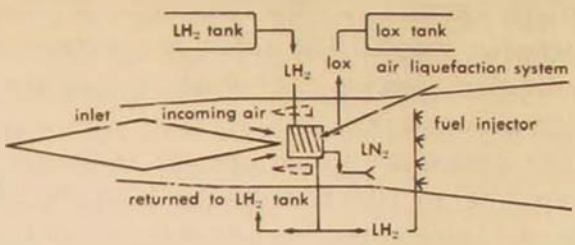
Once in orbit, any required maneuvering could be done with the rocket engines. To get out of orbit, the vehicle must be slowed down. This slowing down process could be done with a retrofire from the rockets. After re-entry, when the vehicle is near the landing site, the ramjet could be started up again for loitering and to assist in the touchdown. Or perhaps a turbofan, like those found on many of today's commercial airliners, could be used. The vehicle using these different engines has a great advantage over a straight rocket vehicle. The propellant load is much less since, while fuel must be carried for the entire trip, only the small amount of oxidizer required for the rockets must be carried.

We could build a future space vehicle with all these different types of engines placed separately aboard. Or, preferably, we could have a single engine that would operate as a rocket, a ramjet, a SCRAMJET, and a turbofan. An engine that could incorporate all these characteristics would be called a composite engine. This engine not only would operate in each of the modes mentioned but also might operate simultaneously in more than one of the modes. Let's see just how the composite engine might operate.

At lift-off, the rocket would be firing, and the turbofan might also be operating to supply additional air to improve the performance of the rocket. After the vehicle is moving at a greater speed, the ramjet would start operating, and the turbofan would be removed from the airstream. The pure rocket would continue to operate briefly to aid the ramjet. As the speed continued to increase, the ramjet would convert into a SCRAMJET. As the vehicle reaches the outer fringes of the atmosphere, the inlets would be closed, and the pure rocket would be used alone for reaching, maneuvering in, and leaving orbit. To return to base after re-entry into the atmosphere, the ramjet and/or the turbofan might be used separately, or they might be used like an afterburning turbofan.

To improve the performance of such a space vehicle even more, we would like to get away from having to carry any oxidizer for the rocket portion of the flight. In other words, the less propellant that must be stored, the more room there is for payload and astronauts. To accomplish this, an air liquefaction system would be required to convert to liquid oxygen the air that would be scooped in as the vehicle traveled through the atmosphere, and the oxygen would either be burned immediately in the rocket portion of the composite engine or be stored for future use when the vehicle is above the earth's atmosphere. To convert air to liquid oxygen, a means of cooling the air to a very low temperature is required, and also a way to separate the oxygen from the other constituents of the collected air —specifically, nitrogen. The cooling could be done with the on-board liquid hydrogen that is used as the fuel for the composite engine. This liquid hydrogen would be carried in tanks at temperatures below —400 degrees F. The nitrogen separated from the air could be used to improve the performance of the SCRAMJET. If a performance penalty could be accepted, liquid air rather than liquid oxygen could be used with the liquid hydrogen in the rocket. This would eliminate the need for a separation device, which today requires a rather large advance in technology to make such a device light enough for a flying vehicle

Figure 3. Schematic diagram of an air liquefaction system in a composite engine. The air liquefaction system incorporates a heat exchanger and a separator. Liquid hydrogen passes through the exchanger, liquefying incoming air. The liquid air is separated into liquid oxygen and liquid nitrogen. The lox is transferred to a storage tank for subsequent use in the rocket engines, while the LN_2 is dumped into the engine. The LH_2 coolant is transferred back to the LH_2 tank or is injected into the ramjet portion of the engine.



and economical enough to achieve a payoff for a reusable vehicle.

While the composite engine is not nearly as far along in development as the high-pressure rocket engine previously discussed, enough basic work has been completed to gain a better understanding of its advantages and problems. The individual components of the composite engine (i.e., rockets, ramjets, SCRAMJETS, etc.) are fairly well understood at this time, but additional work is required to integrate and test them as a single unit.

nuclear rocket

Future engines for space will mate the tremendous energy available from nuclear explosions with the ability of a rocket to operate at high thrust levels in the vacuum of space. While several high-thrust nuclear rocket concepts have been investigated, the one that will probably be used first in an actual space vehicle is a solid-core thermal reactor engine.

The heart of a nuclear engine is the reactor core. The heat given off by this reactor heats the propellant, usually liquid hydrogen, adding energy to it. This high-energy propellant is then accelerated to a very high velocity in the nozzle, thus producing the rocket's thrust. The reactor must heat the hydrogen to temperatures of almost 4000 degrees F. To keep the reactor core and nozzle from melting at such extreme temperatures, they must be cooled. For this purpose a double-walled nozzle and reactor can be used. Cold hydrogen is circulated inside this double wall on its way to the reactor core. This method of cooling not only takes heat from the nozzle and reactor but also improves the overall efficiency of the engine, since this heat adds energy to the hydrogen even before it reaches the reactor.

The amount of heat the reactor adds to the hydrogen is tremendous. In an engine of the size that might be used in a spacecraft bound for Mars, almost three tons of hydrogen is raised from −300°F to 4000°F every minute. The reactor is made from graphite; however, if pure graphite were used in contact with the hydrogen, the hydrogen reacting with the hot graphite would quickly erode the reactor. To prevent this erosion, the reactor passages are covered with a metallic carbide coating. Not only are the high temperatures a source of problems, but so are the long operating times required of a nuclear rocket. On a Mars trip, a nuclear rocket might have to operate continuously for well over an hour. In comparison, on the Saturn V the longest any rocket engine operates is only about eleven minutes.

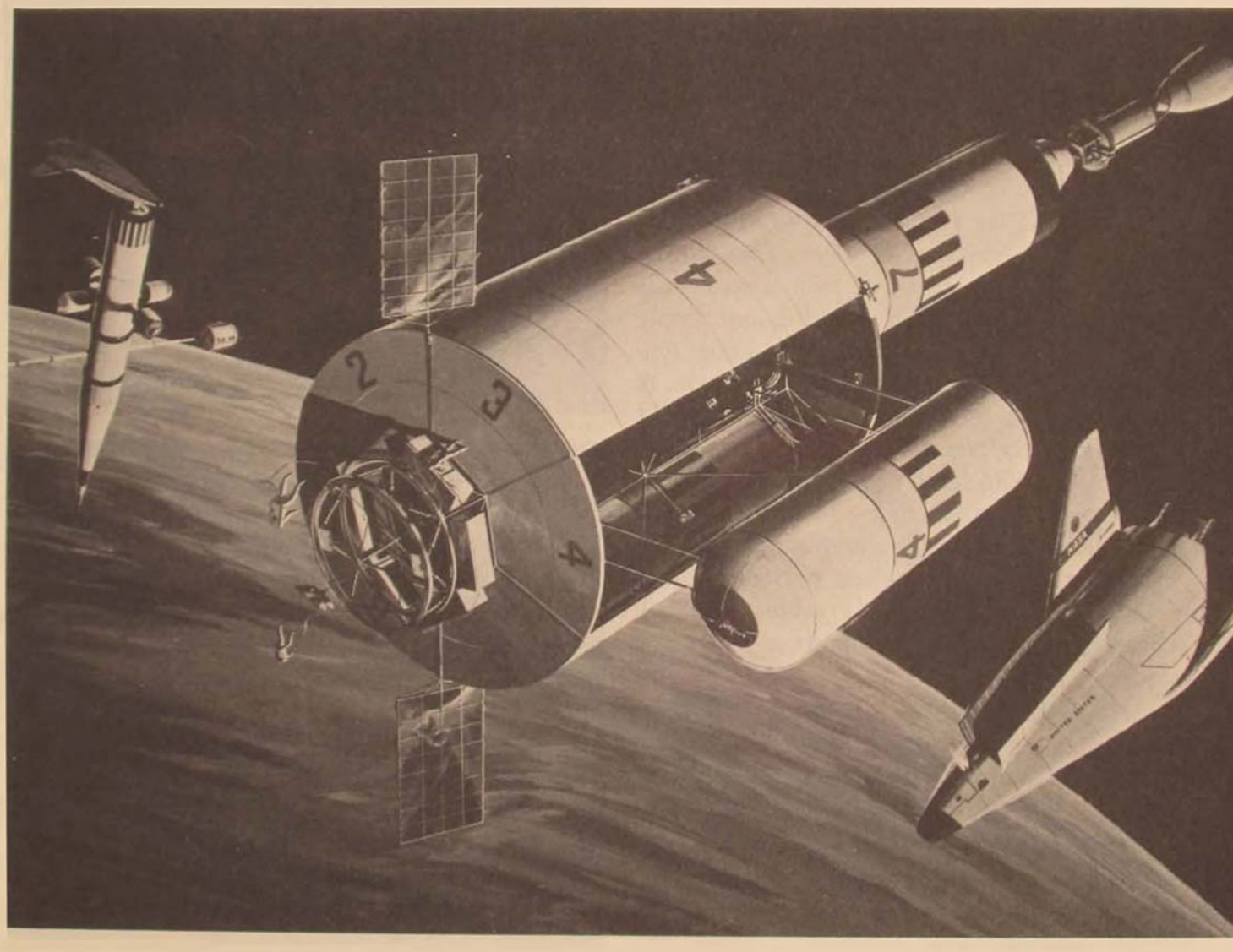
The liquid hydrogen is contained in the propellant tank at a pressure of about 30 pounds per square inch; but for the engine to work efficiently, hydrogen pressure must be increased to about 1000 psi. A pump driven

by a turbine is used to increase the pressure. The turbine is in turn driven by hot hydrogen that has passed through the cooling walls on its way to the reactor. Thus, some of the energy gained in cooling the engine is given up to pumping more propellants through the engine.

A nuclear engine itself is heavier than a normal chemical-rocket engine because of the shielding required to protect the surroundings from radioactivity, the high temperatures involved, and the longer and more rugged operating durations. Also, because hydrogen is so light, relatively large tanks are needed for pro-

Artist's drawing of an earth-to-orbit space shuttle (lower right), which has delivered a fuel tank to a nuclear shuttle during a space refueling operation. The object in the background (left) is a space station with an earth-to-orbit shuttle docked. There are many other concepts for carrying men and supplies between earth and moon or distant planets.

(Courtesy Lockheed)



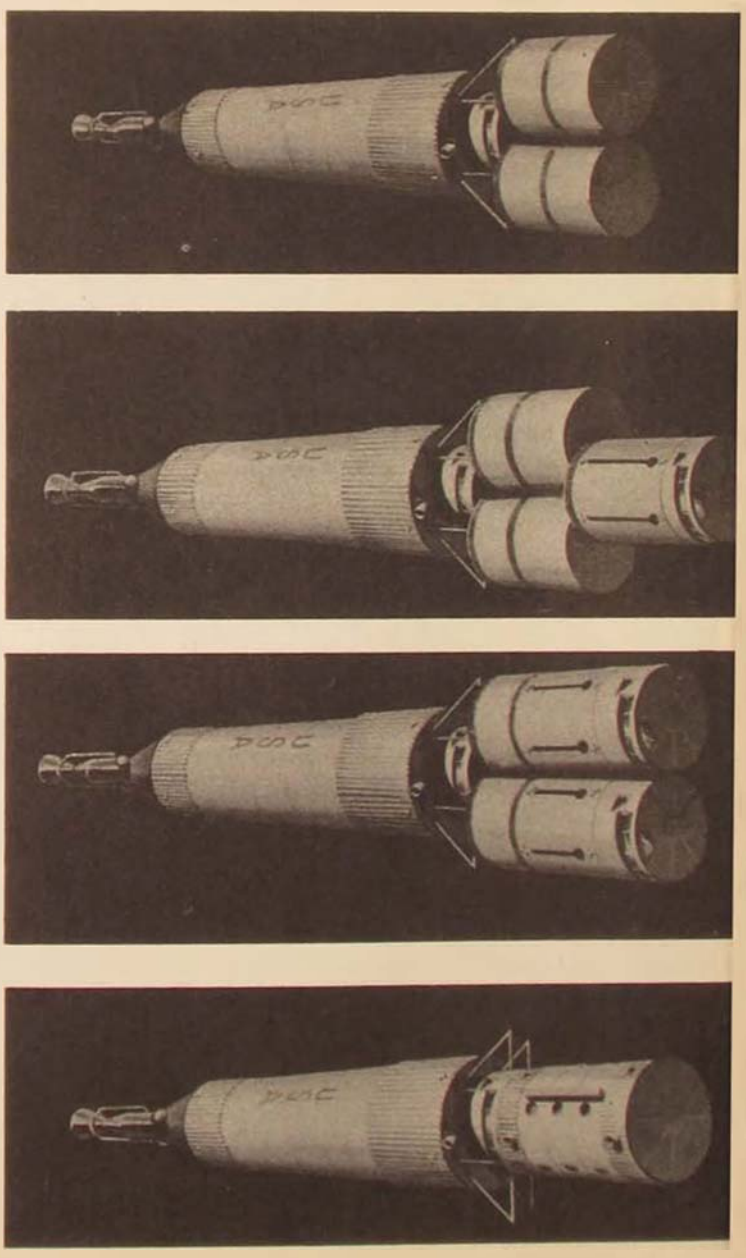
pellant storage. Fortunately the performance of the nuclear rocket more than makes up for its being heavier than a normal rocket. The specific impulse of a nuclear rocket is about twice that of even the best chemical rocket. A liquid-oxygen/liquid-hydrogen engine, like the engines used on the S-IVB stage, has a specific impulse of 430 seconds, whereas a nuclear rocket has a specific impulse of over 800 seconds. To illustrate the effect of this difference in specific impulse, one might compare a nuclear-powered reusable vehicle with a chemical-powered vehicle in performing a specific mission. For example, on a mission requiring the vehicle to deliver a payload to lunar orbit and then return empty to an earth-orbiting space station, a nuclear vehicle could carry three times as much payload for the same expenditure of propellants. For other high-energy missions the comparisons are equally dramatic.

