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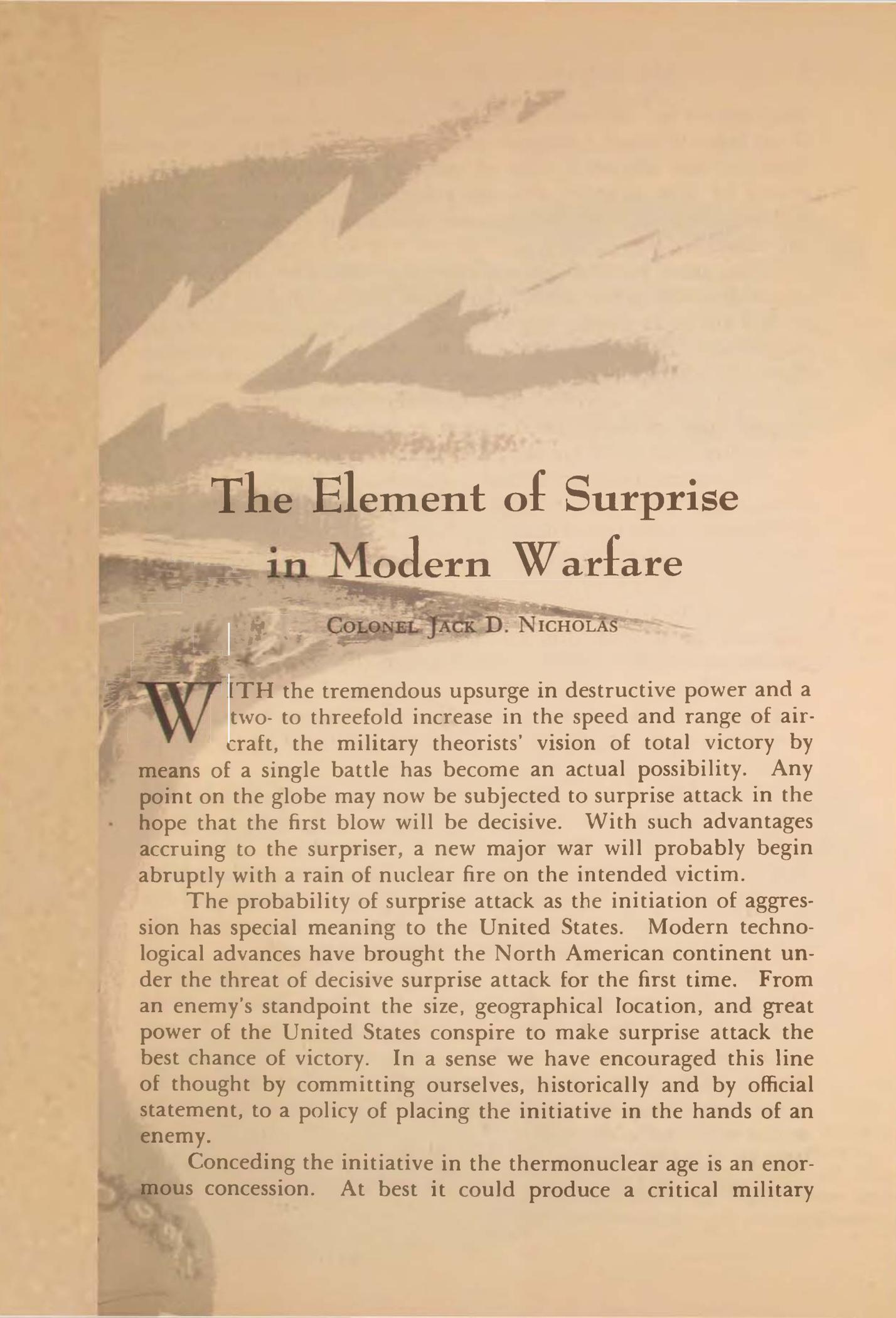
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In the air-atomic age annihilation of an unsuspecting opponent by a shattering initial blow has become the aggressor's blueprint for victory in total war. The attributes of decisive firepower, speed and continuity of attack, flexibility, and limitless access to targets give modern air forces the paramount capability for achieving strategic surprise and largely deny this capability to surface forces. Defense of the United States against the deadly surprise potential of air delivery and nuclear weapons requires the utmost vigilance. Colonel Jack D. Nicholas, Assistant Director, Intelligence Division, Armed Forces Staff College, describes how we may advance our guard by studying the patterns in past applications of strategic surprise.



The Element of Surprise in Modern Warfare

COLONEL JACK D. NICHOLAS

WITH the tremendous upsurge in destructive power and a two- to threefold increase in the speed and range of aircraft, the military theorists' vision of total victory by means of a single battle has become an actual possibility. Any point on the globe may now be subjected to surprise attack in the hope that the first blow will be decisive. With such advantages accruing to the surpriser, a new major war will probably begin abruptly with a rain of nuclear fire on the intended victim.

The probability of surprise attack as the initiation of aggression has special meaning to the United States. Modern technological advances have brought the North American continent under the threat of decisive surprise attack for the first time. From an enemy's standpoint the size, geographical location, and great power of the United States conspire to make surprise attack the best chance of victory. In a sense we have encouraged this line of thought by committing ourselves, historically and by official statement, to a policy of placing the initiative in the hands of an enemy.

Conceding the initiative in the thermonuclear age is an enormous concession. At best it could produce a critical military

situation for us. At worst it carries the seeds of a national disaster. If we hope to deter a surprise attack or dull its effects, we must continue our advanced state of military preparedness. But we would be wise to study also the principle of surprise—to learn about its future potentialities and limitations from past applications.

The art of war changes, not the rules. Surprise as a principle of war is as old as war itself. The term *surprise* implies an unexpected attack or move, producing confusion and disorganization of the attacked nation or force. It may be achieved at all levels—from the most involved strategic plans to the simplest tactical operation. It may be partial or complete, depending on the degree of preparedness of the attacked nation or force. Secrecy, deception, originality, and speed are the main factors in its success.

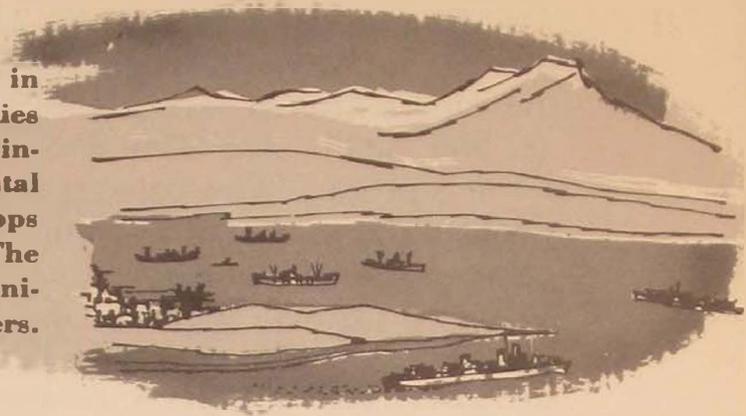
The terms *strategic*, *tactical*, and *technical* describe the nature of the surprise attained. Strategic surprise furthers the strategy of the aggressor and has a major influence, though not necessarily decisive, on the subsequent course of the war. The greatest opportunity for strategic surprise is at the outset—in the initial blow. Tactical surprise proposes improvement of the aggressor's tactical situation. It has only a short-term effect, with little or no influence on the course of the war. Technical surprise involves the introduction of equipment or weapons of advanced technological development which the enemy force has no previous knowledge of or effective countermeasure for. The main interest in this article is in strategic surprise.

Awareness of a forthcoming attack does not necessarily eliminate the element of surprise. The degree and effect is directly related to the attacked nation's state of preparedness. The victim may know important details about the impending attack and still be surprised by its location and timing. On the other hand surprise is not necessarily reserved for the aggressor. Surprise deployments and dispersals are effective defensive measures.

No matter how careful the preplanning, the value of surprise depends upon execution of the plan. A planned strategic attack may turn out to be no surprise at all and backfire, as in the case of the French offensive in the initial phase of the Franco-German War of 1870. With effective exploitation and favorable circumstances, technological surprise may develop into strategic surprise, as was very nearly the case with the German V-2's during World War II. Tactical surprise too may develop into strategic surprise, as illustrated by Guderian's surprise at Sedan, May 1940.

The Principles of Surprise

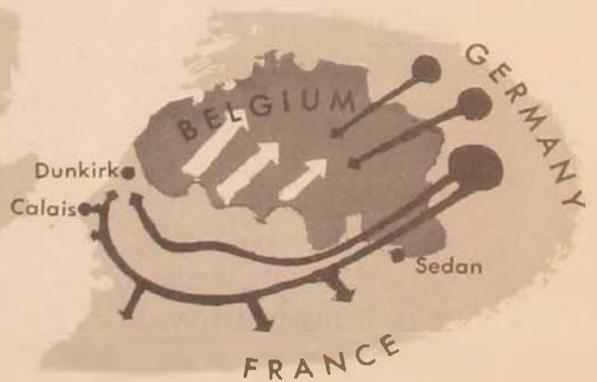
Deception: German seizure of Norway in 1940 capitalized on deception. Supplies and equipment were prepositioned in invasion harbors by innocent-looking coastal freighters. Warships then moved troops in swiftly and without detection. The use of the British flag and communication in English confused defenders.



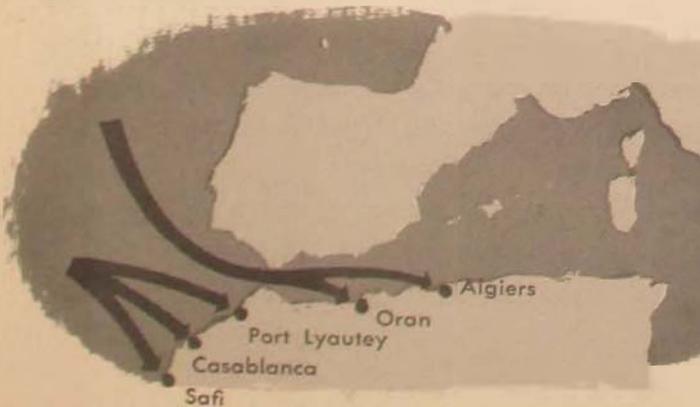
Originality: Breaching of the Nazis' "Fortress Europa" over lightly defended open beaches at Normandy rather than through heavily defended ports in the Pas de Calais was made possible by ingenious new devices—landing craft, artificial harbors, fuel pipeline under the Channel.



Speed: Rapidly exploiting a surprise breakthrough of the vaunted Maginot Line at Sedan, Guderian's panzer divisions swept to the English Channel, cutting Allied armies in two, isolating Belgium, and triggering French military collapse.



Secrecy: The farflung Allied invasion of North Africa pivoted on secrecy of time and place. The Germans first thought Dakar, then Italy or Malta, was the armada's destination. Concentration of shipping, departure, and the entrance into the Mediterranean—all were undetected.



The Evolution of Surprise as a Principle of War prior to 1939

The value of surprise as a principle of war has been recognized throughout recorded military history. It is emphasized in the oldest known military treatise, Sun Tzu's *The Art of War* (c. 500 B.C.). Sun Tzu wrote that all warfare should be based on deception: "The general is skillful in attack whose opponent does not know what to defend; and he is skillful in defense whose opponent does not know what to attack." The Roman military writer Frontius, popular throughout later antiquity and the Middle Ages, listed in his books a variety of ways to achieve surprise. The military successes of Frederick the Great were due in large part to his skill at achieving "surprises with sudden blows."

Three developments in the nineteenth century altered the traditional conception of surprise as a matter of "sudden blows" by a small, professional standing army. The technological revolution made possible the mobilization, supply, deployment, and maneuver of masses of men on an unparalleled scale. European armies grew from easily maneuverable, small professional armies to large conscript forces which could not be raised, trained, or moved in secrecy or with rapidity. By Bismarck's time the rules of warfare were dictated by certain diplomatic formalities wherein the various powers were careful to avoid the label of aggressor. As a result military theorists, epitomized by Clausewitz and Jomini, no longer considered surprise as a condition of victory but as a welcome by-product which sometimes facilitated victory. They agreed that surprise might be helpful when associated with the principle of concentration (or mass), i.e., when one force through surprise achieves relative superiority at a decisive point.

During most of World War I surprise was almost forgotten as a principle of war. The political maneuvering in 1914 precluded strategic surprise. Although relatively easy to achieve in the early phase of the war, tactical surprise became increasingly difficult as the war became more and more positional. The movements of mass armies, the extensive time needed to prepare for offensives, and the time lag between conception of a plan and its execution gave the enemy enough advance warning so that he could reinforce his position and provide countermeasures.