A nuclear-powered space vehicle could perform many roles. One possible nuclear engine application in the future might be in a multipurpose interorbital and planetary shuttle. Such a vehicle would travel from a space station in near-earth orbit to establish and supply space stations in other orbits, including synchronous orbits and orbits about the moon. A nuclear stage with its high performance could easily make the round trip to these intraspace destinations with large payloads and return to the near-earth space station for refueling and reuse. A nuclear stage could have sufficient capacity to place entire space stations in lunar orbit, or earth-synchronous orbits, and still have sufficient energy to return to the home station.

Several of these nuclear stages could be strapped together to form the launch system that could take men to Mars as early as the 1980s. While there are many concepts under consideration for making the trip, they all depend on nuclear propulsion.

In any case, the nuclear stages would have to be launched into space by a chemically fueled launch vehicle. The nuclear stages would be launched totally fueled and ready for operation on top of the chemically fueled launch vehicle, or they could be launched

The adaptability of a projected nuclear shuttle is suggested by the configurations shown below (reading top to bottom): cargo; one space tug, cargo, crew; two space tugs, cargo, crew; station module.
(Courtesy NASA)

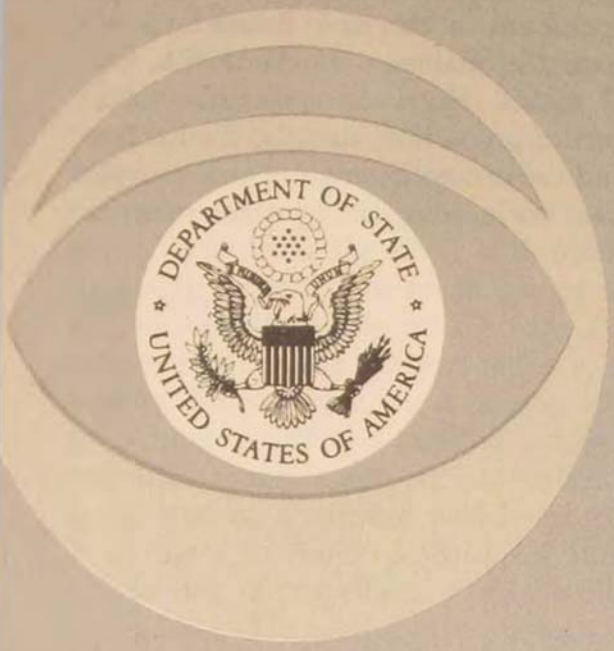


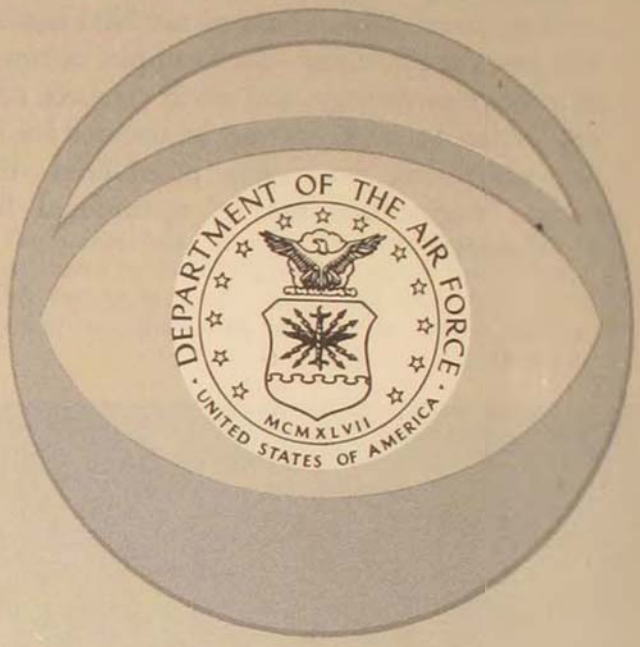
empty with additional stages used to bring up the fuel.

The nuclear stage would also be useful for seeding space with unmanned satellites having numerous applications—for example, communication, meteorology, and earth resource survey. Whatever purposes may be decided for its use—and there are many possibilities—the nuclear engine will not be operational for many years.

THE FUTURE generation of space travel and exploration presents challenging problems for the propulsion engineer. It appears as though space operations in the near future will depend upon the mainstay of the 1960s, the chemical rocket. However, some new additions to space propulsion, namely, the nuclear rocket and the composite engine, may provide new means for accomplishing space missions in the future.

Dayton, Ohio





THE STATE/DOD EXCHANGE PROGRAM

DR. RAYMOND J. BARRETT

MY RECENT two-year tour as Deputy Chief of the Global Plans Division in Headquarters United States Air Force was unusual in that I am not an Air Force officer. I am an officer of the American diplomatic service, a U.S. Foreign Service officer.

My service in the Air Force was part of the officer exchange program between the Department of State and Department of Defense. The program is a recognition of the close relationship between diplomatic and military considerations in maintaining national security. I found the experience highly valuable in a variety of ways, many of them unexpected. This article is a distinctly personal

and informal account of my experiences. I hope it will offer useful insights into the value of the State/DOD exchange program.

The exchange involves about fifteen officers from each department, almost all of whom are career Foreign Service officers (FSO's) or military officers. Several FSO's are in the headquarters of each of the military services, while others are in such offices as the Joint Staff and the Office of the Assistant Secretary of Defense for International Security Affairs.

Normally three FSO's serve on the Air Staff, all assigned to the Deputy Chief of Staff, Plans and Operations. One acts as an adviser to the Deputy Director for Plans and Policy; another serves in the Concepts Development Branch of the Directorate of Doctrine, Concepts and Objectives; the third position is the one that I occupied with the Global Plans Division. The grades of these officers are equivalent to lieutenant colonel or colonel.

The military exchange officers occupy a variety of positions in the Department of State. Several are in the Bureau of Politico-Military Affairs; one is currently Deputy Director of that bureau's Office of International Security Operations. Others serve as political-military advisers in the department's geographic bureaus, e.g., East Asian and Pacific Affairs or Near Eastern and South Asian Affairs. Some officers are assigned in other appropriate sections of the department to take advantage of their expertise; one, for instance, is serving in the Bureau of Scientific and Technological Affairs. Of the military officers on duty in the Department of State, three or four are from the Air Force.

The basic purpose of the exchange program is to expose the military and diplomatic services to each other's concerns and expertise. In today's complex world, foreign policy and military activity can no longer be clearly separated. Effective national security policies require large admixtures of both diplomatic and military considerations.

The exchange program, while modest in scope, has a forceful impact by placing most of the exchange officers into operational responsibilities in the other service. It may seem risky to place high-level responsibilities on an "outsider" who has not grown up in the host organization. But my experiences and what I saw of other officers on both sides of the exchange program convinced me that any risks are manageable and the benefits great.

Bearing operational responsibilities in the Air Force was a salutary experience for me. I felt I came to the exchange program with a sound political-military background. But strong new dimensions were added daily. Having to work with the Air Force's burdens, constraints, and goals made military considerations real and immediate.

Furthermore, many things came to my attention that I might otherwise never have appreciated. I remember vividly being startled when I read a study outlining the practical consequences to the Air Force of a proposed reduction in F-4 squadrons as we withdrew from Southeast Asia. I'm sure I would have been generally aware of some of the physical dislocations involved, but I would scarcely have thought of the manifold difficulties. Personnel, school facilities, and money were all committed to an in-being pilot training program. A change in midstream was bound to be wasteful and upsetting to the personnel concerned. Explaining such seeming "waste" of resources to Congressional or other queries would also be awkward.

Representing the Air Force in interservice or intragovernmental discussions made me thoroughly aware of the Air Force's point of view. I once represented the Air Force in a discussion at which the Department of State was represented by an exchange officer from the U.S. Army. This was not only a fascinating experience but also a vivid demonstration of the validity of the exchange program. Meeting the host service's responsibilities is an impressive learning experience for the exchange officer.

I do not contend that it is easy. I am sure that my Air Force colleagues were often nervous about my being able to do full justice to the Air Force's requirements. And I know it was sometimes disconcerting for an Air Force officer seeking our division's coordination to find himself dealing with me instead of a blue-suiter. But I, of course, was keenly aware of how many things about the Air Force I did not know. So I was always careful, if I had any doubt at all, to check matters with a knowledgeable Air Force officer in our division. In other words, I do not suggest that an FSO is so smart that he can simply step in and run Air Force matters. My experience convinces me, however, that he can handle far more than is immediately apparent and that with reasonable prudence he can assume direct responsibilities without making serious mistakes. The same, I am equally convinced, is true of military officers in Department of State operational positions.

The exchange officer's stepping into operational responsibility enables him to contribute his particular expertise. I frequently found that I brought an additional dimension to the Air Force's consideration of a problem. Generally I found the Air Force officers with whom I worked alive to the importance of the political-military aspects of issues. Quite often, however, from my diplomatic background I saw political-military implications that were not readily apparent to military eyes. Once I caught a serious flaw in one of the contingency plans dealing entirely with military arrangements. The plan was to reinforce a friendly country through facilities controlled by another country that cordially disliked the nation we wanted to aid. I pointed out the unlikelihood of our being able to use these facilities, and the plan was changed accordingly. On other occasions I was able to indicate the important foreign policy implications of weapon systems such as the B-1.

I could also add "something extra" in other directions—for instance, in helping to predict reactions to issues in the Department of State and elsewhere in the government. As many matters with important political-military implications are now handled in the National Security Council structure or other interdepartmental forums, there was a practical need to anticipate the views of other agencies. This was not simply a question of one-upmanship, of trying to pre-empt the opposition of others. Rather, it generally served a constructive purpose. Usually it helped the Air Force to seek and support arrangements that satisfied both its requirements and the likely positions of other concerned agencies. In short, it made for a better product from the beginning.

The fact that I, in effect, had two "hats" was also a distinct asset. I could readily go from the Pentagon to the State Department and, figuratively, put on my State "hat" and talk informally with my colleagues there. This arrangement was useful simply in getting information pertinent to matters being considered in the Air Force. It was also valuable as an insight into State Department thinking on topics of mutual concern. Furthermore, I could informally point out to my State Department colleagues military aspects of seemingly diplomatic questions that might not have been apparent. For instance, we noted that United Nations debates on protecting civilians were tending to define rules of war, and in ways prejudicial to U.S. interests. Similarly, the costs and complexities of arms control were noted as topics to be included in international assessments of the "arms race."

It is worth noting in passing that this dual role does not really frustrate official channels of contact. That it does so is sometimes suggested, and once or twice a management purist specifically objected. In fact, informal contact is generally beneficial. Obviously it must be kept carefully informal and not be overdone. But this sort of contact almost always improves the product from the start. In fact, it comes close to being a positive principle of effective organization. The more informal the

contact at the working level, the more likely it is that the product will adequately reflect all pertinent views and thus be the better product.

I was helpful in another way that may seem trivial but which was significant: I knew how to say things. I knew the style and language of the Department of State, the international arena, the National Security Council structure, and other interdepartmental groups. It is fashionable in some military circles to pooh-pooh the importance of language and especially to deride diplomats for vague and verbose language. But words do make a difference. As the subject is too complex to discuss adequately in this article, suffice it to say that ideas are more readily accepted if couched in the kind of language the recipient is accustomed to. Put plainly, the chances of Air Force ideas being accepted in the wider U.S. government arena were improved by being written in a style adapted to that purpose.

The net results of an exchange officer's assuming the operational responsibilities of the host service are positive in other ways. The effects are salutary not only for the exchange officer but also for the officers of the host service, who see the exchange officer meet their type of responsibilities and add something extra to the job out of his background and expertise.

The personal relationship is similarly beneficial. The officers of the host service learn that the exchange officer is a normal human being just as they are. A State Department officer almost invariably has to demonstrate that he is not some sort of "striped-pants cookie-pusher." Initially some of my Air Force colleagues seemed surprised at the strength of my concern for effective American military forces. On some occasions, in fact, I was more the hard-liner than they, and there were joking comments about "those hawks" from the State Department trying to lead Air Force "doves" astray. In other words, each side learns that the other has a rational basis for its views.

Not all is positive about the exchange program, of course. Some officers are unhappy. Not all are as fortunate as I was in being put into a direct operating role. An exclusively advisory or sideline role can be frustrating, especially for a good officer.

Clearly, the program requires a somewhat special breed of officer that is not always readily available. He needs a broad background. Most particularly, he should have a proven ability as a "self-starter." He has to be able to identify ways in which he can be helpful and to diplomatically inject his expertise in constructive fashion.

Occasionally, to be candid, a poor officer gets into the program. A program such as this is always a temptation to personnel systems; they sometimes insert a poorer officer because they do not know what else to do with him. An occasional second-rate officer does not cripple the program, but he does not move it forward either. The recent affirmation of the exchange program's importance by State and Defense should help in getting high-quality personnel.

Assignment to a program such as this, outside the service mainstream, is worrisome to many officers. They are concerned that their promotion chances may inadvertently be compromised, not only by the lack of opportunity for personal recognition by their service superiors but also by there being distinct styles in writing effectiveness reports. Although there is probably no complete cure for these psychological problems characteristic of bureaucracies, they can be minimized by careful arrangements. For instance, Foreign Service inspectors annually interview and assess each of the exchange officers from the Department of State. On both sides, effectiveness reports are now reviewed and, if necessary, commented upon by knowledgeable officials in the parent service; only then do the reports actually go into the promotion process.

On the more substantive side, I met occasional frustrations, as when my Air Force su-

periors seemingly did not want to admit the foreign policy implications of an issue. An important example was the revision of the Unified Command Plan designating the unified commands and their geographic areas of responsibility. This rearrangement of American military commands around the world obviously had fundamental international impact. But—again to speak candidly—it hit very close to the heart of the Air Force (and the other services); it had a fundamental impact on roles and missions which determined the size, composition, and future of each service. I am not faulting the Air Force's reaction—the State Department reacts similarly on its "gut" issues. I am simply noting realistically that in some areas an exchange officer is unlikely to have much impact even though he thinks his contribution valid.

In the opposite direction I also encountered problems. I found my Air Force colleagues often eager for authoritative foreign policy guidance. Repeatedly I was asked what U.S. policy was toward Country X or Issue Y. They sought such guidance so that they might accurately assess the military implications and thus have a solid foundation for constructing (or eliminating) military programs. Viewing the Department of State as the formulator of U.S. foreign policy, they were often puzzled by the lack of explicit guidance from the department. In part, as I was constrained to explain, the "fault" lay with the American constitutional system. Only from the President, not the Secretary of State, comes authoritative foreign policy. Fortunately, the NSC system was progressively developing and issuing relatively concrete guidance on many foreign policy matters. I think my presence facilitated our ability to obtain and interpret this guidance. My "two hats" also were useful in getting insights into appropriate policy. I was able to talk informally with pertinent desk officers in the Department of State. Each desk officer, to do his job adequately, has to have a good "feel" for U.S. policies toward the country of his responsibility. From such informal discussions I could obtain and convey to my Air Force colleagues some concept of pertinent U.S. policies. To be candid, however, I could not always satisfy them with the kind of explicit guidance that they felt the Department of State should supply.

Bureaucratically, I was somewhat disappointed in the Air Force. Somehow, I suppose, I expected a military organization to be less tied up in procedural detail.

I thought the briefing papers were overly long and detailed. Maybe shifting to letter-sized paper, as State did some years ago, would be conducive to shorter and better Air Force briefing papers. Not only were the papers excessively detailed, but so was the backup material that accompanied them in the "package." The effort seemed designed to cover every possible question or point of fact. At the debriefings of senior Air Force officers I was often struck by how little of the elaborate material provided had actually been used. It would seem better to emphasize—clearly and concisely—the information likely to be most pertinent. Senior officers, after all, can think quite well.

The suspense system also struck me as arbitrary and sometimes counterproductive. Obviously some deadlines must be set and met, but in many other cases a system of spot checks to avoid excessive delays would be sufficient. I frankly think that the present rigid suspense system does more harm than good and that more flexibility needs to be introduced.

To list these bureaucratic flaws in the Air Force is not to deny that the Department of State has its own. I am sure the military officers serving in that department have their complaints; I suspect they feel the department is too relaxed in its procedures. However, I do feel that the department has come to take a somewhat more pragmatic view toward purpose rather than form in internal procedures. The basic situation, as I often kidded my Air

Force colleagues, is simply that in State and the Air Force the "confusion" is differently organized.

THE INTERCHANGE of officers between the Departments of State and Defense has, I submit, been eminently successful. The advantages are profound and greatly outweigh the disadvantages. This interchange has an impact far beyond its modest size. The exchange officers enter thoroughly into the realities of the other service. They bring a real, substantive contribution, and they acquire a realistic appreciation of the techniques and problems of that service. They work with and learn a great deal about many other parts of the department in which they serve an exchange tour. And the personnel in that department work with and learn much about them. In addition, these officers informally pass on their experiences to colleagues in their own service. This exchange of responsibilities develops understanding and improves coordination that strengthens the national security of the United States. Some expansion of this exchange program might well be considered.

Fort Bragg, North Carolina

In My Opinion

THE WHOLE MAN?

A Look at the Neglected Half of Air Force Education

LIEUTENANT COLONEL
WILLIAM L. ANDERSON

TODAY'S Air Force officer is expected to solve more divergent and complex problems than ever before. This requires a renewed emphasis on managerial skills that go beyond the well-defined technical background possessed by many officers now caught up in far-reaching decision-making situations. As today's officer progresses to greater and more involved responsibilities, he must bring to bear a broader knowledge of the many factors involved, which of necessity cannot be limited to his own personal experience. As has always been recognized, such expanded knowledge can most quickly be gained by a broad-base education, an education that encompasses more than just the scientific-technical fields and provides the opportunity to learn from the experience of others.

The professional career schools of the Air Force now give increased emphasis to those areas that make up this broad base upon which officers can develop the capability to make correct decisions when faced with complex problems. At least for the small percentage of officers who attend these schools, from whose ranks may come many of tomorrow's leaders, the necessity for a broad-base education is recognized, and an effort is being made to provide it.

The new Air Force Personnel Plan for officers, "Topline," also recognizes this need.

The basic officer qualification will continue to provide an individual who can satisfy the "whole man" requirement:

(1) He must perform effectively in his assigned specialty.

(2) He must have the potential to progress to high levels of command or staff responsibilities.

(3) He must have the potential to adjust to a changing and intellectually demanding environment and to perform effectively in more than one functional area.[1]

While a scientific or technical background allows the young officer to contribute significantly in a specialized area early in his career, the fact is that it does not afford him the opportunity to broaden his background for the years ahead. "The Air Force must continue to produce officers whose interests and capabilities become broader as they become more senior in grade, and move up the levels of staff and command." [2] It goes without saying that if the "whole man" requirement exists, then the Air Force should offer all its officers who have demonstrated the potential to grow beyond their early specialties the opportunity to extend their experience and background through a broad-base education.

As Morris Janowitz has aptly pointed out, "the military establishment requires a balance between the three roles of heroic leader, military manager, and military technologist . . . ." [3] With the defense establishment's share of the national budget drastically decreasing each year in terms of constant dollars, an ever increasing need exists for better management techniques as well as a better understanding of how the Air Force can best accomplish its mission under the pressures coming from the surrounding society in which it must function. This need has been recognized by General Ryan:

. . . there is the problem of maintaining a flexible force, capable of rapidly responding to changing demands. We must consider just how much "generalization" and "specialization" we can afford in terms of cost-effectiveness. . . . This factor of increased specialization could, unless anticipated and wisely monitored, adversely impact on our force structure and on the flexibility for assignment and employment of individual officers, airmen, and civilians.[4]

Like the other services, the Air Force has been awakened in the recent past to the realization that, if people are her most valuable resource, managing them in the future may require different, if not new, approaches. It is readily apparent that any single individual is more complicated than any machine. General John C. Meyer has emphasized that the future Air Force leader must ". . . be part manager, part sociologist, part psychologist, part student of history." [5]

The Air Force must prepare officers today for the managerial and executive tasks to which they will fall heir tomorrow. The need exists for officers who can manage not only people but also ideas and concepts on a broad basis; these will be the future leaders, and it is important that the Air Force begin to prepare them now. Yet this preparation cannot be accomplished by confining ongoing educational opportunities primarily to scientific and technical fields; rather, it can be accomplished by a continuing emphasis on a broad-base education upon which can be built the professional competence necessary for development as career officers. Samuel P. Huntington's 1957 assessment of this requirement is even truer today:

The military skill requires a broad background of general culture for its mastery. The methods of organizing and applying violence at any

> one stage in history are intimately related to the entire cultural pattern of society. . . . To understand his trade properly, the officer must have some idea of its relation to these other fields and the ways in which these other areas of knowledge may contribute to his own purposes. In addition, he cannot really develop his analytical skill, insight, imagination, and judgment if he is trained simply in vocational duties. . . . The fact that, like the lawyer and the physician, he is continuously dealing with human beings requires him to have the deeper understanding of human attitudes, motivations, and behavior which a liberal education stimulates. Just as a general education has become the prerequisite for entry into the professions of law and medicine, it is now almost universally recognized as a desirable qualification for the professional officer.[6]

As further evidence of the desirability of such a broad-base background, the Air Force Academy offers thirteen science and engineering majors but fifteen social sciences and humanities majors. "Course offerings in the undergraduate program are designed to acquaint the student with major areas of knowledge in the sciences, social sciences, and humanities as well as to lay a foundation for Air Force careers." [7] However, the Air Force Academy cannot supply the Air Force with all its future leaders. The young men who will come from other sources—AFROTC, AECP, and OTS—must also be given the opportunity for this same educational experience. Their continuing education cannot be narrowly limited to any one particular scientific field but should consist of those subjects that will best prepare them for their future responsibilities.

Lieutenant General Harry E. Goldsworthy recently noted the challenge that lies ahead:

> And as we look ahead to the 1970's, there will be an even greater need to justify dollars for military use and, at the same time, systems will be more complex and costly. The answer is rather obvious. The officers we will need to have must be educated, experienced and mature in order to discern between proposals to secure for all three services the best for the least, and to comprehend and articulate the socioeconomic impact of what we do. It follows, then, that we need officers who possess an entire array of skills, who are educated in as many different disciplines as possible, and who have the desire to participate in decision-making.[8]

The educational opportunities to fulfill this long-range Air Force requirement should be made available to all Air Force officers, regardless of their previous educational specialty, in order to better prepare them for the responsibilities that lie ahead. And these educational opportunities must include the humanities and the social sciences if the Air Force does indeed desire the "whole man" as a future leader.

The Present-day Emphasis

The Air Force has already begun to recognize that the ability to communicate ideas and concepts in the English language, as well as foreign languages, is an ability too long neglected among the officer corps.

Yet a look at the educational opportunities available in the Air Force today illustrates the difference in emphasis within the Air Force itself. The professional military schools—Squadron Officer School, Air Command and Staff College, Air War College—are all concerned with broadening the background and increasing the communicative skills of those officers selected for attendance. Their curricula are substantially devoted to the areas which the Air Force has recognized as providing the knowledge that will broaden the perspective and increase the effectiveness of her officers: English, history, economics, geography, and political science, as well as psychology and sociology. Yet only slightly more than 3000 Air Force officers attend these schools each year, and more than two-thirds of them attend the comparatively short ten-week SOS course. Moreover, a much smaller

number of officers attend even two of the three schools during their career, thus further restricting their opportunity to enhance their future capability.