A revived interest in surprise in the closing days of World War I sparked a vigorous discussion between the two wars. Most notable was the recognition that aviation had opened up new pos-

sibilities in achieving surprise, that in future war surprise might provide the key to victory, and that the closer the belligerents' balance in striking power the more vital surprise becomes.

The German Application of Surprise in World War II

Since Frederick the Great the Germans have been masters of the surprise technique. Though neglecting it in World War I, their offensive moves in World War II continually exploited surprise, and their experience provides a rich field for its study. The possibility of a future surprise attack against the United States by another totalitarian power whose ideology also fosters aggression makes it worthwhile to examine the background and foundation of the German surprise attacks.

Prior to World War II no major power had achieved strategic surprise in war for over a century. During that time war and preparation for it had become increasingly complicated. Nazi leaders openly asserted Hitler's basic aim of gaining control of Europe and the world. Yet under Hitler the Germans repeatedly overcame the difficulties of achieving surprise.

The German military surprises were not accidents but the result of extensive psychological, economic, and political preparations within and outside of Germany. Intensive internal propaganda pictured the Nazi party as the savior of Germany from Bolshevism and the designs of the Western democracies. Like present-day Communist spokesmen, Nazi leaders preached the myth of encirclement. Meanwhile the Nazis channeled the entire German economy toward preparation for war, secretly after 1933 and openly after 1935. Hitler consolidated his political power in Germany and established the Nazi doctrine as a code of belief and conduct. The keystone of this doctrine, the principle that complete and total authority was vested in the Fuehrer, was a decisive factor in Germany's success in achieving surprises in World War II.

Beyond Germany's borders Hitler tried to weaken and break up the existing alliances. Political infiltration followed economic penetration. In many cases native Fascist parties contributed as much to the blitzkrieg as did the airplanes and tanks. In diplomacy the Nazis tested the spirit and resistance of their opponents by cautious experiments. They advanced or withdrew according to the temper encountered. Intimidation was joined with the tac-

tic of accusing the opponent of what Germany herself proposed to do. At the same time Germany's protests of her desire for peace after each aggressive step gave birth to false hope in other nations. Thus fear and false hope, seasoned with confusion, combined to keep Germany's victims off balance and militarily unprepared. Unpreparedness set the stage for surprise attacks.

No single element of German surprises achieved during World War II equaled in importance the "Fuehrer principle." One man and one man alone held absolute power, power used carefully to synchronize political, economic, and military endeavors. A master of the psychological side of strategy and possessed of a profound and subtle sense of surprise, Hitler personally set the date for D-day and the time for H-hour.

The underlying principle in Hitler's concept of surprise was that determined and full utilization of the "favorable moment" was the surest guarantee of success in aggression. In the bloodless conquests of 1936-1939 and in the invasion of Poland the "favorable moment" was the appropriate political moment. Thereafter it became the most favorable military moment. All Hitler's victims were made well aware of the probability of attack beforehand by the military or political preparations. What Hitler strove for was surprise in time and in extent. To exploit fully the "favorable moment," Hitler brought the entire force of his armed potential to bear on D-day. From the application of these principles Hitler expected to produce disorganization, confusion, and demoralization in his enemy, culminating in shock that would greatly enhance the possibilities of cheap, quick victories.

Hitler's boldness and success in selecting the "favorable moment" was complemented by stringent secrecy precautions, meticulous military planning, and the initiative of German field commanders. In planning, Hitler personally emphasized security rules: no one should take part who does not have to know; no one can find out more than he must know; and no one may know anything before he needs to know. Security was directed at ally and enemy alike. Not until 12 August 1939 were the Italians informed of Hitler's plans to invade Poland on 1 September—and then only in general terms. The Romanians, who were to assist in the attack on Russia on 22 June 1941, were not officially informed of the date until 18 June. Secrecy applied also to mobilization measures. Although Germany had been mobilizing for war from 1933 onward, military mobilization just before the outbreak of World War II was speeded up without a parallel surge in civilian mobilization and without public announcement.

The success of Germany's efforts at surprise came close to winning the War for her. These surprises were many and varied. History does not offer a comparable experience: the crushing of Poland; the invasion of Norway; the attack against France, May 1940; the attack against the U.S.S.R.; the introduction of the long-range missile. Surprise was achieved repeatedly as to time, place, direction of attack, force employed, tactics, and weapons used. The whole gamut of surprise was achieved at one time or another: strategic surprise, tactical surprise, technological surprise, naval surprise, *coup de main*, and concealment of objective. The main ingredients were political, economic, and military preparations; Hitler's timing of the most "favorable moment"; the meticulous and detailed planning of the German staffs, accompanied by secrecy and deception; the initiative of the field commanders in implementing plans and exploiting opportunities; and scientific and technical skills.

Last, but equally important, German success was aided by the "collaboration" of the victim. Despite Poland's awareness of the imminence of war the degree of German surprise was absolute. Poland's obsolete plan of defense invited surprise attack. She tried to defend everywhere along one of the longest borders in Europe. Norway "collaborated" in her own surprise by pursuing an unrealistic neutrality policy and overlooking fifth-column activities. By ignoring intelligence estimates of German plans to attack at Sedan and reports of strong troop concentrations in the Ardennes, the French High Command set the stage for the German success. What began as a tactical surprise at Sedan developed into one of the most important strategic surprises of the war. In less than three days the French army no longer existed as an organized fighting force.

The Soviet Union also "collaborated" in its own surprise when the Germans struck on 22 June 1941. In view of power relationships in the world today the Soviet experience deserves separate treatment. From it one can construct a possible Soviet concept for the employment of surprise.

Surprise in Soviet Experience

One cannot discover a Soviet concept of strategic surprise by an empirical approach. In its thirty-eight years of existence the Soviet regime has never attempted a surprise attack as the initial blow in warfare. Although begun without a declaraton of war,

the Soviet attack on Finland followed a year and a half of negotiations. Heretofore the Soviets have confined their surprises to the political field and may point with pride to many successes. Planning and executing a strategic surprise attack would be a novel military experience for them.

One may discover how the Soviets view strategic surprise by either of two approaches: reviewing the circumstances under which the U.S.S.R. was surprised by Germany or reviewing the available Soviet military literature relevant to the subject.

German logistic planning for their campaign against the Soviet Union began a year in advance, in August 1940. A two-phase deception plan was set in motion in September. The purpose of the first phase was to give the impression of larger forces facing the U.S.S.R. than were actually present. In the second phase the reverse impression was intended, and every means was employed to induce belief in German preparations for an attack on England. German troops were briefed on an invasion of Britain. Plans were prepared to block off certain areas on the Channel coast and in Norway. German and Russian trade continued unabated.

As the invasion date approached, deceptive measures were stepped up. Every effort was made to disguise force concentrations in the East as a large-scale maneuver. Rumors of attack against England were widely circulated. Large numbers of fake orders for the transfer of troops to the West were issued. Goebbels wrote an article describing the Crete invasion as a rehearsal for a great airborne operation, then withdrew it "for security reasons" after foreign correspondents had cabled the story. After the opening attack on 22 June, Chief of the German General Staff Franz von Halder commented that "surprise of the enemy has been achieved all along the entire line."

The Russians received numerous warnings of impending Nazi attack from British, American, and German intelligence sources and from their own espionage apparatus in Switzerland, Japan, and Germany. The air was rife with rumors of the attack. Yet in general the Communists officially denied the rumors and attacked Western sources as trying to foment a Russo-German conflict. Despite Hitler's extensive plan of deception it is difficult to see how the Kremlin leaders were actually deceived. On 13 April 1941 the Soviet government signed a neutrality pact with Japan, an obvious move to protect her rear under the threat of German assault. Stalin personally took over the functions of the head of the Soviet government on 6 May. In a quick series of maneuvers the Soviet appeared to try to buy time from the Nazis. On 8 and 9

May the Norwegian, Dutch, Belgian, and Yugoslav representatives were requested to leave Moscow, belated recognition of the Nazi conquests. The Russians fulfilled their trade obligations up to the eve of the attack, including the transport of rubber from the Far East by express trains.

Soviet political reactions to the imminence of hostilities suggest awareness of the threat. The timing of the reactions corresponded to the growing danger. The absence of such reactions in the military sphere accounts for the achievement of German surprise.

The propaganda claim of a planned strategy of active defense in depth cannot explain the tremendous Soviet losses in men and materiel early in the war. In fact the Red Army was totally unprepared when the German attack came. In June 1941 the Red Army was undergoing four important changes: redeployment, retraining, reorganization of the army divisions, and re-equipment with new tanks and aircraft. The training schedule indicated no special vigilance or preparedness; in some cases maneuvers were in progress at the time of the invasion. In one sector the Soviet troops failed to return fire because they had no orders.

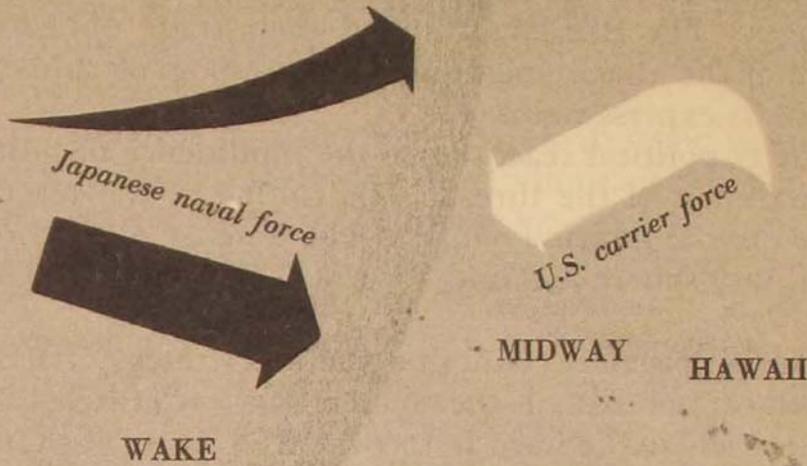
That Stalin knew war would come is certain. The question is why the military were not alerted. With only circumstantial evidence to go on, one may consider the following explanations: (1) Churchill's suggestion of "purblind prejudice and fixed ideas" which Stalin raised between himself and the "terrible truth"; (2) weaknesses in government and military organization, lack of coordination, and lack of willingness to assume responsibility except at the top; (3) a loss of confidence by Stalin after the Finnish debacle in the capabilities of the Red Army and the belief that a "cause" besides communism was required to invigorate the Army and unite the populace, i.e., a "treacherous surprise attack" that would bring on the cry for "defense of the fatherland." Regardless of the true explanation, a significant point emerges: the Kremlin leaders little appreciated the potential effects of the forthcoming German surprise attack.

The German assault on 22 June 1941 caught the Russian armed forces off guard and unprepared to meet it or to minimize its destructiveness. The effect was almost sufficient to carry the Germans to a quick victory. Yet in subsequent statements Stalin attempted to play down the importance of surprise as the initial blow in warfare and described it as merely a fortuitous and transitory element. Apparently he was seeking some explanation to account for his blunder in permitting the Soviet forces to be surprised, with the resulting tremendous loss in men and materiel.

Defensive Surprise

JAPAN

MARIANNAS

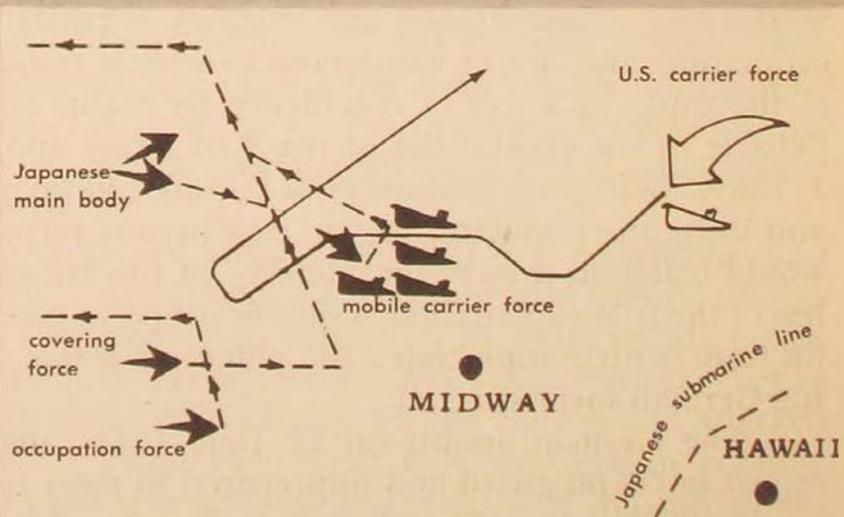


Battle of Midway

In June 1942, to shore up their defensive ring of island strongholds in the Central Pacific and to lure the U.S. fleet into a fatal trap, a vast Japanese amphibious force moved against Midway Island and against the northern flank in the Aleutians. But the breaking of the Japanese code enabled the U.S. to turn the surprise against the enemy. A hastily assembled U.S. carrier force smashed the Japanese carriers and compelled the opposing fleet to withdraw. The balance of power in the Central Pacific shifted in favor of the Allies.