By contrast, the Air Force Institute of Technology has the mission of providing ". . . education and training to meet Air Force requirements in scientific, technological, managerial, medical, and other fields as directed by HQ USAF." [9] To accomplish this mission AFIT conducts university-level education along with continuing education and specialized training programs. The former provides the broad background that gives officers the ability to ". . . satisfy specific Air Force needs for special skills of immediate applicability." [10]

However, in the regular FY 1973 program entries leading to degrees, AFIT has opened up 947 master's degree programs, but only 25 of them are in the humanities and social sciences; of the 38 Ph.D. programs available, three are in the social sciences and none in the humanities.[11]

Although now offering officers the opportunity for lateral degrees, this program is good only for those engineering areas for which a specific career field can be identified and only in those academic areas where AFIT has had difficulty filling its quotas.

The short courses offered and the special AFIT programs available, such as the Area Specialist Program or the Commander's Option Program, are open only to a mere handful of officers, as indicated by the fact that under the latter program the Air Force recently granted a quota of only three slots a year for the next five years to one of its largest commands, Strategic Air Command.[12]

The most recent major educational program offered by AFIT, the Airman Education and Commissioning Program (AECP), limits its academic fields of study to those areas which "will meet Air Force technological, scientific, and other professional requirements." [13] Even though "other professional requirements" are thus acknowledged, the large majority of AECP's 300 annual program slots are in technical and scientific areas.

The emphasis today is on educating officers in specific, clearly defined career fields that call for certain academic prerequisites needed by the specialist. The Air Force has made but a limited attempt to offer educational opportunities in those areas that have already been acknowledged as being a necessary adjunct to the development of the future decision-maker. Moreover, the real problem here lies not so much in meeting the ever present scientific and technical quota presently established for AFIT as in fulfilling the educational desires of those motivated and qualified officers who wish to broaden their experience beyond their particular scientific field. To a large extent, given the opportunity to increase their knowledge in the humanities or social sciences, these same men may immeasurably aid the Air Force in carrying out its ever broadening mission.

The greatest strength of many officers lies outside scientific areas. These valuable officers should not be allowed to lose career motivation simply because they lack the qualifications, ability, or even desire for a degree in an engineering field. Perhaps most important of all, the Air Force cannot afford to lose what in the long run could be a prime source of future aerospace leadership.

As already noted, the emphasis on specific scientific and technical expertise becomes increasingly less important as an officer progresses through his career. This is not to argue that no need exists for the scientifically oriented officer; rather, it is to argue that the scientist, as well as the nonscientist, should be given the opportunity to expand his horizon beyond his immediate field.

With the exception of several courses in business management, the educational programs offered by the Air Force are primarily concerned with getting an immediate result: young engineers who are equipped to handle

today's technical complexities. Although the present emphasis in the Air Force is designed to meet these immediate problems, there still remains the equally urgent requirement to prepare tomorrow's leaders today. The Air Force can meet this responsibility by emphasizing more than one aspect of its educational needs, thus developing the "whole man" as a future leader.

The Plan

Steps taken now to prepare tomorrow's leaders today can be the beginning of a long-lasting, valuable program which over the years can provide a broad-base background for many selected officers. The Air Force has at present all the administrative procedures and personnel necessary to implement what in essence would be an expanded program rather than a new one. The present AFIT program for selecting young officers for training in the scientific fields need not and should not be cut back; today's program has met and should continue to meet the Air Force need for well-trained officer-engineers. Indeed, these officers have the scientific and technical education upon which a broader background may readily be built.

The plan proposed is relatively simple: expand the already constituted AFIT program to include a greater number of officers for schooling in the humanities and social sciences. Those fields in the humanities—English, history, philosophy, and foreign languages—as well as those in the social sciences —economics, geography, law, political science, psychology, and sociology—are all of vital importance to the Air Force. The criteria for officers applying for these courses should be comparable to the entrance requirements for engineering courses.

AFIT can meet this required flexibility and the standards as expressed by Dr. Robert C. Seamans: "One of the prerequisites to solving many current issues is more effective education, education which is geared toward preparing the individual for a productive, rewarding role in our economy and in his personal life. To do this, the educational system must be able to work effectively with people of widely varying backgrounds and abilities."[14]

Such course offerings, to be taken at selected civilian institutions under AFIT, would give maximum opportunity to active duty career officers to demonstrate their ability to grasp and handle new ideas. Few officers could then contend that their talents are not needed by the Air Force simply because they are not directed toward a scientific field. The Air Force would be assured a continuous input of motivated young men willing and able to grasp the complexities of the ever changing world of international relations, economics, social history, and communications. The past has indicated that in times of crisis such men are usually at a premium. In fact, such a recognition of "the diversity of excellence" might go a long way toward "motivation of excellence" in the Air Force.[15]

As a final adjunct to this plan, the Air Force needs merely to open a wider range of career fields to officers who do not possess a technical degree. As an officer today progresses through the ranks, his knowledge in a particular field becomes relatively less important than his ability to deal with the broader scope of increased responsibility. Under this program, for instance, many officers who have been given this opportunity to expand their backgrounds can become excellent managers upon returning to a field in which they previously have had some practical experience. Such a broad, solid background should make many officers eligible for a wider array of assignments than has heretofore been possible. And, as we can undoubtedly expect as we move into the seventies, new career fields in the management of human resources will open up, not to mention a new "office for the study of national character as it relates to cross-cultural and persuasive communication,"

which would be manned "by officers . . . who have professional experience and academic training in anthropology, sociology, psychology, communication, and international affairs." [16]

Such a plan embodies no new concept; it merely proposes implementation of a concept that already has Air Force acknowledgment. This proposed plan, which would give recognition to that part of a military leader's education now so neglected, does require a longer look at Air Force needs of the future. A longer look would recognize that such a plan can include all officers in the Air Force, regardless of their background, and lead to some very able engineers becoming very able leaders.

TODAY, the Air Force must look to the whole man—the man who has demonstrated the ability to deal with the complex concepts of a world with a changing balance of power. The education of tomorrow's leaders today cannot go only halfway toward fulfilling this ultimate objective; rather, it must provide the young officer with the broad-base background upon which he can build the attributes so necessary for future leadership. All officers, including the technical specialist of today, should be given the opportunity to become the specialized "generalist" of tomorrow.

The long-range goal of the Air Force is unchanging: superiority in aerospace power. This sustained dominance can be accomplished by continuing to provide the type of education so essential to a competent leader, not one that trains an officer to be a specialist only. A broad-base education can provide the future leader with the expanded ability and background to deal effectively with the rapidly changing world he must face tomorrow. This can be the real answer to the Air Force's future needs if, in the years to come, the Air Force is to have those officers with the flexibility of mind, firmness of philosophy, and intellectual breadth that will make them the true leaders of the aerospace age.

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Notes

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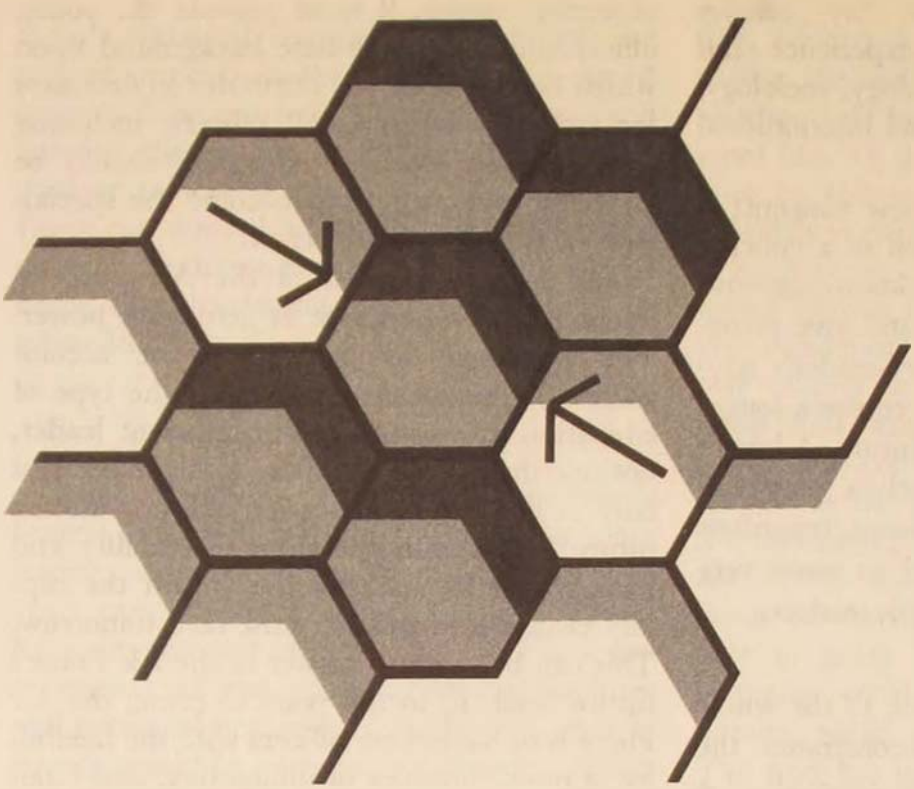


THE STRATEGY OF RESOLVE

David K. Pansius

COINCIDENT with U.S. withdrawal from Vietnam, U.S. goals and policies in the world arena have been tossed into a state of confusion. To many, the consequences of Vietnam have made the old notion of the commitment obsolete. Where once we viewed our international role as protector of the free world, today we ask to be relieved of some of our burdens as "world policeman." But with Soviet troops still occupying Czechoslovakia, with Soviet pilots flying missions for Egypt, with the rapid advance of Soviet military capabilities, it becomes obvious that just as we cannot afford the cost of another Vietnam, neither can we afford the cost of ignoring our responsibility to defend world freedom. Pulled between our desire to avoid potential costs and our need to defend our allies, we have sought a solution through avoiding the issue. Rather than employ a rational strategy to act upon our problems, we have let our problems act upon us. We respond according to reflex, not reason. The prolonged use of such a "strategy" can only lead to eventual failure.

The answer to our dilemma lies in a basic reinvestigation of the essential

variables and peculiarities of international relations in the nuclear age. From such an analysis two strategies emerge: the strategy of prudence and the strategy of resolve. Only by employing the latter, the strategy of resolve, can we give maximum protection to our interests at a minimum level of cost.

The essential parameter in the international arena is the decision-making process. Nations competing for control over limited resources, territories, and populations unconsciously behave like the idealized economic man; they attempt to maximize national gain, given existing constraints. Much like the ordinary consumer, nations make estimates of what "purchases" they desire the most, and then they attempt to "buy" them, how much they buy being determined by the amount of political "money" available. First they recognize that various international positions can be represented by values of utility. For example, controlling Cuba has a utility value for the Soviets that they themselves can estimate in comparison to the value of other positions. Furthermore, recognizing that the political resources of one's own nation are limited, each player will choose the strategy or international mode of behavior that promises to yield the greatest utility value. In other words, faced with a choice between two value-action sets, he will choose that set in which the utility value is greatest. For each nation, then, the essential issue becomes how to be a smart shopper: In what manner can one manipulate political resources so as to derive the greatest benefit?

The first step for a nation involves recognizing that the economics of international politics conforms to an auction analogy. Each international player approaches a goal aware that he must "outbid" his opponent. Thus the essential characteristic of our nation-shopper is that he exists in a state of conflict. Three variables structure a nation's competitive bidding: estimates of cost, estimates of risk, and estimates of interest. To vie for a prize, a nation expends certain assets. Most of these are financial, such as the cost of placing an army in the field, the costs of supplying that army, the costs arising from lost trade, and many other factors. Other costs are irreplaceable, such as the lives lost should a competitive engagement burst into open violence. And finally there are psychical costs. Deploying such political tools as the military usually lowers a nation's international prestige, creates dissent at home, and exacerbates its losses should a nation's military effort fail. A second variable is that of risk. Any military confrontation occurs at a certain level of violence. Thus, by definition, a conflict will always have an element of risk, risk that present costs will escalate to greater costs. And finally, on the positive side, each nation has a particular interest in the goal. Snyder sees three basic values that any territory possesses. First, strategic: how the area contributes to the military situation. Second, the political effects: how our action influences the alignment of other countries. And, finally, the deterrent value, embodying "evidence which our response provides to the enemy concerning our future intentions." [1] Thus, as one would logically assume, control over an area yields certain benefits. The problem for the United States, or any other nation, is to estimate these benefits and then determine how large a bid it is willing to make in terms of costs and risks.

The nature of the bidding process is normally not offensive but defensive. Nations generally worry more about protecting what they have rather than actively seeking what they want. The primary tool of defensive bidding is the commitment (although certain kinds of commitments are offensive tools as well). A commitment embodies a pledge of defense, aid, or some other action, should a competitor perform an act that threatens an interest. According to our above logic, the commitment strategy should be a situational one.[2] In other words, commitments need not

be verbalized; rather, they are inherent in the situation. Those commitments that are verbalized will be fulfilled contingent upon whether or not to do so serves national interests, i.e., whether the costs of the commitment are greater or less than the interest under dispute. Furthermore, according to the rules of the situational commitment, a nation can break a pledge if the fulfillment of that pledge would endanger that nation's national interests. Such an act represents no major weakness; rather, as Maxwell states, "The obvious conclusion to be drawn from the failure of a state to fulfill a commitment is simply that the commitment did not represent an interest worth defending, at the level of violence and risk estimated to be necessary."[3] Thus Italy did not endanger its international position by failing to fulfill its pledge to come to the aid of Germany in World War I, as breaking her commitment kept the British fleet out of her harbors. On the other hand, in some instances commitments need not be made. For example, the United States does not have to pledge that it will defend Canada, as Canada represents an interest greater than the cost of defeating an aggressor.[4] Thus the situational commitment merely represents the result of the cost–risk–interest calculations.

To rely on the situational strategy, however, will doom a nation to constant defeat in the continuing contest of international competition. At this point, international bargaining differs from our auction analogy. In bidding for an item a prospective customer inflicts the cost upon himself; in other words, he voluntarily decides the price above which he will not go. However, in the international arena the buyer is never sure of what the cost is because the cost is inflicted upon him by his opponent. Thus the Soviet Union, debating whether or not to attack West Berlin, realizes that the costs of such a venture range from the costs of sending the troops in (should the U.S. do nothing) to complete annihilation (should the U.S. consider an attack on Berlin as an attack on Europe, which represents an attack on the United States). The United States, not the Soviet Union, decides what costs the U.S.S.R. will incur. Thus the planned Soviet action is interdependent with the actions of the United States. Furthermore this interdependence swells, in that in the ultimate case both nations, through the development of nuclear weapons, have the capability to destroy each other simultaneously. Because of this extreme interdependence, a nation does not debate simple utility—"What is my most advantageous policy?" but rather the nature of interdependence—"What are the likely reactions to my policy?" Thus a commitment should not arise from mere estimates of cost and interest; rather, a commitment should manipulate the interdependency that determines the cost–risk–interest equation.

The appropriate strategy thus becomes the "nonsituational" commitment. The analysis of game theory aptly illustrates what kind of strategy this entails. In our old outlook, costs and interests are finite and more or less predetermined. Thus a nation's acts parallel the moves involved in a simple game matrix. The following game has two players, each with the option of two moves. The first value represents the gain or loss for "B," and the second value represents the gain or loss for "A." According to this game, Player A goes first. Following our formula of rational decision-making, he chooses strategy (2). He does this expecting a result of 5 as he realizes that Player B will choose (2), also as B prefers 0 to −5.

	Player A	
	(1) →	(2) →
Player B	(1) 5, 0	−5, −5
	(2) 5, 0	0, 5

However, Player B sees the game beforehand. He realizes that, as the rules are set up, he will get zero, but he would rather have 5. His only alternative is to somehow "change" the rules, thus establishing a different game.[5] This Player B can do by making a commitment to

choose strategy (1) regardless of what Player A chooses. B's commitment is nonsituational. It does not weigh which value is greatest but rather attempts to manipulate the process of choosing this value. It plays on the interdependence of the two players. If Player A believes that Player B will enact his commitment, he now has only two alternatives: 0 or −5. He chooses strategy (1) as 0 is greater than −5. Through manipulating the interdependence of the players, Player B makes a strategic move in that he "influences the other person's choice, in a manner favorable to one's self, by affecting the other person's expectations of how one's self will behave." [6] Thus Player B constrains Player A's options through constraining his own. In so doing he leaves Player A with a simple maximization problem, the solution of which is to Player B's advantage.

Returning now to the Soviet Union's debate over possible actions in Berlin, one can see how the U.S.S.R. and the U.S. are in the same positions as Players A and B. Berlin represents a value of 5 for those who hold it. If

	U.S.S.R.			
	does not attack		attacks	
U.S.				
attacks if attacked	5	0	−5	−5
does not fight	5	0	0	5

both nations go to war over Berlin, the value is −5, as Berlin would probably be destroyed as well as men and material. In this situation the solution of the game would be a Soviet attack on Berlin that went unopposed by the United States. The problem, then, for the United States is to alter the game somehow. This can be done by committing oneself to an attack-if-attacked strategy. Should the Soviet Union believe the credibility of this commitment, the attack strategy no longer represents a rational choice, for to attack would bring the Soviets −5, which is worse than the status quo. The United States, by placing a constraint on its own actions, i.e., limiting itself to attack-if-attacked, has won the new game.

To clarify further, this U.S. strategy represents a special type of commitment—the threat. The threat alters the opponent's expectations about his own gains or losses that would result from the various options available to him.[7] A threat "makes one's course of action *conditional* on what the other player does. While the commitment fixes one's course of *action*, the threat fixes a course of *reaction*, of response to the other player." [8] (My emphasis.) To illustrate, a commitment would be the NATO alliance—these North American and European countries have agreed to integrate their armed forces to some degree. A threat, on the other hand, would be a pledge on the part of the United States to launch an attack on the Soviets *should they* attack a NATO country. As the role of the commitment is mainly deterrence, most commitments involve a threat, the usual context being something like: I will choose peace, should *you* choose peace; but should you attack an interest, I will have to fight. In other words, violence is not chosen irrevocably, only if the other side so chooses. Thus "the distinctive character of a threat is that one asserts that he will do, in a contingency, what he would manifestly prefer not to do if the contingency occurred, the contingency being governed by the second party's behavior." [9] Or something like: I will defend Berlin should you attack it, even though I would prefer not to. The principle remains one of limiting one's own options, removing from use those strategies that would help one's enemy.

The commitment or threat represents a *voluntary* restraint of one's options, and it works only if the opponent truly believes that one will fulfill one's pledge. A commitment threatens *mutual* harm. Once enacted, it makes both players worse off, not just the opponent. Thus, should one player "call the bluff" of the other, the latter has a strong incentive to back down. He has a choice between accepting

greater costs in order to protect his word and agreeing to the enemy's terms. In this situation the commitment has failed because it was not believed. The nation that pledged its word now faces a difficult decision: either conform to the old game and lose "face" or maintain the integrity of one's word and accept greater costs. To prevent such a catastrophe, a nation must establish the credibility of its commitments, by making them appear absolutely binding.[10] Once stated, a commitment must appear irrevocable, almost sacred, removing the opponent's incentive to call one's bluff. Thus it is not one's actual willingness to carry out the threat that determines the threat's success; rather it is the opponent's perception of one's willingness to carry out the threat.

Just as the bidding of nations relies on the interdependence of actions, so the credibility of the commitment relies on the interdependence of these commitments. A nation that faces a threat determines its future actions according to its estimate of the resolve of its opponent. Such estimate of resolve arises from a learning process. As Young describes it, all bargaining situations are to some degree iterative, i.e., the players will meet again under similar circumstances. The reasoning of the combatants then becomes shaped in analogies derived from previous encounters. The iterative nature of the conflict creates a new goal: establishing a precedent concerning one's reputation. A country's reputation moulds the opponent's view of the country's resolve. Consequently, reputation determines the bargaining solution by shaping the opponent's expectations of one's own acts through projecting "certain characteristic behavior patterns that an adversary will take into account in selecting his own course of action in a given bargaining situation." [11] Thus the Soviets, in contemplating their attack on Berlin, must compute the willingness of the United States to fulfill her commitment of defense. Such a computation of U.S. resolve can only be derived from the willingness of the United States to defend past commitments. Since a threat represents merely the pledge of one's word, one must maintain the integrity of one's word in order to maintain the integrity of one's threats. Thus the United States cannot back down from her commitment, because to do so would be to jeopardize future commitments. Breaking one's word establishes a dangerous precedent that threatens to make a nation's word worthless. And, as has been demonstrated, a nation's word can become its most powerful political tool.

In fact, face plays a major role in every confrontation. Once an international crisis has arisen, all the major participants find their national honor involved to some extent. In order to preserve the credibility of future strategies, each nation must see that the crisis becomes resolved in a manner favorable to itself. Furthermore, in the case of the Soviet Union and the United States, each nation has the military capability to win any conflict, provided that the other does not respond at an equal or greater level of violence. Since both nations recognize that both possess the capability to win, but neither desires to do so at the cost of mutual annihilation, the issue becomes one of who wants to win the most—who possesses the greatest resolve to defend its commitments as well as its interests. Consequently a nation's resolve becomes judged by its willingness in general to absorb costs and risks in defense of commitments and the extent of its interest in the particular conflict, as judged by its past behavior pattern. But in this interplay of wills the salient feature is not the actual values a nation attaches to its honor and interests but rather the values that the opponent *believes* the nation has attached to its honor and interests. As Glenn Snyder states, ". . . calculations of reciprocal *intent*, and attempts to influence such calculations, are likely to become more important as compared with calculations of relative *capabilities*, and the actual clash of capabilities in war." [12] A country such as the Soviet Union decides its

course of action by comparing its estimate of the United States's intent with its own incentives, and vice versa. Thus the country that demonstrates the greatest willpower, nerve, and strength gains the bargaining advantage. The role of reputation transforms international conflicts from military war to psychological war. "War appears to be or threatens to be, not so much a contest of strength as one of endurance, nerve, obstinacy, and pain." [13] A nation must "influence underlying thought processes, perspectives, and conceptual frameworks in ways that extensively affect patterns of decision-making with regard to the specific issues of a given crisis." [14] The winner of this psychological competition achieves the position necessary to win the conflict in general.

To make one's psychological position more credible, each nation will compete in trying to ascertain who can link its national honor with the issue to the greatest extent. During a crisis there are conflicting desires to demonstrate both resolve and prudence. Resolve dictates the acceptance of costs in the defense of one's honor. Prudence dictates caution in the hope of avoiding the huge costs of military conflict. Attitudes, and hence actions, will tend to oscillate between these poles.[15]

That nation which can control such an oscillation and more consistently maintain the posture of resolve in opposition to the posture of prudence will appear to value the interest more than the opponent. In order to attach one's honor and resolve to the "stakes of the game," i.e., project a posture of resolve, the primary rule demands that the player make his threat precise. Clarity strengthens the credibility of a threat. If a threat fails to deter, there is a period of time in which both parties have an interest in undoing the threat. Thus the party that made the threat will have an incentive to back out of any loopholes he may have left himself. As Schelling states, "The credibility of the threat before the act depends on how visible to the threatened party is the inability of the threatening party to rationalize his way out of his commitment once it has failed its purpose. Any loopholes the threatening party leaves himself, if they are visible to the threatened party, weaken the visible commitment and hence reduce the credibility of the threat." [16]

Furthermore, in order to demonstrate the willingness to carry out threats, demonstrations of force tactics offer profitable possibilities for altering the opponent's view of the psychological game. For example, the placement of American troops in West Germany demonstrates U.S. willingness to fight to defend Western Europe. Other tactics include "staging maneuvers" along the border of a crisis area, moving reinforcements to a standby point in a crisis area, putting certain military units "on alert," and any other devices that make the fulfillment of a threat easier and backing down harder.

One can also gain a psychological advantage through being "rationally irrational," by publicly underestimating the costs and risks one expects to incur through enacting a promised threat. In this manner a threat of escalation is often coupled with the assertion that the enemy would be foolish to attempt a counterblow if the threatened escalation were to take place. Or one can take the contrary approach and appear "reckless." Such a player would try to give the enemy the impression that to him life means little, honor means a lot, and conflict is not to be shunned but rather glorified. If a player accomplishes this, his opponent will believe a threat even in those situations where to make such a threat would be totally irrational. Finally, one can overestimate the interest value of the conflict to oneself. Tactics such as these are common. In Vietnam, for example, the North Vietnamese try to expand their interests by claiming that the war is a civil war of unification. The Americans, on the other hand, describe the conflict as a battle with an international imperialist force that must be fought in Vietnam so that we will not have to fight in New York

City. Thus the players try to correlate their desired outcome with their own strategic necessities. By so doing they demonstrate the degree to which they *must* fight, simply because the issue involves national survival to some degree.