NEW GUINEA

AUSTRALIA



Unknown to the Japanese the U.S. Navy hurriedly grouped three carriers and their escorts on the flank of the Japanese carrier force, avoiding the submarine patrol line lurking west of Pearl Harbor. The American carrier planes struck the Japanese carriers as they were recovering planes from a Midway strike. All four Japanese flattops engaged were sunk, with a loss of only one American carrier.

Stalin's depreciation of the importance of striking the initial surprise blow established the line in Soviet doctrine during his time.

But the Nazis' effective use of strategic surprise employing conventional firepower undoubtedly left its mark on Soviet military leadership. The obvious implications of thermonuclear firepower coupled with surprise have not been lost on Soviet military leaders either. Released from Stalin's iron hand, current Soviet military literature takes the frank position that because of the power of thermonuclear weapons, surprise aggression could become a deciding condition not only for success in the initial phases of a war but even for its outcome.*

In contrast to the Stalinist depreciation of surprise, current Soviet military doctrine recognizes many ways of achieving tactical surprise in combat. The rules listed for achieving tactical surprise may well form the basis for the Soviet concept of strategic surprise: secrecy, deception, unanticipated and overwhelming superiority of force, unexpected use of new weapons or tactics, and adroit maneuver and speed.

The Surprise Attack Against Pearl Harbor

The Japanese surprise attack on Pearl Harbor and the German surprise attack on Russia present an analogy of enigmas. The United States also possessed timely and adequate intelligence, but as with the Red Army the armed forces of the United States were not alerted.

Japan's ambitious program of conquest began in 1931 with the subjugation of Manchuria. Announcing a "Greater East Asia Co-prosperity Sphere," she set about to drive the "barbarians" from the Orient. As early as January 1941 her dominating military clique conceived the plan for an attack on Pearl Harbor. On 2 July 1941 final plans were made for an advance into southern Asia, with the expectation of war with the United States and Britain. Conditions were imposed throughout the empire presaging a major military effort. Failure by the Konoye Cabinet in the Tokyo-Washington negotiations resulted in a government crisis, which the U.S. government knew of from intercepted dispatches, and in the formation of a war-bent military dictatorship under General Tojo on 16 October. War games in August 1941

*[See articles by Leonard N. Beck ("Soviet Military Literature and Soviet Air Doctrine") and by Dr. Kenneth R. Whiting ("The Search for a Soviet Air Doctrine") in *Air University Quarterly Review*, VIII, 2 (Spring 1956), 93-107.—Ed.]

preceded a war plans conference from 2–13 September which finalized operations plans for the beginning of the Pacific war, including a surprise attack on Pearl Harbor.

All units assigned to the Pearl Harbor attack conducted extensive training. Meticulous planning and timing were emphasized. Detailed intelligence data were collected. Elaborate deceptive measures were applied. The most telling deception, however, was self-deception by the United States. U.S. leaders were convinced that Japan would attack only to the south. Japan appears to have been aware of this belief, and to abet the deception made no effort to conceal moves in that direction. The final ingredient in the Japanese plan was the element of surprise. If discovered prior to "X - 2" days the striking force was to abandon its mission. If discovered on "X - 1" the decision to attack was to be based on local conditions.

Although later investigations agreed that all interested U.S. agencies recognized the imminence of war, the Japanese attack at Pearl Harbor achieved strategic surprise. Other factors in addition to deception contributed to Japanese success. First, throughout 1941 the U.S. government focused its principal efforts and attention on Europe, believing that the destiny of Europe, if not of the world, was in precarious balance. Second, in estimating possible courses of Japanese action, U.S. decision-makers failed to allow for the Oriental attitude. To U.S. planners the risk of an attack on Pearl Harbor—the imperilment of most of Japan's eight carriers—seemed out of all proportion to its value. The willingness of the Oriental to conduct a suicide attempt in order to gain an extraordinary advantage and his penchant for unexpected, reckless, and daring moves were overlooked, despite the record of previous Japanese uses of surprise attack. Third, the United States committed errors of judgment in underestimating Japanese military power and in believing that Pearl Harbor was too strong to be attacked.

A fourth factor contributing to Japanese success was the U.S. intelligence muddle. There was excellent and timely intelligence before Pearl Harbor of Japanese designs, decisions, and operations at home. The breakdown came in evaluation and dissemination. Warning of a surprise attack had become the prerogative of planners, not of intelligence. No system existed to identify and collate indications of attack. Realization was lacking of the importance of intelligence and of its requirement for specialized training.

Other considerations operated in addition to these factors: the peace psychology ("it can't happen here"), serious defects in

the military structure, and lack of coordination and of centralized authority in Washington and Hawaii. But the major factors discussed above were sufficient in themselves to aid surprise at Pearl Harbor. The similarities between Pearl Harbor and the German surprise attack against the U.S.S.R. are self-evident. In both instances political tension preceded the attack and there were apparently sufficient intelligence indications of attack, but the victim was caught off guard and unprepared with near catastrophic results. In effect both victims "collaborated" in being surprised.

The Element of Surprise in a Future War

In the German and Japanese surprises of World War II the effects achieved could be directly related to the explosive power of TNT. The speed of the tank governed the speed with which the Germans could exploit surprise. The twenty-six-knot speed of the Japanese carriers governed the speed of execution of the blow at Pearl Harbor. But speed is now measured in Mach, and explosive power in megatons. With increased aircraft ranges any point on the globe may be subjected to surprise attack. One aircraft can deliver a destructive force equivalent to thousands of World War II bomber sorties.

As a result of these major revolutions in the art of warfare the element of surprise assumes a completely different dimension. "Victory through a single battle" or "annihilation by one battle," theoretical topics in military literature for the past fifty years, have become distinct possibilities.

The United States today provides the most important opposition to a regime demonstrating an appetite for power and an intention to dominate the world. To achieve world domination, the Communists must overthrow the United States. They cannot realistically hope to do so through political infiltration or a Communist-inspired revolution. Only decisive military victory will gain their ends. Ground defeat of America overseas could not be decisive, and surface or airborne invasion of its homeland is obviously impossible. Strategic air power is the only military force in sight that could be used effectively against the United States.

In the event of a decision to wage war the Soviet leaders presumably would make every conceivable effort to capitalize on the element of surprise. Consideration of three factors pertinent to such an aggression supports this hypothesis: (1) the Soviet

weapon system; (2) circumstances attending the outbreak of hostilities; and (3) the first Soviet objective.

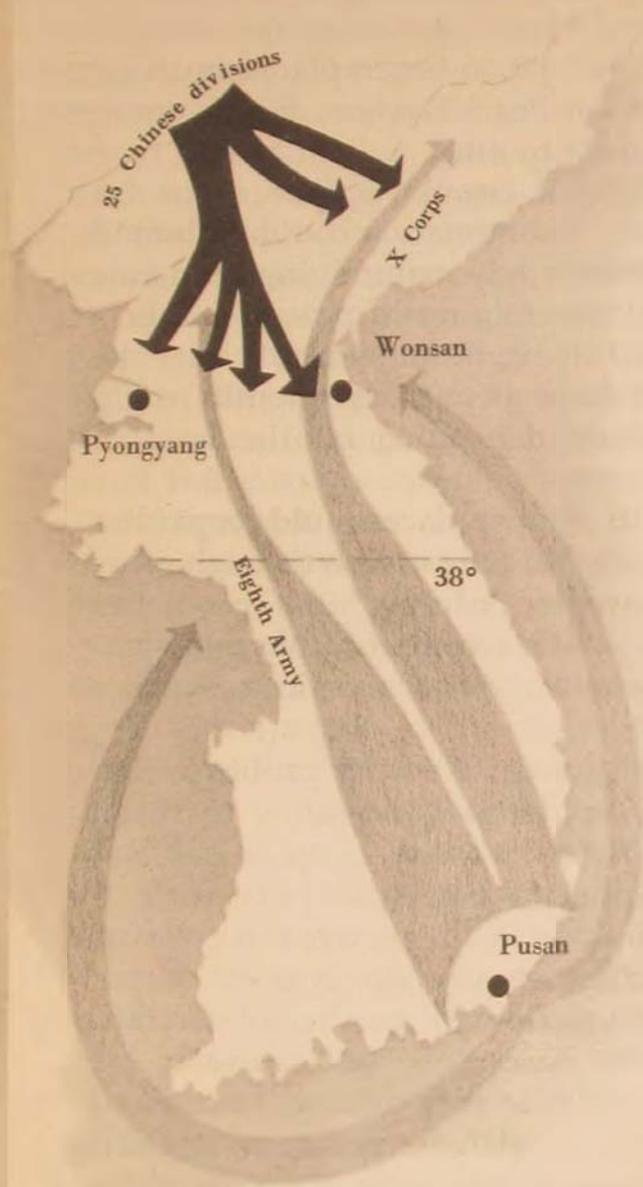
- Russia's speedy development of atomic weapons, her hurried acquisition of a strong air defense, and her rapid creation of a long-range strategic air force reinforce this conclusion. By 1957 to 1959, Sir Winston Churchill estimates, Russia can launch a full-scale nuclear bomber attack against North America. Senator Symington considers that by 1960 the Soviet Union may possess enough intercontinental ballistic missiles, with hydrogen warheads, to deliver an all-out attack against the United States. The power of Soviet land forces is so paramount that the development of long-range bombers and nuclear weapons can serve no requirement other than an attack on the United States. By responsible and informed estimate Soviet weapons development and production will enable them to engage in all-out nuclear warfare before 1960. Intercontinental missiles will become available in the subsequent five-year period.

- Adventurism heretofore has not been a characteristic of Soviet policy or military strategy. Soviet leaders have proved shrewd, analytical planners not given to taking chances. In the age of nuclear weapons it seems unlikely that the Soviets would become engaged in a war through miscalculation. Provocation has not been lacking before, and "tactical retreat" has long been a demonstrated part of Communist doctrine. When the Soviets engage in open hostilities, it will probably be through deliberate design and when they are ready: they would possess the initiative and could exploit surprise; they would have the initial choice of objectives, tactics, weapons, and battle areas; they could ready their striking force in accordance with their own time table; they would have the opportunity to choose the "most favorable moment" for attack; they could make final preparations for the defense of the U.S.S.R. to reduce its vulnerability to retaliation; and the availability of nuclear weapons on both sides would make it mandatory to concentrate on winning the first battle.

- The first Soviet objective in the event of war would be the strategic air force of the United States, the only force able to deliver a full-scale atomic attack on the U.S.S.R. Soviet ability to neutralize this force would turn on their ability to achieve surprise. Thus achievement of surprise would likely form the basis and become the keystone of Soviet strategy.

The greatest Soviet problem would be to make preparations without jeopardizing the element of surprise. Soviet political and military doctrine places an eminently high value on preparedness.