The Vietnam example, however, points up the dangers of pursuing a strategy of psychological war when the full aspects of such a strategy are not completely understood. Psychological war is grounded in the escalation process, which enables a nation to threaten an opponent with rising levels of cost. Thus psychological war occurs only when (1) a credible escalatory process exists and (2) the opponent can be so isolated that he can be threatened with such a process. Such is not the case in Vietnam, which is primarily a political war, not a psychological war. First, it is difficult to escalate war against guerrillas without also escalating the costs to the very people whom you are trying to protect. But, even if such an escalatory process were available, one has no one to threaten, since guerrillas by their nature are not organized into an identifiable unit with territory and assets that can be destroyed and recognized communications centers with which a threatening nation can negotiate. Thus the real basis of the internal war in South Vietnam lies outside the bounds of psychological war. Certainly, interactions between North Vietnam and the United States do conform to the criteria for psychological conflict. Just as certainly the United States, through lack of resolve, has lost this aspect of the Vietnam engagement as well. But our biggest mistake in Vietnam was not so much a lack of willpower as the misdirection of willpower. By failing to perceive the dualistic nature of the conflict, we have created enemies in the South while failing to defeat our enemies in the North. Thus, when contemplating action in future engagements of this kind, the United States must be sure that she recognizes exactly which aspects of the conflict demand political strategies. If we do not, we will once again involve our honor in a conflict that we cannot win at a cost we are willing to pay.

Returning to the basic confrontation between the United States and the Soviet Union, we see another danger in psychological war which its practitioners must recognize. Psychological war is placed in an explosive military context by the fact that, through the medium of national honor, any crisis ultimately involves national sovereignty. Just as the United States must fight to protect her national honor, so must the Soviet Union. Therefore, in the process of winning an engagement, we must be sure that we win in a manner that does not destroy the credibility of the opponent. We must endeavor as much as possible to allow him to back down in such a manner that he appears not to be really backing down.[17] When threats are made, they will be more effective if made in secret. When the opponent conciliates, rather than pursuing our victory we should compliment our enemy on his rationality and sense of the collective interest. In this manner we can win engagements of psychological war at a minimum of cost and risk.

Thus the interdependent, explosive, and catastrophic aspects of crises involving the superpowers indicate two strategies for the United States. First, national honor, the image of one's resolve, in the long run means national sovereignty. A nation must utilize the commitment tool if it is to survive. Americans, consequently, must revise their view of U.S. military pledges. Because American resolve ultimately defends America's vital interests, we as a people must be willing to die to defend the integrity of that resolve. Second, we must realize that the Soviet Union faces the same dilemma. In our desire to "win" we must realize that we cannot win "big"; the Soviets, if *they* are to survive, cannot allow us this luxury. The United States must keep her aims limited and must not let it appear that her opponent was "defeated." We must use our psychological tools not only to "win" the engagement

but to ease the opponent's pain of defeat as well. We must not allow tactical achievements to endanger the strategic security of the opponent, for in the age of nuclear deterrence to endanger the sovereignty of the opponent is to endanger one's own as well.

Consequently, any purposeful foreign policy, if it is to succeed in the long run, must conform to the demands of international strategy in the nuclear age. In each situation where the potential for military conflict affects the nature of the outcome, the United States must first determine whether she is engaged in political war or psychological war. If the latter, she must recognize that, in order to minimize costs, she must demonstrate a willingness to absorb costs. But in the process of so employing the strategy of resolve, the United States must also appreciate that, just as her honor is at stake, so is the opponent's, and she must thus respect the opponent's need to maintain his own psychological credibility. Only by so recognizing the strategic nature of resolve can America hope to profit from future world events. Americans must realize that it is our honor, more than our arms, that protects us in the nuclear age. Thus for the U.S. to compromise her honor would be to compromise her national sovereignty as well. This is the essential point to remember when in some future war the perennial question arises, "What are we fighting for?" We fight for honor; we fight for America.

Chapel Hill, North Carolina

Notes

1. Glenn H. Snyder, *Deterrence and Defense* (Princeton: Princeton University Press, 1961), pp. 32–33.
2. Franklin B. Weinstein, "The Concept of a Commitment in International Relations," *Journal of Conflict Resolution*, vol. 13, March 1969, pp. 40–41.
3. Stephen Maxwell, "Rationality in Deterrence," *Adelphi Papers*, No. 50, August 1968, p. 19.
4. Weinstein, p. 43.
5. Anatol Rapoport, *Fights, Games, and Debates* (Ann Arbor, Michigan: University of Michigan Press, 1960), pp. 228–29.
6. Thomas C. Schelling, *The Strategy of Conflict* (New York: Oxford University Press, 1960), p. 160.
7. Fred Charles Ikle, *How Nations Negotiate* (New York: Frederick A. Praeger, 1964), p. 62.
8. Schelling, p. 124.
9. *Ibid.*, p. 123.
10. *Ibid.*, p. 27.
11. Oran R. Young, *The Politics of Force* (Princeton: Princeton University Press, 1968), p. 35.
12. Snyder, p. 239.
13. Thomas C. Schelling, *Arms and Influence* (New Haven: Yale University Press, 1966), p. 7.
14. Young, p. 362.
15. *Ibid.*, pp. 177–78.
16. Schelling, *The Strategy of Conflict*, p. 40.
17. Klaus Knorr, in a theoretical discussion of limited war, points up the need to avoid the appearance that one side was defeated, in order to facilitate a bargaining solution. Klaus Knorr and Thornton Read, eds., *Limited Strategic War* (New York: Frederick A. Praeger, 1962), p. 20.

HUMAN ASPECTS OF A SYSTEMS APPROACH

Captain Richard E. de la Menardiere

THREE MASONS were once asked what they were doing. The first said that he was laying stone, the second allowed that he was making a wall, the third replied, "I'm building a cathedral." The third mason expressed the attitude necessary for a systems approach. The nurturing and development of this philosophy is of foremost importance in the development of the systems concept.

Acquiring the "systems attitude" requires recognition of elusive sociobehavioral characteristics and their relation to the planning, organizing, control, and communication aspects of an organization. These factors must be addressed in order to manage an organization efficiently.

One of the best indicators for appraising an organization is to evaluate the leaders and their ability to make human observations. Many failures could have been avoided if managers had read the human factors correctly. This applies not only to leaders but to individuals at all levels. This pervasiveness of the human aspect is one of the reasons that it is so important. Analysis of human factors will add some administrative load; however, it will provide an organizational lubricant for more efficient achievement of the desired objectives.

Individuals have idiosyncracies and easily become discontented. In order for a system to operate properly, accurate sensors must continually measure employee attitudes, dissident or otherwise, and provide this information to management. It is imperative that sensors and feedback loops be integral parts of the system, to assure that personnel remain within satisfactory performance parameters. Leaders must continually monitor these indicators so that a control loop can be established to keep the organization within the limits congruent with the desired output.

pervasiveness of the human aspect

This nation is experiencing a "socioindustrial" revolution. Many events, such as rock festivals, have been heralded as the beginning of a new national attitude whose attributes are gentleness, spontaneity, and emotional abandon. Some theorists have seen a return to so-called human purities, which are said to have been edged out by the industrial revolution and institutional calcification of greed, alienation, and envy. This has not occurred, but various new social conditions have surfaced.

The "drop-out culture," with its outbursts of anarchism and condemnation of the present value system, has only added to social problems rather than provided solutions. There are other individuals who have not dropped out but who do have difficulty discovering identification and self-purpose in the complexities of our society. In addition, there is a growing number of people who are genuinely concerned with our social problems. These attitudes have contributed to a growing list of problems facing contemporary organizations, includng the military structure.

Absenteeism, tardiness, and quality control deficiencies are increasing. A recent study at an automobile manufacturing plant showed a 200 percent increase in absenteeism and a 300 percent increase in tardiness over the past five years as compared with the preceding five-

year period. Quality-control problems in foods, automobiles, and appliances are common. Institutions also face problems involving minority groups, politics, and pollution. The military is not immune to these problems.

changing attitudes

Traditionally the central objective of business institutions has been profit, and they have been reluctant to shoulder responsibility for social and environmental problems. Corporations are now developing a social conscience. For instance, one large corporation has established "systems analysis of company action and response for dealing with social problems," and a metropolitan bank expects its young executives to counsel minority-owned businesses and communities on financial matters.

While military and business institutions have different social outlooks, they share the same human factors problems.

Air Force personnel today are well-educated and socially aware, and many of their jobs involve complex tasks requiring discipline. In order to achieve this discipline, men must be led, not driven. Leaders must instill in their subordinates a feeling that their recommendations and decisions will be supported in terms of a thorough and fair evaluation. Individuals must acquire pride in identification with their contribution to the objectives of the organization. Once this has been accomplished, the intelligence of the individual becomes a valuable asset rather than a source of dissent. This sense of identification is not acquired from pamphlets or lectures. It is something the individual absorbs through constant association with leaders who are proud of themselves and their organization, who care about their people, and whose dedication is unquestioned.

effective communication

In an era of communication through satellites and other sophisticated electronic devices, we sometimes still live in the nineteenth century in respect to the transmission of management directions to staff and line organizations. Misinterpretation or lack of communication creates confusion and delays the objective.

The question is, How does an organization solve the information distribution problem? One way is through effective managers. It has been said that the two most important qualities of a manager are baldness for a look of distinction and a slipped disc for a look of concern. In addition, managers at all levels must be visible to people in the organization, be accessible for problems and suggestions, and be sensitive to perceived as well as real problems. They must also insure that personnel understand what their responsibilities are and the necessity of fulfilling them.

A peasant leader once described his generals in the following manner: "There is nothing to distinguish generals from their subordinates except the star they wear on their collars. The uniform, boots, and helmets are the same. They live on rice they carry with them, fish they catch, and water from streams. They have no secretaries, no cars, no large bands to greet them, only victory damnit victory." This may be a radical approach to leadership, but it does suggest that leaders must keep in touch with their subordinates and provide the cohesiveness that directs the team toward its objectives. Each person has a right and need to know that he is performing important and meaningful work. An effective manager must insure that personnel are treated fairly and equally, must work to impress subordinates as well as superiors, and must impose his authority judiciously.

There is a need to improve the accuracy of identifying personnel with behavioral skills needed for leadership positions. An individual's performance on his current or previous job provides only limited evidence for predicting how well he might perform if selected for another type of position.

In addition to education and technical skills, institutions have been investigating other factors, such as interpersonal skills, control of feelings, passivity, and dependency, in search of effective managers. These studies yield data on such other factors as decisive action, courtesy and understanding, information acquisition, and casual informality.

Awareness of employee attitudes is an important part of systems management and can directly affect an organization's future planning and present operations. Frequently leaders are too remote to be able to anticipate personnel attitudes correctly. Studies have shown that leaders are frequently unaware of personnel problems and may be engaged in addressing nonexistent problems.

effective organizational management

"And God created the organization and gave it dominion over man." [1] The traditional approach is to organize by cooping individuals in separate pigeonholes. In applying the systems approach to organizing, perhaps we should think of an organization as an aviary: individuals are allowed to interact within certain well-defined constraints. An organization is simply a means to accomplish a task, and it should not be too constricting or unwieldy.

Ancient man, millions of years ago, organized in hunting bands, camps, and tribes. They organized for a simple purpose, survival. Though today's institutional objectives have become more complex, leaders are perpetuating some errors of human organization that would seem elementary to leaders of "primitive" tribes. The two most significant of the errors committed are loss of perception of organizational objectives and inadequate communications. Even though drawings, computer print-outs, and films are available, there is no substitute for talking to people and providing them instruction that cannot be gleaned otherwise. For example, a research study conducted by a consulting firm revealed that 25 percent of manned computer hours are being wasted as a result of idleness, rerun, machine maintenance, and downtime. Deficiencies observed included inadequate instruction, lack of internal controls, improper scheduling, and inefficient procedures for tape management. Most of the blame for these deficiencies was attributed to inadequate management communications.

behavioral aspects of leadership

The traditional approach to the behavioral aspects of organizing has been based on the assumptions that people hate work, have to be driven, want security, are not ambitious, and dislike responsibility.

The progressive approach is to trust people rather than control them. Instead of giving them functions and procedures and then checking what they have performed, give them power, resources, and an objective and let them choose the procedures for accomplishing the task. This modern approach is based on the theory that man is a wanting animal whose behavior is determined by unsatisfied needs. These needs form an internal hierarchy of values. In order of importance the hierarchy has five levels: body, safety, social, ego, and development.

Man is totally motivated by his level of hierarchy until that level is satisfied. This is one of the reasons why the fulfillment of valid, rational human need in a viable environment is becoming a matter of concern. In today's society the majority of people have the first two levels satisfied. That is, most of us have enough food, shelter, clothing, and are fairly safe. Most individuals are in the upper three hierarchy levels. These levels of satisfaction involve more complex goals that may conflict with organizational goals. This has given rise to present-day theory that people do not hate work and do not have to be driven if their individual and organizational objectives coincide. This results in people's committing

themselves toward organizational objectives as a way of satisfying their level of the hierarchy.

In essence, man's nature does not change much. So when large numbers of men become despondent, angry, corrupt, it is a good idea to consider that something is lacking within the organization, not within the men themselves.

Leaders must begin to address the hierarchy of human needs if they are to effect change efficiently. In addition, leaders must reduce resistance to change by ensuring feasibility, education, training, and participation. An organization must create an environment that is receptive to new ideas. Most people have virtual gold mines of ideas that only need to be properly tapped.

THE human element is an integral part of a systems approach. In order to influence personnel attitudes and their effect on the objectives of the organization, one has to be aware of what they are. The responsibility for awareness lies with leaders. They must not become so remote that they lose touch with their personnel.

Effective communication probably contributes more to satisfactory behavior than any other organizational factor. Personnel must know their specific function and its importance to the overall objective. They must not be isolated and if possible should identify themselves with the organization's objectives.

There are some effective methods of assuring that the human aspect does not create problems in an organization. Most important is that leaders be properly educated in the behavioral aspects of individuals. This can be accomplished not only at the various management and leadership schools but within the internal operating structure of the military. Since the principal training place for leaders is on the job, that is where the behavioral aspects should be addressed. Seminars, individual research, and practical applications greatly aid in comprehension of the behavioral aspects of management.

Participative management is another method that allows subordinates to identify with the objectives of the organization. While subordinates cannot, of course, take part in all decisions, perhaps they can be made aware of organizational goals and objectives through comprehensive organizational meetings and briefings.

Encouraging individual development will also improve personnel morale. Educational courses, seminars, and informative trips allowing individuals to broaden their knowledge will aid in satisfying their urge for development and subsequently will benefit the organization. Oftentimes education provides intellectual rejuvenation that challenges the individual to achieve his potential. This attitude is likely to carry over onto his job.

The psychological interface with physical resources is of extreme importance in the operation of systems involving human beings. This human element is the golden thread that slithers its way through an organization. If human beings are properly inspired, not demoralized by excessive constraints, and given the appropriate resources, then Max Weber's "bureaucratic machine without friction" [2] can be achieved through effective communication. If not, then, in the words of Voltaire:

When people believe absurdities
They will commit atrocities.

Rockville, Maryland

Notes

1. Robert Townsend, *Up the Organization* (New York: Alfred A. Knopf, Inc., 1970), p. 20.

2. Rocco Carzo and John Yanouzas, *Formal Organization, A Systems Approach* (Homewood, Illinois: Richard D. Irwin, Inc., 1967), p. 27.

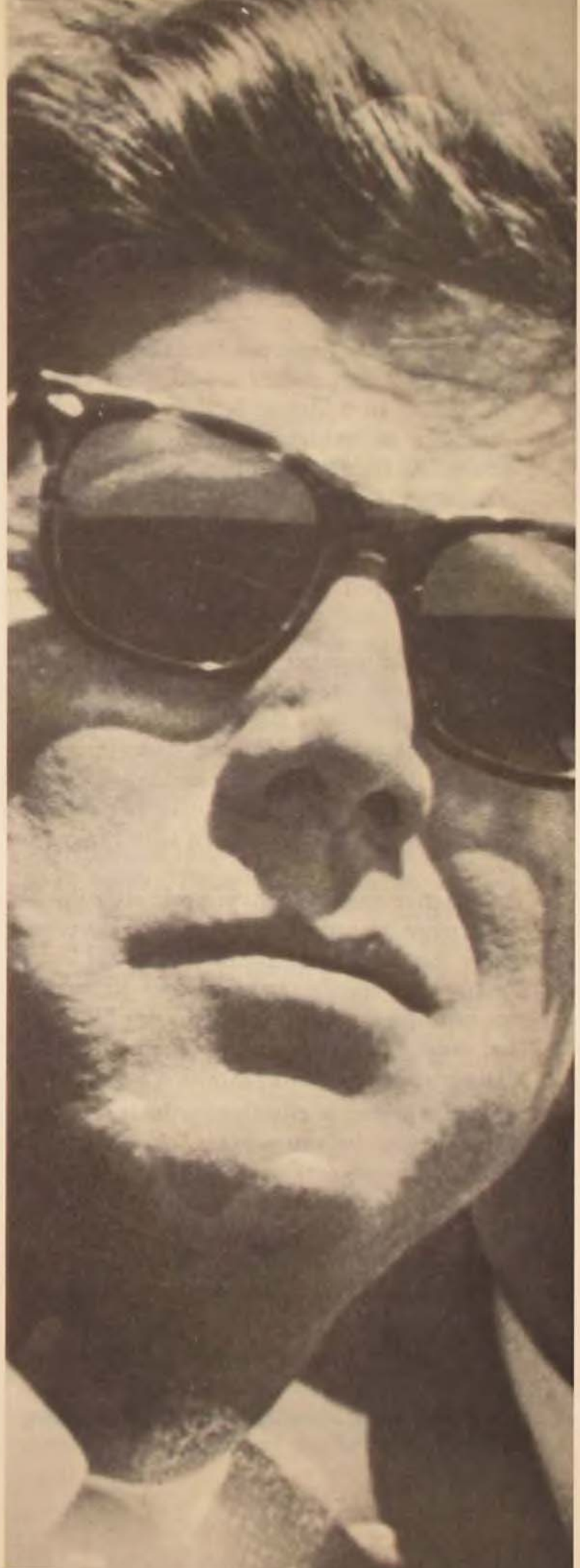
Books and Ideas

DID THE EMPEROR HAVE CLOTHES?

COLONEL DON CLELLAND

IN THE WORDS of Mark Antony, following the assassination of Caesar,

> The evil that men do lives after them,
> The good is oft interred with their bones.



Richard J. Walton, the author of *Cold War and Counterrevolution,*† might claim that the same conditions could apply to our late President John F. Kennedy. However, the author would probably be inclined to add that the evil is still obscured by the unwillingness of most people to compare Mr. Kennedy's actual record with what they thought to be his record.

In a speech given at the University of Rochester in 1959, Mr. Kennedy said: "The real test of Mr. Khrushchev's desire to end it [the Cold War] will be in his deeds, not his words. . . ." *Cold War and Counterrevolution* applies this same test to Mr. Kennedy. Seemingly less interested in iconoclasm than in a new consideration of recent events, Mr. Walton points out that the late President's actions were based solidly on the traditional post-World War II policy of containment—with the usual knee-jerk reactions—and that he showed little ability to distinguish and exploit differences in the monolith of Communism or to distinguish between "honest" revolution and Communist conspiratorial revolution.

The author finds contrast his most effective tool. In laying the words of the late President beside his deeds, Mr. Walton found he could often dispense with commentary. Contrasting rhetoric and record is not a new technique, of course, nor is it an invalid one. Presidents, no less than the rest of us, should be held responsible for the things they say they are going to do. Nevertheless, most people would probably admit that no Chief Executive could successfully squeeze the final sprawl of his policies back into the neat mold of his intentions. After all, one is written precisely on long yellow pads in a vacuum of sorts, while the other must grapple with the real world.

The type of exercise undertaken in *Cold War and Counterrevolution* is particularly appropriate today. Never—since the advent of mass public pulse-taking—has the people's confidence in political figures been at a lower ebb than it is now. On the other hand, the late Mr. Kennedy's reputation continues to soar. Should the thesis held by Mr. Walton prove true, should the hopes of those who thrust their political dreams into the late President's hands turn out to have been hung un-

† Richard J. Walton, *Cold War and Counterrevolution* (New York: Viking Press, 1972, $7.95), 250 pages.

wisely on panache rather than proof, it can only further weaken the already weak connections between the citizenry and its leadership.

Cold War and Counterrevolution is a short book of hardly more than two hundred pages. Though important, it is actually quite superficial. It is not particularly well researched, the bibliography consisting of only 43 references, mostly standard works. Furthermore, some chapters are loaded as to "sidedness"—32 of 38 footnotes in chapter 10 cite works of friends, such as Arthur Schlesinger. Yet, even when all this is taken into account, the aura of truth still lingers. Walton is in the forefront of those who will cry, like the child in the fable, "Look, the Emperor has no clothes."

Other books of greater depth on this same theme will follow *Cold War and Counterrevolution*, but with this brief work the author has come up with a significant first.

Frequently, however, in his efforts to prove that Mr. Kennedy—despite widespread assumptions to the contrary—was in fact something much less than a liberal in his foreign policy, Mr. Walton is a little unfair on the subject. He chooses, for example, to cite these words from the President's Inaugural Address as "tough talk" and provocative: ". . . only when our arms are sufficient beyond doubt can we be certain beyond doubt that they will never be employed." The author neglects to add that the President went on to express solemn misgivings about the arms race, to talk about the need for arms control, and to summon all to take up the challenge of "tyranny, poverty, disease and war itself."

Further on, the author talks about the substantial arms buildup initiated by President Kennedy, saying that this was quite unnecessary since ". . . the Soviet Union had reduced its military spending. . . ." *The Yearbook of World Armaments and Disarmaments* hardly supports this statement when it gives the following comparison of billions spent on arms by the U.S.S.R. and by the U.S. for the years in question:

	U.S.	U.S.S.R.
1960	45.3	22.1
1961	47.3	27.6
1962	51.2	30.2
1963	50.5	33.1[1]

(The reader is cautioned against quick judgments concerning overall amounts, since the U.S.S.R. "conceals" many of its arms expenditures by inserting them into the budgets of several departments.)

Cold War and Counterrevolution makes a fairly good case when it associates the Bay of Pigs fiasco, the Berlin crisis, and Cuban missile crisis with dangerously haphazard combinations of hard-line thinking, bungling, and certain recent traditions. Walton hits home when he says, ". . . that is just the rewarming of the old Washington myth that the Russians always back down when faced by American resolve." This simplistic approach to international confrontations is the type of quick answer that Americans prefer. Before applauding ourselves unduly for those instances where our "firmness" has been rewarded, however, it might be most profitable to stand back and (1) ask how seriously the U.S.S.R. has needed (not necessarily wanted) the points over which we have successfully faced them with force; and (2) also remind ourselves that, despite the "American resolve" in Cuba, the U.S.S.R. got much of what it sought there, though it did back away from our show of force.

In his discussion of Vietnam and related issues, Mr. Walton blames the late President for "the war and all its terrible consequences. . . ." He suggests that Mr. Kennedy's most grievous mistakes stemmed from his failure to understand the inseparability of burgeoning nationalism and revolution; his belief that nationalism could always be converted to American purposes; and his inability to come up with an imaginative policy that would strengthen nationalism—even though it was based on Communist principles.

Today, of course, Titoism is a familiar ar-

gument as we acknowledge our failures in Vietnam, Cuba, China, *et al.*, and admit that Communism is not the monolith we once thought it to be. But this sort of thinking was not as widespread in 1961 as it is today. And the argument about how to deal with nationalism and revolution, always difficult to conclude, was never less clear than when the ferment took place under the eaves of a neighboring Communist giant *and* the shadow of containment.

Politics is still the art of the possible. Stanley Karnow, writing of President Nixon's China visit in the February 20 *Washington Post*, noted that "a reconciliation with Peking could make it easier for him to justify an American withdrawal from Vietnam by seeming to remove the Chinese threat that originally served as the rationale for the US commitment." Without doing too much violence to logic, one might also conclude that such a reconciliation, if concluded ten years ago, would have made our entry into Vietnam unnecessary. But was it politically possible ten years ago?

In speaking to the Senate on 14 August 1958, President Kennedy certainly indicated that he understood what revolution was all about:

> We retain an ideological advantage, better equipped than any nation in the world to export the revolutionary ideas of the Declaration of Independence, and thus lead, not frustrate, the nationalist movement against imperialism of any variety.

For Walton to cite Diem, rigidity, and the absence of reform in South Vietnam as indictments of Kennedy's understanding does not seem sound. Nevertheless, the *general* charges that he makes do seem valid, and other authors will doubtless pursue them. The period of literary mourning is apparently past. Those of us who sat numbly transfixed before the TV set during those long, sad November days in 1963 will follow the new quest with mixed feelings.

NATO Military Committee

Note

1. *Yearbook of World Armaments and Disarmaments*, 1970, Stockholm International Peace Research Institute.