Communist Use of Surprise

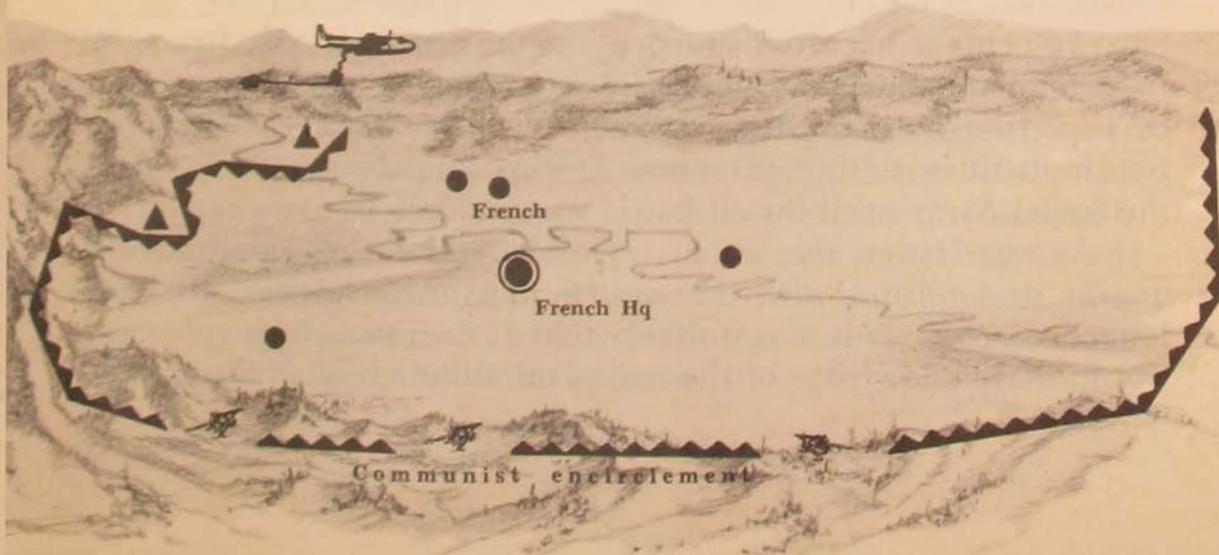


Korea

The treacherous Communist invasion on 25 June 1950 revealed the Soviet bloc's adoption of surprise attack as the initial blow in armed aggression. Chinese Communist intervention in November 1950, following defeat of the North Korean People's Army, illustrates another Communist use of surprise. Like the Communist forces in the Chinese civil war, NKPA troops melted away northward to draw on pursuing U.N. forces for the surprise assault of Chinese armies massed behind the Yalu. Striking in the weak center, the CCF turned the flanks of the Eighth Army and X Corps, forcing U.N. evacuation of North Korea.

Indo-China

At Dienbienphu Communist Vietminh forces engineered tactical surprise by suddenly massing small guerrilla groups into a disciplined army with modern tactics and weapons. Tactical surprise became strategic surprise when surrender of the beleaguered stronghold signaled collapse of the French defense system, ending in partition of Indo-China.



The Soviets have had two dismal experiences of unpreparedness in the Finnish War and in the war with Germany. But to obtain an advanced state of readiness without jeopardizing surprise would be a delicate problem. Germany began preparing ten months before its attack on the U.S.S.R., and Japan began planning about eleven months prior to its attack on Pearl Harbor. Furthermore both countries were already on a war footing.

Relatively speaking, the U.S.S.R. would appear to be far more ready for war than the West. Yet no nation could withstand the economic repercussions of indefinitely maintaining economic and military structures on a full war footing in peacetime. Economic readjustments would probably begin immediately after the political decision to go to war. Perhaps six to twelve months would be required for that readjustment, depending on the level of production required.

The effect of such activity on the populace would jeopardize surprise without extensive psychological preparation through propaganda. The leaders would have to "educate" the people to desire or accept their undertakings. To accomplish this goal without alarming the West again would require a delicate balance between preparations and surprise.

Military preparations would present a special problem. Detection of them would not only be the most revealing in themselves but would confirm suspicions aroused by political and economic readjustments. Preparing the Soviet air offensive and the air defense of the U.S.S.R. would probably receive top priority. The air offensive could be readied with a relatively good chance of maintaining secrecy, since only a limited number of aircraft, selected personnel, and distant air bases need be involved. Air defense preparations, however, might be very difficult to conceal, since augmentation of a peacetime air defense system would call for both active and passive measures involving large numbers of military and civilian personnel. A step-up in such activity would also cause restiveness among the populace.

To achieve maximum surprise in the attack on the Strategic Air Command, Soviet ground force activities prior to D-day would be kept to a normal pattern. There would seem to be no vital requirement or telling advantage in exposing the greater part of the Soviet Army until the air battle was decided.

As was Hitler, the Soviet regime would be reluctant to acquaint its satellites with the actual plan until surprise was no longer a factor. It is also unlikely that Communist fifth columns would share knowledge of the real plan, although once the initial

strike was executed they could go into action by virtue of their training and standing operating procedures.

Other problems for the Soviet planner include selecting the "most favorable moment" and then timing final preparations and execution of all offensive actions involving weather, navigation, communications, and logistics; placing his main trust in an untested force with but little experience in strategic air operations during World War II; and running the risk of defection of key political and military personnel. But on balance the Soviets hold strong cards favoring success in achieving surprise—deception and secrecy. They are proven masters of the art of deception. The geographic position of the U.S.S.R. favors secrecy in preparation for war. Of even greater significance is the unparalleled effectiveness of their totalitarian control mechanisms guarding the security of information and the movement of people.

So great are the advantages of surprise and so great are the risks in its absence that the Communists probably would attempt every conceivable political and military deception. Instead of the diplomatic threats and intimidations used by the Germans, the Russians would make sure the enemy was not alerted. Propaganda campaigns featuring antimilitarism, disarmament, and negotiations would set the stage. On the military side deception would call for secrecy, camouflage, feints, misinformation, and activity or ostensible lack of activity to conceal actual intent.

From the point of view of the United States the problem of deterring a Soviet surprise attack is vitally linked with national survival. German and Japanese successes depended not only on secrecy but also on the reaction of the intended victim to the signs of impending attack. To deter surprise attack or blunt its effectiveness, a threatened country has two courses of action: gaining information of the enemy's capabilities and intentions while denying such information to him; and executing positive and timely measures to decrease the potential effect of surprise.

In 500 B.C. Sun Tzu wrote that to remain in ignorance of the enemy situation because one grudges the outlay of a hundred ounces of silver is the height of inhumanity. The wisdom of the advice is obvious. No amount of money should be spared to gain knowledge of a potential enemy's intentions and capabilities, for without it countermeasures to avoid surprise cannot be established. Conversely "maximum secrecy," never practiced by the United States, is an important factor in avoiding surprises. Disclosure of information about U.S. military strategy, weapons, and forces can only help the Soviet planner.

But the lesson of Pearl Harbor proves that deterring a surprise attack does not end with the acquisition of intelligence. Democracies have always been unprepared when an aggressor attacked, yet they have always been aware of the probability of attack. History indicates that if democracies are to survive nuclear warfare they must be more realistic and aggressive in the prehostilities stage.

Surprise need not be reserved for the aggressor. Surprise deployments and dispersals of offensive forces coupled with strong and alert defensive forces are effective methods of deterring or decreasing the potential value of surprise attack. An air base structure permitting flexibility in dispersal or redeployments would enormously complicate targeting for the Soviet planner.

In peacetime training the factor of surprise should gain the attention it actually deserves. Since the consequences of surprise to morale are sometimes as decisive as the material results, peacetime training should condition troops against unexpected attack.

Statecraft and democratic processes must be attuned to the recent revolution in the state of warfare. It is suggested that an aggressive and meaningful policy of deterrence would be less accommodating to surprise than the single principle of "massive retaliation." This latter principle, to be sure, should be the most important and the "backstop" or last-resort element of a policy of deterrence. Besides bearing the connotation of receiving the first blow, to rely solely on the single principle of "massive retaliation" leaves a large gap in a meaningful policy of deterrence which should cover the widest possible scope of contingencies. (For example, the principle of "massive retaliation" does not abolish Communist freedom of maneuver, as both Korea and Indo-China have shown. It leaves open other courses of action—political infiltration, subversion, and Communist-inspired civil wars.)

To assure timely and appropriate action should hostilities appear imminent, it would seem wise that the National Security Council study contingencies that could arise in a prehostilities phase and develop assumptions leading to alternate, flexible plans.

Above all, if the history of strategic surprise offers any lesson at all, it is that a nation must be psychologically and morally aware that "it can happen here." The luxury of hesitation in the face of clear warning of enemy attack is no longer merely foolhardy. It is suicidal. If the democracies are led by their principles to surrender the initiative to the enemy, their only recourse for survival is to be certain in their own minds and in their dealings with potential aggressors that this surrender is no more than a momentary one of timing, that the surprise will be tactical rather than strategic.

A Formula for Strategic Planning

BRIGADIER GENERAL LLOYD P. HOPWOOD

MILITARY audiences at Air Command and Staff College lectures are probing more and more for specific and concrete resolutions of the frequently abstract complex considerations underlying national defense. The process of responding to their questions is a challenging, a stimulating, and not infrequently a frustrating experience. The frustrating question usually comes from the frustrated questioner who is trying to find a hard core of reason among all the complexities, controversies, and emotional elements generally surrounding the concept of air power and particularly beclouding the derivation of a strategy that will most adequately support the national posture.

During the past two years of making periodic presentations on various aspects of air power to the officers attending the Air Command and Staff College, I have had opportunity to assess the reaction of an audience of some ten thousand from the platform, in seminars, or at social gatherings. Evident in this experience with many groups and individuals is a substantial agreement among them, a collective conviction holding that we must get back to the fundamentals of fact, reality, and logic as the foundation for any strategy capable of achieving our national objectives.

Perhaps the basic fundamental is for military men to return to full awareness of our obligations as military men. I am not referring to dedication to the nation and devotion to duty, because I have found these attributes of strength to be the overwhelming rule and their absence the very rare exception. I refer particularly to the obligation of the military to be prepared for the worst—since that is the major justification for our existence. It is our obligation to plan constantly against the possibility of war, for only through this process and in its most specific terms can we test the adequacy of our readiness. No man is prudent who assumes that the smooth sailing of the moment can never be superseded

by a period of rougher going in the future. Success accrues most frequently to the man who constantly plots his means against the logically conceivable courses of the future. Foresight and planning do not deny his sharing in the hope that emergency will not occur. The thousands of official and unofficial words of optimism should therefore be accepted by military men as evidences of the common hope of all for peace and national well-being rather than as signs of blindness to the existence of continuing international problems. Hope and optimism thwart the military man only if they lead to incapable military force born of wishful thinking divorced from reality. Military force assembled for the purpose of deterring war and preserving our national well-being is a costly delusion if it is not genuinely prepared for or capable of action to achieve our objectives and deny those of an enemy.

A Confusion of Terms and Views

BUT when one would return to these military fundamentals, he is apt to find himself opposed by an obscuring multiplicity of terms coined during recent years, all subject to multiple interpretation, that fog the basic issues and bar access to the facts. *War* itself, once a clearly understood word, has taken on such qualifications as "local," "perimeter," "limited," "restricted," "warm," "cold," "hot," "global," and "total." From an extreme view it might appear that solution to the entire problem of international conflict is being sought in semantic exercise. Compounding the loss of meaningful vocabulary is an increasing smokescreen of generality, so that the menace of Communism becomes as imponderable as that of old age, which is lacking the sharp definition of cancer, heart disease, or pneumonia, all in themselves within the scope of correction if identified in time and treated specifically.

As a point of departure a brief examination of the concept of war would therefore seem desirable as a means of reducing the numerous gradations currently accorded to it and agreeing on exactly what we are talking about. For that purpose the three

Soviet imprecation of the Free World may diminish, but the drive of the Reds for nuclear parity increases their potential menace to the Western alliance. As the United States thus experiences a period of quieter but unremitting tension, a confusion of many views obscures the available guide lines for a practicable U.S. posture. To develop a sound military strategy capable of supporting national objectives, Brigadier General Lloyd P. Hopwood, Commandant, Air Command and Staff College, urges a return to the fundamentals of fact, reality, and logic.

categories of cold war, total war, and limited war retain all essential distinctions in usage of the term. The former may be defined as any use of the various forms of power available to a nation which falls short of the probable premeditated use of significant firepower. For the first time in our history we are facing an enemy who holds any means to be ethical that contributes to the achievement of his end objective. He has built what we consider the unethical into an effective weapon system to achieve the greatest conquest of area and people since Genghis Khan. His technique includes the threat of military force as an instrument of blackmail, and he constantly serves notice of that force by periodic attacks upon aircraft of the Free World. Such attacks at one time were considered grave enough to precipitate conventional war. But today the definition of war has apparently patterned itself along lines similar to those used in distinguishing between homicide and murder—the degree of premeditation.

At the other end of the scale is the full and unrestricted exploitation of the entire capabilities of one side against the other. This, beyond any argument, is the condition of total war. A war of this sort, with both sides fully committed with modern weapons, tends to become unmanageable by either side. Thus a new feature enters into consideration simply because the drastic contraction in time required to annihilate an enemy virtually assures his annihilation before slower-moving political action can use its instruments of negotiation. To a regime seeking the domination of the world this ultimate resort may well have drawbacks, even if for different reasons than our own. But by the same token the urgency the Communists have felt to achieve effective atomic capability opposed to the West must be regarded as no more than wisdom from their viewpoint, both with regard to their own security and to the possibility of external exploitation, should we become complacent. Likewise, since we recognize the unacceptability of absorbing nuclear attack, the first prerequisite of our survival has been, is, and will continue to be a countercapability to checkmate Red ambitions for a quick or easy victory over us.