FILLING THE VOID ON CLAUSEWITZ

Major Edward Vallentiny

PROFESSOR Michael Howard states in the Foreword to this biography of the great military thinker, critic, reformer, soldier, and writer Carl von Clausewitz, "It is usually said of Clausewitz, as of many other sages, that he is much quoted and little read. He has also been much abused and misused even by the few who have read him." † In truth, almost with the authority of "Simon" in the children's game "Simon Says," the name Clausewitz is often tossed into discussions of military affairs to support or destroy one viewpoint or another. Much of the time, as Professor Howard points out, Clausewitz's ideas have been misunderstood and hence misappropriated.

This charge has quite properly been leveled at authorities who have read extensively in Clausewitz's magnum opus *On War*, as well as those who have read little or none of it. In truth, since very few can claim the distinction of having read the entire piece, *On War* is probably the most partially read but heavily quoted study in the field of military affairs.

There are significant reasons why so many students of military affairs have read so little of Clausewitz's great work. For one thing, its size is discouraging; so is the belief that not all of what he wrote has contemporary meaning. But equally impeding an adequate digestion of the work are the deep implications of the thoughts and ideas contained in its opening sections. The reader is very likely to be overwhelmed and subsequently have difficulty in getting through these sections and proceeding with the task at hand. Perhaps this is a good thing, in a way. Clausewitz's writings should not be read once and then put aside with a sense of finality; they are too potent.

While the reasons so many are only partially familiar with the writings of Clausewitz go a long way toward explaining the inadequate grasp of his ideas, they are not the whole story. Another part of the problem has been the almost total lack of knowledge among English-speaking people of the man himself and his times. This "unknown region" is what Roger Parkinson has attempted to chart for us. Overall, he has done an impressive job.

Parkinson is a graduate of King's College, London, where he studied under Professor Howard. He has written two other books dealing with the origins of the two World Wars and had fairly wide experience as a war correspondent from Africa to Asia. In this effort, Parkinson set as his primary goal to describe Clausewitz's "experiences, opinions and character, in such a way that the eventual appearance and content of *On War* may perhaps be better explained and understood." In so doing, he has given a good general coverage of Clausewitz's writings and detailed information on his military career and personal life.

Parkinson aimed this book at a wide audience, for he hoped to reach even those unacquainted with Clausewitz's *On War*. It is perhaps for this reason that he does not present a detailed and interpretive discussion of Clausewitz's treatise itself. This is not to say that Parkinson has ignored *On War* in this biography. On the contrary, he has devoted a chapter to the topic—though it is only nine pages long—in which he outlines Clausewitz's basic intent for the entire work, his desire to refine it further, and some of the main points. Nevertheless, the biography does not provide the *why*; that is, a clear and detailed analysis of *On War*'s "pronouncements" derived from a close correlation with the author's personality, experiences, and intellectual development. This shortcoming, however, does not cancel our debt to Parkinson for a solid biography.

CARL VON CLAUSEWITZ began his military career in the Prussian army at

† Roger Parkinson, *Clausewitz: A Biography* (New York: Stein and Day, 1971, $10.00), 352 pages.

the age of twelve as an officer cadet. He received his first taste of combat shortly thereafter as the flag bearer for his regiment in the limited engagements against the French in 1793. The next year he went on extended leave, as the war faded, and began a long period of study to make up for what he termed "a mediocre education." When the war with the French ended in 1795, the fifteen-year-old second lieutenant realized that peace had ended opportunities for rapid promotion resulting only from talents displayed in the field. Therefore, he pursued his education even more fervently and enrolled in a local school in the small garrison town in which he was stationed. In 1801 he entered the Institution for the Young Officers in Berlin to broaden his knowledge of science, tactics, and strategy. It was there he met his greatest friend and mentor, Gerhard von Scharnhorst, an instructor on the faculty.

By the time of the ill-conceived and badly timed Prussian declaration of war on France in 1806, Clausewitz had finished most of his formal preparation for a military career and was serving as an aide to one of the princely relations of the King. Along with the rest, he marched off to war against Napoleon. But the Prussians, encumbered by the outdated methods and style of warfare handed down from Frederick the Great, were no match for the French military genius, who headed a newer kind of army imbued with flexibility, national spirit, and experience. The defeats at Jena and Auerstädt were as shocking to Prussian institutions and self-image as they were decisive on the battlefield.

From 1808 to 1812, Clausewitz labored hard with a small group of officers in attempting to rebuild, reform, and modernize the shattered army—a task that could not be fully performed without certain parallel changes in Prussian institutions, social structure, and ways of thinking. The job was not an easy one, as French watchfulness, the limited resources of Prussia, and considerable opposition from the Prussian ruling class hindered practically all but the most obvious and necessary changes. Finally, frustrated in his efforts, smarting under "French arrogance," and disgusted with royal inertia to throw off Napoleon's yoke, Clausewitz resigned in 1812. On the eve of Napoleon's Russian invasion, he entered the service of the Czar—Prussia's enemy, by treaty with France.

Until the final victory over Napoleon in 1815, Clausewitz served with the Russian army as a staff officer. He spoke almost no Russian, but most of his service was in an attached German legion. The major engagements from Moscow to Paris and Waterloo in which Clausewitz participated are related vividly and realistically by Roger Parkinson. Although the author's maps of these sweeping campaigns are sometimes inadequate, he compensates by his lively account of the fascination and brutality of warfare of the time.

At the end of the war, Clausewitz was permitted to return to Prussian service. His having switched to the "enemy" in 1812 and his opposition to the conservative desires of the ruling elements of Prussian society, however, were never fully forgiven. Relatively powerless to halt it, he witnessed the postwar undoing of many of the reforms instituted during the crisis period. Although he finally achieved the rank of major general, he was kept out of the mainstream of Prussian military development (or stagnation) until his death in 1831. He died from cholera at the age of 51, after serving as chief of staff of a Prussian force organized to guard against popular uprisings in that portion of Poland held by Prussia.

Parkinson recognized that the process which worked to make Clausewitz such an interesting and significant figure in the study of strategy, politics, and military affairs was dependent on other factors than those presented in a sketch of his military career. These factors included his own personality and the times in which he lived. Hence, to offer the reader a firmer grasp of the man, Parkinson

delved deep into these vital areas.

Even as a young man, Carl von Clausewitz was not of the same mold as the majority of his contemporaries in the Prussian officer corps. Instead of the swashbuckling arrogance so prevalent in his day, he possessed a rather shy and introspective nature. In a social structure based heavily on noble status, tradition, wealth, and "name," the Clausewitz family was poor and held only a tenuous claim in the ranks of Prussian nobility. Furthermore, the "service to the state" rendered by his ancestors had primarily been in scholarly pursuits, not in military service. To be sure, Carl's father had served under Frederick the Great. Because of a war wound, however, he rose no higher than the rank of lieutenant and retired early, to become a petty tax collector. Two of Carl's three brothers were officers when he entered military service (the third was a scholar) but only in the company grades—hardly a firm claim to a tradition of service. Therefore, by background, he was something of an outsider in the officer corps.

Besides his family heritage, Clausewitz's drive to improve himself intellectually—in a military atmosphere of drill, discipline, glory, and honor—tended to set him apart. His desires for glory and honor were certainly no less than those of his contemporaries, but his penchant for study—hardly a soldierly characteristic at the time—exposed him to the great writers and thinkers of the day, of both the Schools of Reason and Romance. This exposure enabled him to probe logically the deeper reasons for Napoleon's stunning victories and look critically at the Prussian social, governmental, and military systems that hindered Prussia's efforts to compete favorably with the French. In short, it helped prepare him for the role of a reformer.

At the same time, this intellectual exposure created within him the passionate desire to change and restore his nation, a desire so strong he could not abide Prussia's royal inertia in castin ogff French control. This was why he resigned to fight with the Russians against Napoleon and why he eagerly returned to his nation's service after Prussia joined in the crusade against the Corsican "anti-Christ."

Clausewitz's shy, retiring personality did not allow him to gain a large circle of friends. To those with whom he did become intimate, however, he was fiercely loyal, particularly to Scharnhorst and Gneisenau. Whereas Clausewitz's valuable talents for study and writing eminently suited him for staff duty, this kind of work and his personality tended to reveal these gifts only to close associates. Hence, his reliance on friends was considerable, yet personal recognition during his lifetime was fairly limited. This lack of recognition gave him intense pain and disappointment throughout his long career.

Although Clausewitz began writing his great work *On War* after the Napoleonic era had ended, he continued to revise various sections almost until the time of his death. Indeed, it is generally believed that he regarded only the opening sections as satisfactory; yet, as Parkinson points out, there is evidence that Clausewitz intended to tighten even these segments. Be that as it may, the shortcomings from the perfection that Clausewitz hoped to achieve should not deter the serious student, nor does it detract from the value of the work.

From the foregoing summary of Parkinson's biography, it should be apparent that Clausewitz's discussion of war reflected a number of factors that influenced him. One which Parkinson neglected, however, was the scholarly style of the day which sought to establish a clear definition of a topic in an abstract or "perfect" state against which to discuss the "real life" model. In this manner, Clausewitz organized and presented his experiences, observations, and analyses concerning the great scope of modern warfare. The result, as in the opening portions of *On War*, was an initial discussion of war in its purest form—unbounded, unlimited, senseless, and savage.

Then followed a description of war in the "real world"—bounded by restrictions, limited by political intent, and, hopefully, rational in its violence.

Without an understanding of the man and his times, it is easy to slip into the gross misinterpretation that the "perfect" state of war to which Clausewitz alluded was the "ideal" that rational men should strive for, rather than merely a backdrop to facilitate his discussion of the topic. This error was common in the past and is no less common today.

The "real war" described by Clausewitz was a new kind of war, modern and devastating. It was a style gradually forming in the minds of strategists, organizers, and planners well before Napoleon, but with the social energies unleashed by the French Revolution and the leadership and skill of Napoleon, it sprang forth decisively on the unreformed and unready. The new version of war drew sustenance from the people and was limited by, among other factors, their enthusiasm for and dedication to the task at hand. It was war waged by the "nation at arms."

This enthusiasm and dedication of the people permitted the implementation of new tactics, strategies, and flexibilities for the battlefield. Clausewitz recognized these new modes and emphasized them by contrasting them with the outdated styles employed in earlier conflicts. But the key to the new process was the new role of the people. Yet, whereas the changes that fostered the implementation of the new form of warfare had come in France rather naturally as a result of the Revolution, which destroyed so many institutions of the past, the reverse was true in Prussia. There, under the leadership of royally appointed committees of reform, men like Scharnhorst and Clausewitz worked from a model or conception of what they believed their military forces had to become to be successful. Their efforts thus went past the obvious need for military reforms and updating. They labored to change the obstructing political, social, and governmental institutions that prevented them from effectively tapping the energies of the Prussian people in the achievement of their goal. The results, however, were intended to be the same as the French had accomplished.

It was entirely reasonable that, while studying popular involvement in conflicts between nations (not just between royal houses), Clausewitz should have examined man's "newest" form of struggle, guerrilla warfare. An example of this kind of war had occurred in the Spanish resistance to Napoleon, and Clausewitz was well aware of the potential this mode of activity afforded a defeated and occupied Prussia to harass the French. Roger Parkinson points out that in 1810, while an instructor in what later became the Prussian War Academy, Clausewitz lectured on the topic, which to most of his students must have appeared an outlandish proposition. Nevertheless, he had organized his thoughts on the use of guerrillas to act as insurgents for a "have not" nation (as Prussia was in the period after the defeats of 1806) or as auxiliaries to regular forces in more traditional struggles. He thus clearly anticipated the concepts of modern "inventors" such as Mao or "Che" Guevara.

In sum, as Roger Parkinson has related, Carl von Clausewitz lived in a period of great change. As a serious student of the art of war, he tried critically and logically to evaluate the causes, meaning, and impact of these changes on his chosen profession. Fortunately for later generations, he was not content just to be a thinker; he recorded his thoughts, ideas, and concepts, exposing their weaknesses or strengths to his own intellect for further refinement. In their final form, *On War*, he achieved a grasp of the subject of warfare far deeper and more complete than any of his contemporaries and all but a few of his successors.

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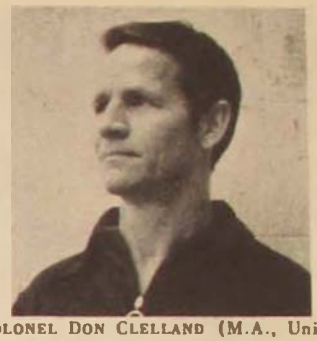

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The Air University Review Awards Committee has selected "Winners and Losers: A Conceptual Barrier in Our Strategic Thinking" by Dr. Ralph E. Strauch as the outstanding article in the July-August 1972 issue of *Air University Review*.

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