Between the two extremes of cold war and total war there is only one other kind of war: employment of premeditated firepower under conditions which are manageable and which permit negotiation, retreat, termination, or armistice. Perhaps the terms *limited* or *restricted* are as appropriate as any.

The term *massive retaliation* has provided perhaps the greatest confusion of all. It is hard to explain it in terms of "reaction to threat" or "the concurrent operation of action and reaction."

To many it suggests that we have accorded the Communists first turn at bat, with little option but defense until our turn comes. If the Red offensive is to be measured by megatons and Mach numbers, this construction of the term is hard to make convey anything but disaster.

Certainly in coining the phrase it is unlikely that Mr. Dulles intended for it the misunderstanding and misconstruction it has invoked. A perusal of the statements of responsible leaders suggests that a specific meaning for it was added by the words "with means and at places of our choosing." "Massive retaliation" was to denote no more than a proclaimed transition from the traditional "barter system" of war, one of mutual attrition, to a more acceptable "cost-plus" strategy, in which we tender the enemy a statement of costs in advance of his aggression. In effect we say to him that the costs, if he compels them to be levied, will exceed the dividends that he may be anticipating from aggression.

This concept of "retaliation" gives the clue to its timing and incidentally brings into sharp focus the urgency of accurate and timely intelligence. A recent statement by Mr. Dulles (*Life*, 16 January 1956) explains how the threat of retaliation can assume the characteristics of initiative. The technique displays simplicity of a high order. If we take the political initiative to advise the enemy of our terms of engagement should he elect to exercise military initiative, we enable him to calculate his risk. So far the Communists have found the calculable risk too great, because the nature of our announced retaliatory program extends to them the risky alternatives of losing their initiative or accepting an expanded war, neither of which they have cared to accept.

It is worth noting the extent to which enemy planners sold the United States short in World War I, in World War II, and in Korea. They miscalculated in Berlin. Guatemala taught them a lesson. These episodes, combined with our new policy of warning in advance, must be substantially disturbing to an ambitious enemy of any intelligence.

The foregoing examples of semantical confusion are in reality symptoms of a general confusion about the proper bases for a national strategy. Very serious and very immediate in effect are the attitudes into which this general confusion polarizes. One is the view that air power stands discredited because it has not provided an absolute guarantee of decisive results at no risk if it is committed. But war has always been a risky business in which the only basis for taking the risk has been the differential existing between surrendering to the unacceptable and fighting to preserve

the desirable. The ultimate judgment can only be that if we surrender we lose irrevocably, while if we fight and have had the prudence of preparedness we may win. At the worst we could be no more badly off than if we had quit rather than fight.

Another reaction is the understandable one of permitting Red growth of capability in jet-nuclear power to generate frustration or worse. Our own jet-nuclear power is by no means neutralized by this event. We have simply ceased to enjoy the unique advantage of an absolute monopoly. It is true that we must cope with the disturbing fact that for the first time in our history we have become a target system subject to immediate and devastating attack, a status the U.S.S.R. has lived with since the Trinity Bomb at Alamagordo. We are now in somewhat the position of England at the time of the Battle of Britain. What has happened is the advent of sobering competition. Jet-nuclear power in no wise loses its effect because someone else is developing a similar capability. The rifle, tank, or destroyer didn't lose effectiveness because someone else had them also. What has always happened is that competition forces a degree of concentration upon quality never present under conditions of monopoly. This is manifest in acceleration of B-52's, Dew lines, and fighter interceptors.

Specifics for Planning

FIRST of all, I think we must look a little more deeply into Communism as we have been able to observe it in action. The Kremlin must have the same problem with traditional thinking as we do, particularly with the mandate of ideology and with success in past application. From examination of the record we may therefore add two specific qualifications to our general evaluation of the Red threat. First is the consistent history of caution and patience. The Communist goal of world domination is so colossal that Red leaders are willing to take their time, never permitting involvement in favor of some immediate objective to compromise its ultimate attainment. In the words of Stalin, the "tactics of retreat to buy off a powerful enemy and gain a respite," Hence the foot-dragging in the Korean armistice talks that persisted until increasing United Nations irritation became so risky as to suggest the virtue of a settlement. The second specific is the total absence of ethics in Communist diplomacy. Any form of skulduggery is proper if it advances the cause. Thus the more cautious and so far the most productive course of conquest without the use of

military forces may be presumed to continue to appear to them as the preferable course. The commitment of overt military force would therefore seem to be a last resort, a decision to be made only if all other means of power fail to produce the desired results in time or at all.

The foregoing observations suggest another specific, the import of which is sometimes overlooked by military men. This is the need for firm allies, with the capability and the determination to stand up against an aggression. In assessing the order-of-battle capability of many of our allies, some among us have wondered if we would not be wiser to increase our own strength with the funds now going out to arm others and prepare ourselves to "go it alone." Strictly from the view of an order of battle, this conclusion may have some merit, since it is in accord with the principles of mass, concentration, and flexibility. The more important consideration, however, is the vital requirement that our allies, regardless of size, have both the means and the will to resist an aggression, for it is the act of resistance that gives us our only opportunity to intercede. This point has been ruled academic by some. It is not. Its significance is familiar to us, repeated hundreds of times over, in the acts of schoolboy bullies on the schoolyards of any city. The bully usually comes out without trouble if he picks on the weaker youngster who acquiesces instead of resisting. If he makes the mistake of picking on the weaker boy who elects to fight for his rights, the bully often finds that he has miscalculated. If we are to continue to hope for a decent, free world, we must make sure that we have neighbors willing to fight for their rights and we must assure them that we ourselves are ready, willing, and able to go the distance in their support.

The need for determined allies suggests another very fundamental and specific consideration—the nature of our objectives. Although we express them in various ways, our objectives are to stop aggression and to apply some punishment as a warning against future aggression. This is a new approach. Nowhere do we employ such words as *capture*, *conquer*, or *occupy*. To stop aggression is to make it impossible for the aggressor to continue. To punish it is to inflict attrition to an extent that the enemy can recognize as severe. The enemy, on the other hand, has the objective of acquisition, characterized by capture and occupation.

It is difficult ever to guarantee that you can guess the enemy's intentions. But since he must have certain fairly specific means for any course of action, an assessment of his means permits at

least a logical estimate of his probable courses of action. Chief among resources of the Communists is a Red-dominated population of about 900 million, approximately one third of all the people in the world, under a ruthless, positive, and fast-acting police regime. The existence in being of their massive land force, to which the attrition rates of former wars are relatively acceptable, is well known. With one exception the Communists are not credited with any significant sea power or amphibious capability. They do possess a very strong submarine capability, believed by many analysts to be stronger than the German U-boat fleet that was so nearly decisive in the Atlantic in World War II.

In air power we have been so preoccupied with the growing long-range capability of the Reds that we tend to overlook the Soviet air force as a whole. Although it is reputed to be the world's largest we are told that its long-range arm is not yet as large as ours. The balance of the force, a very large balance, must therefore be made up of aircraft suited to the shorter ranges of surface strategy and invasion. Logic also tells us that if the Soviet had significant long-range airlift capabilities, typified by such aircraft as our DC-7's, DC-6's, C-54's, and C-124's, we would have seen or heard of them. We can conclude that the Reds have no airborne capability approaching the requirement for an inter-continental air invasion.

In summary we find that the Communists have a massive land force, supported by large tactical air forces, protected by significant sea-interdiction capabilities, but without major amphibious or airborne capabilities. From its structure we must infer that they intend to use this force, if they use it at all, in movement over land on the Eurasian continent. Our military strategy therefore need not be geared to operations "any place in the world" unless we have conquest in mind—which we don't have. We have opposed this Red capability for surface conquest both in Europe and to a considerable degree in the Far East. But we do not have, nor can we maintain, U.S. combat forces along the perimeter of the 5000 miles between these two Free World bastions. There we are viewing an area diametrically around the world from us, with difficulties in communications, terrain, and climate. However these operational factors may be viewed, Red capabilities and the Communist situation present enough facts to suggest the logical desirability of a U.S. strategy based upon available specifics and not upon the frustrating and costly concept of meeting these forces anywhere on the globe.

Means to the End

LET us now consider the means available to us with which to accomplish our own objectives. I have neither the competence nor the desire to assess all of the forces and weapons of the Department of Defense, but I will try to assess the air weapon systems, in terms of two questions that are basic to such evaluations: First, what can the various weapon systems do to the enemy toward achieving our objectives? And, second, what is the probable cost to us using these weapons as a basis for our strategy?

It is not necessary to belabor the subject of the power of air forces. In the period from Pearl Harbor to VJ-day the Army Air Forces dropped a fraction over two million tons of bombs, a weight that could also be expressed as two megatons. In partnership with the interdiction and blockade of the Navy, air power brought about the surrender of a still-strong major power without undertaking the planned surface invasion.

We could equal the energy release of World War II bombing by dropping bricks, but with the delivery forces now available to us we would require something like 5000 years to do it. We could equal World War II tonnage in about the same time and manner, if we were permitted a similar mobilization and something like 100 billion dollars. But modern firepower has afforded the capability to match the results achieved in World War II in a much briefer period. Since time can mean lives and resources, this compression of time is important. The point here is that circumstances and the efficiency of the means available rather than tradition or emotions must be the determinants of our selection of weapons, if we hope to win. This is true whether the firepower is delivered by aircraft, rocket, or rifled barrel.

Along with the firepower itself, we must consider the means of its delivery. From a military standpoint nothing is as worthless as undelivered firepower. Both speed and the complexities of delivery are important. Air power is moving into the range of Mach numbers, offering far broader delivery options than the average of two miles per day in the ground battle from Normandy to VE-day. While this variety in the speed of delivery may or may not be a determinant, it must be considered.

Equally important is the speed of delivery from base to point of engagement and the complexity of this movement. If the engagement involved prepositioned forces, the time factor would be relatively short. But if we face another Korea, or war in an even more remote area, the choice of a delivery system may be decisive.

To illustrate, the Colt .45 automatic, for years the side arm of all U.S. forces, is a final delivery system of considerable effectiveness at a short range measured in yards. But if this pistol has to be moved thousands of miles to a beachhead and then carried into the range of its effectiveness, it becomes part of a complex, time-consuming system, even though it is itself a simple weapon. A jet bomber, on the other hand, is a very complex unit. But once its complexity has been mastered in peacetime, it is a simple, fast system in war. It takes off from an existing base, arrives on target in a matter of hours, and then relies on the law of gravity to deliver a munition from bomb bay to target. It becomes complex in a military sense only if we have to build its bases after a war has started. That is why we seek intercontinental-range capabilities for bombers and build all combat aircraft to accept air refueling.

A recent Gallup Poll demonstrated the public's general understanding of air power's capability to penetrate to any target within a combat or supporting area. Perhaps less well understood is the characteristic effectiveness of the vertical component of firepower, due to the vulnerability of surface features to vertical attack. Surface forces have always used terrain, trenches, or other buffers as protection against horizontal firepower trajectories. However, similar protection from vertically delivered firepower is the exception and not the rule. If the time and cost to create impervious overhead protection is accepted, surface mobility is lost. Without mobility a surface force loses offensive power and becomes a defensive force, with stalemate as the best outcome it can anticipate, as in Korea, or defeat the worst, as in France in the Maginot Line of 1940.

We are now led to the less frequently considered problem of the cost to us of the strategy we elect. Fortunately, once we are committed to war our military leaders have been so dedicated to gaining victory that they have not paused to ensure that statistics would be available to Monday-morning quarterbacks. Nonetheless a substantial array of almanacs, histories, and other sources of data is available.

In World War I we find that we outnumbered the enemy between one and a half and two to one. Although we won the war, our casualties were in a ratio of five of ours to six of the enemy. For the purpose of illustration this ratio may be considered as roughly one to one. In the second World War we held a military manpower edge of two to one over the enemy. Casualties were 4.36 million on our side and 5.17 million on the other, again a fairly even exchange. We won both wars, but in both our marked

superiority in numbers permitted us to outlast the enemy even though our losses were about equal.

Such an equilibrium is generally to be expected when men fight with similar weapons. To return to the example of the .45 automatic pistol: armed with it the better marksman, or the luckier, will probably win over his opponent. The one not so favored will probably lose. The odds are otherwise even.

The figures for losses in Korea, another war fought according to a surface strategy, more or less support the same ratio of parity if the available statistics are accepted. Here we were outnumbered, and the casualties for the U.N. forces were about 1.5 million and an estimated 2 million for the Communist forces.

Let us trace through the records of two wars and isolate if we can the exchange of attrition between our air forces and enemy surface forces. For the most part these figures are estimates, since air-induced casualties can normally be counted accurately only by the enemy, who is apt to be too hard pressed to count them. We can, however, find some examples.

One case appears in General Marshall's *Third Report to the Secretary of War*, in which it is stated that on the single day of 22 January 1945 our air destroyed 4192 pieces of enemy heavy equipment. We can only presume that casualties were considerable. Our own losses from these forces during that entire month of January were 4 light bombers and 85 fighters.

More interesting is the testimony of Major General Handloser, Chief of Military Medicine for the Nazis. Although unfortunately his records were destroyed in an attack before VE-day, he states that the greatest cause of casualties to the German armed forces during World War II was air attack, followed by artillery shelling and infantry weapons fire. Whereas air weapons induced the most costly casualties for the enemy, our costs were only 62,144 air casualties as compared with our 524,484 ground casualties.

Turning to the Pacific, we find many examples of the low cost of employing air power. Three examples will suffice both to illustrate the position and perhaps to stimulate thought through contrast.

In the first we can turn to the historic Battle of the Coral Sea, which helped turn the tide of battle in the south in our favor. This has been proclaimed as a carrier-task-force battle, which really means a surface-oriented operation, using aircraft as extended-range artillery in a battle for survival of ships. The box score ran as follows:

	<i>U.S. Losses</i>	<i>Japanese Losses</i>
Personnel	543	900
Aircraft	66	80
Ships	3	2

It is fairly obvious that this factor of parity in attrition in surface strategy tends to continue even though aircraft were employed. Let us look, therefore, at the Battle of Midway to see if there is a change. We had the heavy advantage of advance knowledge of Japanese plans. An additional very significant factor is best explained in the words of Rear Admiral R. A. Ofstie's Naval Analysis Division of the U.S. Strategic Bombing Survey. The report states: "Naval losses at Pearl Harbor and in the Battle of the Coral Sea had not been replaced. In view of this deficiency it was decided not to commit the United States surface vessels, *but instead to reduce the strength of the Japanese Fleet through attrition, prior to its arrival at the objective, by means of long-range air attack.*" Let us look at the box score now that air strategy is emerging:

	<i>U.S. Losses</i>	<i>Japanese Losses</i>
Personnel	307	2500
Aircraft	150	253
Ships	2	5

An example of the pure application of air strategy is the Battle of the Bismarck Sea, in which land-based aviation under Air command operated against a surface force. The cost ratio is even more significantly in our favor:

	<i>U.S. Losses</i>	<i>Japanese Losses</i>
Personnel	13	**2900
Aircraft	4	*61
Ships	0	**13

As we come to Korea, we have more precise data in at least one case and relative data in another. Between July and October 1950, when our advance made observation feasible, incomplete statistics show 39,000 Red troops killed by air attack. This figure does not include wounded. Counted or estimated destroyed were

*From the War Reports of General Marshall.

**From the Naval Analysis Division of the U.S. Strategic Bombing Survey. Estimates of General Kenney, General MacArthur, and General Marshall are higher.

452 tanks, 6000 vehicles, 1300 freight cars, and 260 locomotives. Our own cost in air casualties during the same period was 241, a ratio of 1 to 160 in our favor.

We can only estimate the total Red losses inflicted by our air forces during the Korean War. Some estimates run to 50 per cent and higher of the total Communist losses. The following table, a comparison of the usual estimate of 2 million Red casualties with the established 1262 Air Force casualties, provides a ready display of possible cost ratios:

<i>Percentage of Red casualties caused by air attack</i>	<i>U.N. cost</i>	<i>Red cost</i>
50%	1	790
40%	1	680
30%	1	475
20%	1	300
10%	1	150

In a future war we may be outnumbered for the first time. Incomplete though it may be, the record suggests that our strategic thinking should give as much consideration to costs to us as to costs to the enemy, especially since capture is not our objective and we seek only to stop, roll back, or punish.

Pattern for a Strategy

From consideration of the foregoing specifics a pattern capable of relatively concrete formulation emerges to guide us to a sound national strategy:

- First, we can calculate with appreciable accuracy the target systems exposed to us, particularly for enemy aggression upon territory still open to our inspection.

- Second, we can form a reasonable estimate of the fire-power necessary to achieve our objectives against the identified target system.

- Third, our policy or military estimate can guide us as to the time available in which to achieve our objective.

- Fourth, we can then calculate the rate at which firepower must be delivered.
- Fifth, we can fit our available weapon systems to the rate of delivery required and, as a part of the fit, check the costs to us and the adequacy of our available forces.
- Finally, we can select from the wide range of munitions available the level of power necessary to achieve our objectives in the time available, with the means at our disposal and at the least cost to ourselves.*

The precision of this formula is affected by the validity of our knowledge of enemy capabilities and probable intentions. The need for accurate information will approach its zenith when the mobility of firepower increases by a quantum jump with the advent of intercontinental ballistic missiles. Because of their brief time of transit, knowledge of enemy intent to employ them may provide our best defense, since the intent would constitute the first step in an unacceptable threat.

Confusion over terms and a strategy based on generalities frequently make the Red look nine feet tall. We know he isn't. Good, solid thinking based upon facts, reality, and logic can keep our strategy sound and our qualitative edge sharp. The facts are available, we Americans pride ourselves on our logic, and our realism has made us strong as a nation.

Although the history of past events provides no firm guarantee of the nature of the future, we know that no police state or evil ideology has ever attained to total conquest. With or without war all have fallen short of their ultimate aims. Our military readiness and a realistic strategy can impose upon the Communists the seed of frustration and the degeneration of their threat. If we are wise enough and strong enough and if we possess the courage of our convictions, military force can achieve the ultimate objective of its existence—peace without war.

Air Command and Staff College

*To the intellectually curious the qualities of flexibility, mobility, and penetrative capability inherent in modern air power fit the requirements of this formula to a unique degree.

Top airmen testify to . . .

The Value of the Pro

A Quarterly Review Report

. . . the opinions of LeMay, Weyland,

Partridge, and O'Donnell

THERE is one deficiency which pertains not only to Strategic Air Command but to the military services as a whole. . . . This is a deficiency in skilled manpower.

"We will never be able to maintain the kind of force-in-being capable of striking against the enemy on a moment's notice or of assuming an alert posture which will in any way approach what we ought to be able to do with the money which has been expended against our equipment and facilities unless we have skilled *professional* manpower required to maintain and operate a modern weapons system.

"We will fight, and win or lose with what we have in being at the time. I think the decision as to what the ultimate outcome of the war will be, will be decided by the people who are on duty at the time a war breaks out."

These statements by General Curtis E. LeMay in hearings before the Senate Subcommittee on the Air Force have been echoed by every major commander to testify. General Partridge of Continental Air Defense Command and Air Defense Command and General Weyland of Tactical Air Command joined General LeMay in stating categorically that the most critical shortage in the USAF today is one of professional airmen.

To operate and maintain the present complex systems of air weapons demands the utmost in technical skill. For the average airman to acquire a working degree of this skill entails as much as two and one-half years of technical training during his first enlistment. A pilot needs three and one-half years of training to become fully combat-ready in a weapon system. The training costs vary with the kinds of skills involved: \$22,500 for a K-system bomb-navigation mechanic in SAC; \$160,000 for a TAC F-84F pilot.

Time and dollar costs incurred during the first four years of enlisted

or obligated service are only one facet of the problem in creating a professional air force. Retaining these trained and skilled people for second and subsequent enlistment is currently the most serious challenge. For the technical skills, cumulative reenlistment figures were supplied by Lieutenant General Emmett O'Donnell, Deputy Chief of Staff, Personnel, Headquarters USAF: "The significant point is that in the hard-core fields such as radio-radar systems maintenance, pilotless aircraft guidance and control systems maintenance, armament systems maintenance, atomic weapons maintenance, aircraft accessories maintenance, the reenlistment rate for first termers is in the teens and lower twenties, whereas in the soft-core fields such as fire-fighting, transportation, food service and supply, it is running in the forties and fifties." In the officer field the picture is scarcely better: only about one in four of the new graduates of flight training is indicating a willingness to extend beyond the time limit of the obligated service.

Air Force Career Versus Civilian Career

Various reasons motivate skilled technicians and operators to turn their backs on the Air Force after completing their minimum required time of service. Summed up, the overriding one is that an Air Force career does not offer the monetary reward of a comparable civilian career.

Senator Jackson: "What can the Congress do now . . . ?"

General LeMay: "I think that the Congress must pass some legislation that will make the career in the service as fully attractive as a career in civilian life.

"Prior to World War II we had a requirement for a small Military Establishment, and we were able to find among our citizens a sufficient number of people who would dedicate themselves to public service and perform this duty with a low compensation, compared with what they might obtain in civilian life.

"However, the situation that faces us today in the world requires that we maintain a large portion of our civilian population in uniform for our

The Subcommittee on the Air Force of the Committee on Armed Services, United States Senate, was appointed by the Committee Chairman, Senator Richard B. Russell, "to examine into the condition and progress of the Department of the Air Force and ascertain if present policies, legislative authority, and appropriations are adequate to maintain a force capable of carrying out its assigned mission." Under the chairmanship of Senator Stuart Symington, its membership includes Senators Henry M. Jackson, Sam J. Ervin, Jr., Leverett Saltonstall, and James H. Duff. Chairman Symington has indicated the subcommittee will focus "primarily on one fundamental question: Are the present and planned strengths of the United States Air Force adequate to preserve the peace through the deterrence of aggression?" During the first seven weeks ranking Air Force representatives highlighted U.S. strengths vis-à-vis those of the Communists and testified to certain areas of USAF weakness. Critical among the latter is the drain on strength and professional performance caused by a high separation rate of trained and experienced personnel.

defense, and no longer can we find a sufficient number who are willing to bear this burden at the compensation that they are offered."

One of the major causes of the losses is the high-pressure competition offered by a booming civilian economy. Technological developments, both civilian and military, have created skilled jobs in industry. Industry actively recruits technically trained airmen and personnel with college degrees, particularly in technical fields, offering high wages, job security, and increasingly attractive fringe benefits. At present the Air Force is not able to meet this competition of prosperity and civilian life.

Capabilities Affected by Rapid Turnover of Hard-Core Personnel

Although a certain amount of personnel turnover is necessary to maintain a healthy Air Force, losses of the magnitude which have been experienced because of personnel leaving the service at the end of the tours of obligated service have seriously impaired the Air Force's ability to perform its mission. Lieutenant General Irvine, Deputy Chief of Staff, Materiel, Headquarters USAF, testified that "about one-third of the people in the Air Force is engaged in maintenance work of some kind, some form of maintenance support, so that a deficiency in this area is a very serious problem." General Weyland stated that his command could not generate sufficient flying hours for adequate training because of inexperienced maintenance.

Mr. Hamilton, the Committee Counsel: "Would it strengthen your forces if you were able to get more quickly more of the 100's . . .?"

General Weyland: "It would not improve my situation if I got more F-100's now; I couldn't maintain them."

And on another day—another witness:

Senator Symington: "Now you say you are short of crews."

General Partridge: "Yes, Sir."

Senator Symington: "What is the result of being short of crews?"

General Partridge: "You either overwork the ones you have, or you degrade your defense a little bit to have lesser numbers of them immediately available."

General Partridge also testified, "We would keep more crews on alert if we had more maintenance people, and more pilots. We have actually reduced our defenses somewhat to accommodate these factors." To the same point General LeMay said that a shortage of trained, technically skilled personnel would limit the possibility of dispersal of SAC units as a passive defense measure against an enemy surprise attack.

The steady loss of technically trained personnel creates a continuing training requirement for replacements. Thus approximately twenty-five per cent of all Air Force personnel are tied in training processes, denying many qualified personnel to the combat commands. If the goal of an over-all reenlistment figure of sixty-five per cent, especially among the hard-core skills, could be achieved, the very costly retraining process could be greatly reduced. As an example of the costs, in the calendar year 1955 there were 42,619 separations from the service in SAC alone, with the departing airmen valued

at \$634 million in training and experience. Here General O'Donnell had some pertinent comment:

General O'Donnell: "If I may say one thing, I think we have not had too much quarrel with anyone on numbers.

"It goes back to quality. We are after a quality force, and, in fact, if we get the type of people that we want, if we could get officers to stay with us for 6 years or 8 years, if we could get enlisted men that go for 4 and reenlist, maybe 60 per cent, we could cut the over-all strength of the force right now; there is no question about it. We could come down at least 10 to 15 per cent and be much more effective."

Senator Jackson: "What has happened is that about a fourth of your service is immobilized to train people?"

General O'Donnell: "That is right."

Senator Jackson: "What you are saying is that you can take a lot of people out of the training command and put them in active duty assignments?"

General O'Donnell: "That is correct."

Senator Jackson: "If you could solve this problem of reenlistments?"

General O'Donnell: "We can do the job not only in the training command which, as I say, does represent one quarter of the force but also in the units where you do not have to do so much on-the-job training with the newcomers."

Senator Jackson: "But assuming that you cannot solve the problem of continuity of personnel, you do have to add more people. That is the only other way out, is it not?"

General O'Donnell: "That is right; keeping training them."

Senator Jackson: "If you are going to make combat effective what you have in the way of equipment?"

General O'Donnell: "That is right."

The quality to which General O'Donnell referred is represented by the fully trained technicians in maintenance and operations. These "professionals," men in their second or subsequent enlistments, in these categories are relatively few. For example, SAC faces this problem: "In December of this year," testified Brigadier General Horace Wade, SAC's Director of Personnel, "we will have approximately 170,000 airmen in the command, of which 77,000, or 45 per cent of our strength, will be in their first year in SAC. Another 45,000 or 26 per cent will be in their second year. In other words, 71 per cent of our strength will have less than two years in the Strategic Air Command. The majority of these first- and second-year people will be inexperienced and will lack SAC know-how. The people whom we have to rely on to do the training and get the job done come to approximately 29 per cent. Twenty-four thousand of these people are in their third year, 9400 in their fourth year, but only 14,000, or 8½ per cent of the command strength will have been in SAC over four years. Gentlemen, does this look like a professional air force?"

The other two combat commands face the same situation. The manpower problem revolves not around having enough "bodies," but in being effectively manned. As General LeMay put it: "When we say we are manned,

we mean that there is a man present for duty in that vacancy. We are not effectively manned, however, until he is fully trained and capable of carrying out the job the vacancy calls for, so you can see that we will always be less effectively manned than we should be. However, we should not have such a large discrepancy as we now have."

The low percentage of effective manning in technical skills has had its impact on three related phenomena: accident rates and in-commission and abort rates. Each is affected by the shortage of competent technicians, and all directly affect the combat-readiness of the three combat commands. A more adequate degree of effective manning would provide greater utilization of equipment now in the combat units.

There are other aspects to the problem of retaining skilled personnel. One of great importance involves lead time. A weapon system can take from 6 to 7 years from drawing board to Air Force inventory. With personnel it is different. Lead time is limited to 4 years, the initial enlistment period. When a new weapon system is planned, personnel to operate and maintain it should also be planned. This is impossible; the 4-year turnover keeps repeating itself.

In the Strategic Air Command the low retainability of young officers is posing another critical difficulty. The two peaks in the numbers of officers assigned occur in the 36 to 38 and the 24 to 26 age brackets. For the most part the first group entered service in World War II. They are regulars or career reservists who will stay in. The second group is made up primarily of young Air Force ROTC officers. They are not now staying with the Air Force. Only 24 per cent of new pilots and 11 or 12 per cent of new officers in the support fields stay on beyond their 3-year tour of obligated service. This means that the inventory of aircraft commanders is getting older, with fewer replacements in prospect. According to General Wade: "This low retention rate [of new pilots] also means that we will not be retaining an adequate resource to replace our aging aircraft commanders. Unless we do something today to improve this retention rate, we will be training for attrition rather than for an increase in combat-ready status."

Efforts to Increase Retainability of Officers and Airmen

The personnel problem facing the Air Force is not new, and over the last three years the commands have taken all possible steps within their authority to improve the reenlistment and retention rates. The most comprehensive program detailed before the Senate Subcommittee was presented by General Wade of SAC. It included efforts in four different areas: (1) Non-commissioned officer academies (four) were established to raise the prestige and utilization of the noncoms. Graduates are improved as leaders and managers, with a consequent improvement in utilization of airmen. (2) Seeking to diminish personal problems, dependents assistance centers were established, staffed by volunteer wives of officers and noncommissioned officers. (3) Living accommodations for the unmarried airmen were improved, introducing room-style barracks for the degree of privacy necessary in units with

missions which require working around the clock. (4) Finally off-duty recreation activities were increased, the most rewarding of which have been the aero-clubs, open to officers and airmen of all ranks, and the automotive hobby shops, which help to increase an individual's mechanical skill. The dependents assistance program and the two recreation activities cited are conducted at no cost to the Government.

During the past two years certain actions by the Department of Defense and the Air Staff have stepped up the retention rate. Important among these are the base-of-choice program, concurrent overseas travel for dependents, bimonthly pay by check, and equitable distribution of personnel, which ensures that the one who has been back from overseas the longest is the first to return. Concerning the problem of sending families overseas, where housing and other necessities are not always available or convenient, General Weyland observed: "The system we are working toward is a rotational system whereby one combat squadron out of a group will constantly be in place. I feel that one combat squadron, without its dependents, will have actually more combat capability than the entire wing would if they had the families and children around there to worry about."

Further Legislation Necessary

Legislative actions, including the reenlistment bonus, the home loan guaranty bill, and the pay increase of 1955, while helpful, so far have not achieved the required level of retention, according to Lieutenant General O'Donnell. Therefore the Air Force is actively supporting legislative proposals now before Congress. These include survivor-benefits legislation, regular Air Force augmentation, severance pay for Reserve officers, and other current legislative proposals.* Here it should be noted that the representatives of both the Army and the Navy testified that their most critical personnel problem was the same: the high rate of separation of skilled personnel at the end of their first obligated tour of service.

The Air Force believes that the field for corrective action is wide but that new policies requiring further legislation will be needed to make specialist personnel seek a service career rather than avoid one. To meet the competition of industry and the attractions of civilian life, first of all a radical change is needed in the present across-the-board pay structure. There are currently 239 different USAF specialties that must be fitted into 7 pay grades. All skilled airmen receive the same pay; a skilled baker receives the same amount as a skilled radar technician. Some skills are paid as much as they can get in civilian life, and others are not being paid enough. A system must be devised to provide more realistic compensations for highly trained, technically skilled people. It must be competitive with industry and based on the same considerations as are recognized in private industry, such as special incentives for personnel serving at remote and isolated locations.

*In the remainder of the session after General O'Donnell's testimony Congress has passed legislation providing for better dependent medical care, improved survivor benefits, severance pay for involuntarily separated Reserve officers, augmentation of the Regular officer corps, and more military housing. These acts represent all of the major requests for legislation made by the Department of Defense of this session of Congress.

The dollar cost of these competitive proposals, if successful, would be much less than their savings in replacement training costs.

A second greatly needed improvement is in the dependent housing field. For instance, there is no Government housing for 72,000 of 89,000 families in SAC, who are forced to find their own, in hunting grounds often not so happy and at costs often greater than the housing allowance. This deficiency relates to the SAC bases in the United States zone of the interior as well as overseas. In general, on-base housing is almost always inadequate to accommodate the numbers assigned to the base, and what there is, is often less desirable than the dwellings occupied by comparable persons in civilian life.

A third area in which constructive legislation can contribute to the retention of personnel embraces the restoration of commissary and base-exchange rights. These benefits have been constantly under attack by retail merchants organizations. As a result stocks have been cut, prices have been raised, and surcharges have been imposed. The Air Force believes that these facilities should be expanded to offer bigger stocks, more name brands, and lower prices. These benefits cost the Government nothing; in fact the Government is saved money, since the profits from the base exchanges pay for almost all the recreational activities and facilities on the air bases.

The Air Force's final proposal concerns educational rights. Personnel on active duty have opportunities to further their education but must pay for tuition, books, and related costs. According to SAC testimony, ". . . ten per cent of all the enlisted personnel who left the service last year said that they were leaving to take advantage of . . . the Korean GI bill of rights. . . ." The individual who remains on active duty should be given the same rights as the individual who separates, not penalized for staying.

The Air Force believes that the enactment of adequate legislation in the above four fields will serve to contain the constant turnover of personnel within acceptable limits. The goal is a professional USAF, a professional personnel force-in-being, one that is capable of executing the mission today, one that is fully trained, not half-trained, one that is fully ready, not half-ready.

Senator Jackson: "What is the answer to all this?"

General O'Donnell: "I think that within reason we have to give these people who are good men, both pilots and airmen in skilled areas, a comparable—we cannot be in competition with civilian industry; but we have to give them enough so that they can maintain themselves with a moderate amount of dignity. I think that they do not worry about taking on a few hardships here and there. It has always been connected with the military anyhow. But they have to get a little bit more than they are getting."

Air University Quarterly Review

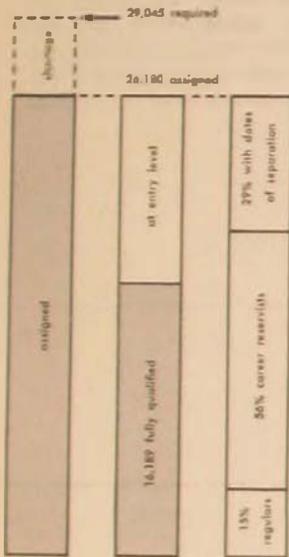


Some significant figures:

- on training for attrition
- on manning the 137-wing USAF

Training for Attrition

Example of Air Force-wide need for retention of trained and experienced personnel is dilution of professionalism in the largest combat command. Charts and facts derived from briefing of the Symington Committee by Brigadier General Horace Wade, General LeMay's Director of Personnel, highlight the SAC manning problem.



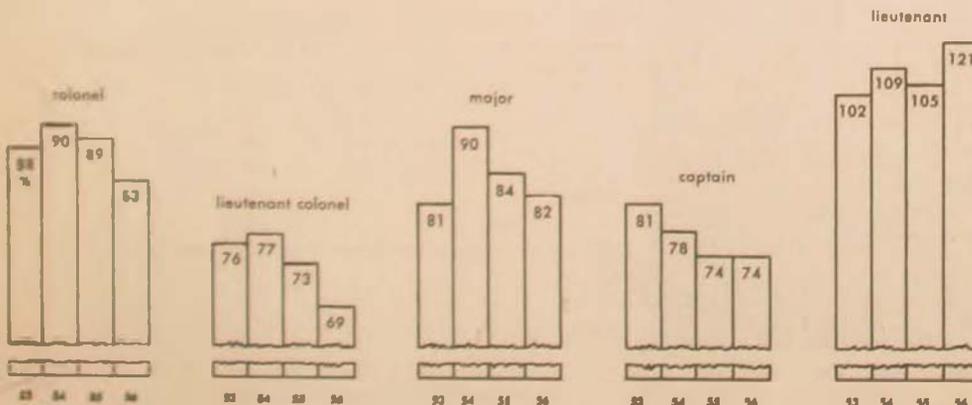
Composition of SAC Officer Manning

On 1 January 1956 SAC's requirement for 29,045 officers was 90 per cent assigned. More than a third of the assigned were at the entry level of their specialty, still learning the job they were assigned to do. Career reservists could be expected to continue in the Air Force, but as for the reservists with dates of separation, largely new lieutenants just out of college ROTC, only one in four has been staying on in service.

ratio of inexperienced officers is high

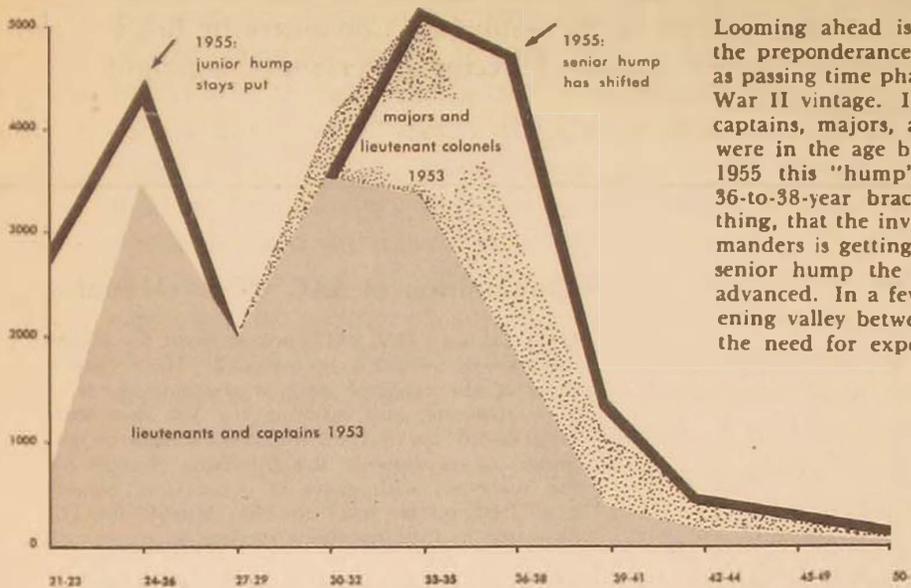
ratio of inexperienced officers is increasing

Although from January 1953 to January 1956 SAC has expanded 20 per cent in military personnel assigned, the proportion of officer experience has declined. Increase in officer strength has been attained primarily from assignment of second lieutenants, who for the most part do not stay in service long enough to become truly experienced. Meanwhile the percentage of higher grades assigned has declined.



SAC Officer Manning by Grade: 1953 to 1956 (per cent assigned)

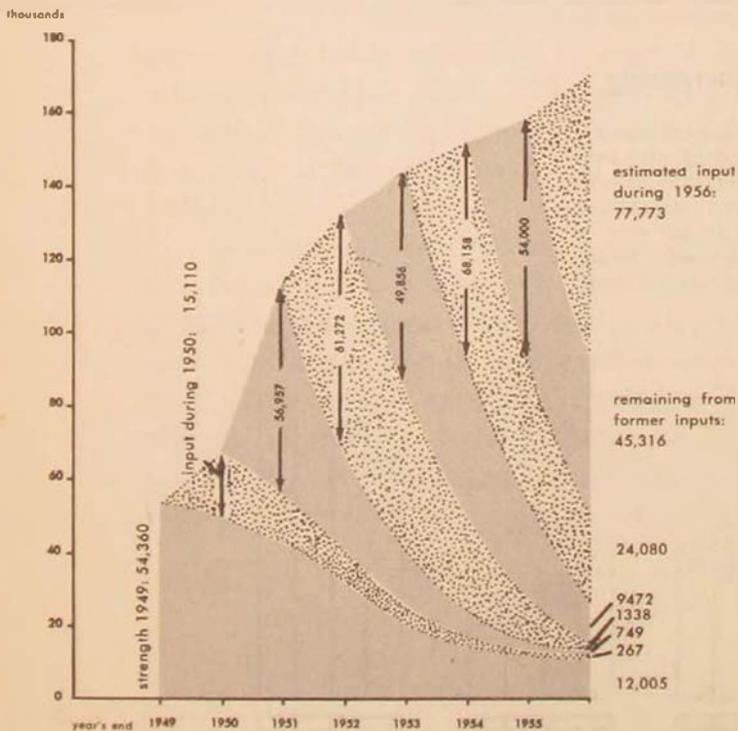
average age of experienced officers is increasing



Looming ahead is the wholesale loss of the preponderance of SAC senior officers, as passing time phases out those of World War II vintage. In 1953 the majority of captains, majors, and lieutenant colonels were in the age bracket of 33 to 35. By 1955 this "hump" had moved into the 36-to-38-year bracket, meaning, for one thing, that the inventory of airplane commanders is getting older. Yet behind the senior hump the junior hump had not advanced. In a few years, unless the widening valley between the humps is filled, the need for experience will be critical.

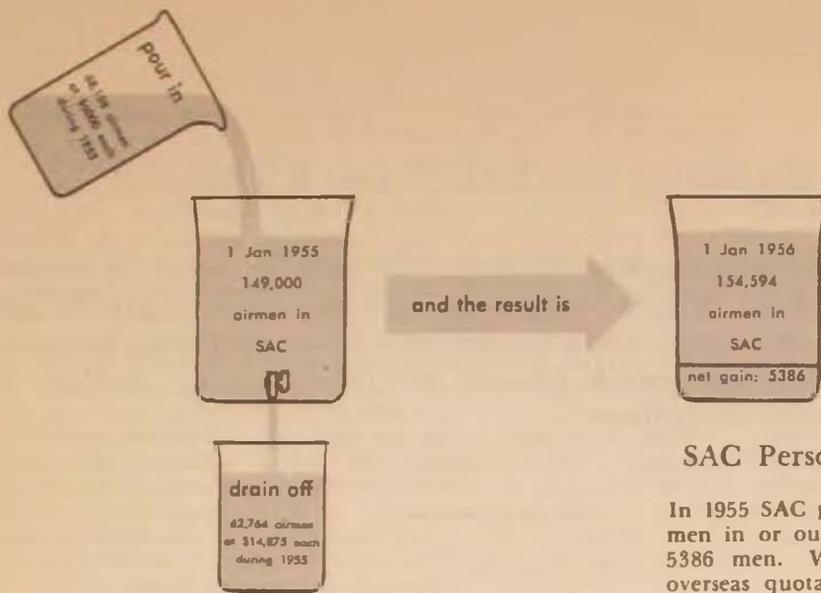
Age Level of SAC Officers

airman manning has suffered heavy attrition



Gains and losses since 1949 display the burdensome attrition to SAC enlisted strength. In 1949 SAC had 54,360 airmen. Of these same airmen 12,005 would remain in SAC at close of 1956. Input for 1950 was 15,110, of whom 267 would remain in 1956. Despite large input each year, only small net gains were attained after 1951.

Gains and Losses in SAC Airman Strength

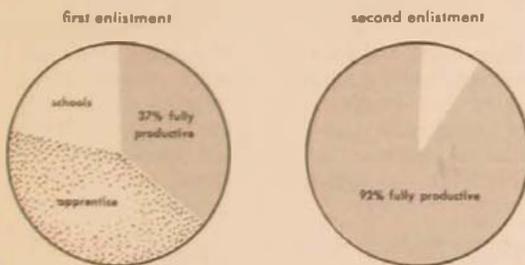


SAC Personnel Actions: 1955

In 1955 SAC processed some 130,000 airmen in or out of the command to gain 5386 men. Withdrawals by USAF for overseas quotas took 20,000, but 42,619 left the Air Force for civilian life.

a large annual input produces a small net gain in airman manning

but the real payoff does not begin until the second enlistment

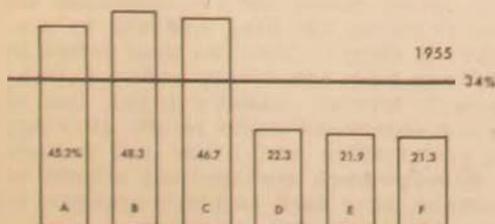


The extensive training of a new K-system bomb-navigation mechanic is largely lost if he is one of the 90 per cent of such men who separate at the end of their first enlistment of four years. Complex equipment requires complex training and dictates the need for at least a 65-per cent re-enlistment rate.

Complex Maintenance: Productive Time

over-all re-enlistment rate is often misleading

1954	29%
1955	34%



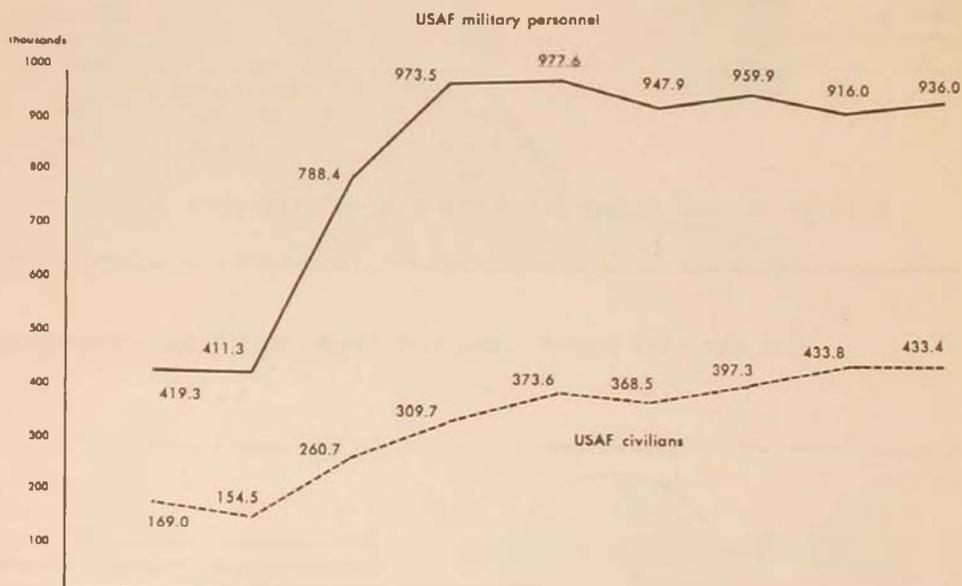
Re-enlistment rate has increased as result of actions to enhance Air Force careers. But rate for many highly trained technicians was well below the average in calendar year 1955.

- A. supply
- B. transportation
- C. food service
- D. radio-radar specialist
- E. armament specialist
- F. aircraft accessory specialist

SAC Re-enlistment Rates

Manning the 137-Wing USAF

Long-range USAF programing has called for 137 wings in-being by the end of fiscal year 1957 (30 June 1957) to be operated by a maximum of 975,000 military personnel. The yearly strength totals of Air Force personnel during the period of 1948 to 1957 indicate the growth towards the 137-wing goal. Notable is the increase in the number of civilians.



fiscal year	49	50	51	52	53	54	55	56	57
Ops/Wings	60	48	87	95	106	115	121	131	137

Currently the manning goal for operating the 137 wings is set at 936,000 men, sharply under the formally established ceiling of 975,000. On 1 July 1955 approximately 960,000 men were on duty to operate 121 wings. In response to the Committee's questions concerning how 16 more wings were to be operated with 24,000 fewer men, General O'Donnell submitted several analyses, from which the following high lights are excerpted:

The difference between the aggregate military and civilian personnel programs between end of fiscal year 1955 and fiscal year 1957 amounts to 22,057 spaces. Over this same period the Air Force is activating 16 additional wings. The question is, how can this be done? The manpower cost of the 16 wings, which is obviously far in excess of the 22,057-space increase referred to above, has been and will be provided for within Air Force ceilings through several means. Over the time period in question, requirements in base support areas have been continually reduced, technical training costs have been reduced through leveling enlisted input, use of civilians has been increased in these areas where economies would result, Air Force mission areas have been subjected to close examination and where not entirely essential have been reduced or eliminated. Through such management actions as these, spaces over and above the program increase, have been and will continue to be diverted from other areas in support of the additional wing activations.

Since the beginning of the 137-wing program in fiscal year 1954, considerable progress has been made in reducing requirements. Over this period through standards reductions in certain functional support areas, through the lowering of training costs by leveling enlisted input, through increased utilization of natives in

overseas areas and numerous other actions, requirements as originally seen for fiscal year 1957 have been reduced by approximately 142,000 spaces.

On the other hand, over this same time period there have been many unanticipated additives to the Air Force program commonly referred to as the 137-wing program. Such items as an expansion of the radar aircraft warning net, additional missile sites and units, the Air Academy, assistance in training the Japanese and German Air Forces were not in the original program. These and many others have increased requirements over those originally foreseen by approximately 125,000 spaces. Looking beyond fiscal year 1957, it can be foreseen that, with the increased number of aircraft planned for heavy bombardment wings, the necessity for dispersal, etc., that the trend toward increased costs is continuing.

From the above it can be seen that, had there been no increases to the program, the Air Force would have reached its initial goal without difficulty. As a matter of procedure, however, additions to the program were accepted and every effort made to absorb them also within the ceilings. At such time as the Air Force cannot see its way clear to man the 137-wing force within the current ceilings, it will request that they be raised. This has not been considered necessary to date nor is it foreseen as necessary through fiscal year 1957. It would be premature at this time to indicate to what extent, if any, an increase in ceilings may be necessary in fiscal year 1958 and subsequent fiscal years.

Numbers alone do not tell the complete story. The difference between "manning" and "effective manning" is critical—the essence of the Air Force's foremost problem today.

We have the training capacity and the capability to train the required numbers of people in the skills we need. However, if present trends continue, a large part of our training will not contribute to the force effectiveness because our retention of personnel, particularly of first enlistment airmen, is too low. In some important personnel areas we are only holding our own instead of increasing the proportion of trained personnel in the Air Force. An increase in overall numbers without attaining greater retention at the same time would not improve our manning situation.

To cite specific examples, between July 1, 1953 and December 31, 1955, we have graduated 14,128 pilots from our flying schools while losing 7,527 other pilots to inactive status. Between July 1, 1953 and December 31, 1955, we enlisted 309,671 non-prior service airmen. During the same period we lost 272,526 airmen who had completed an initial 4-year enlistment and 63,341 airmen who failed to complete an initial enlistment. Between March 31, 1954 and December 31, 1955, the numbers of skilled 7-level personnel available, in what we consider our most critical specialties (electronics, armament, and jet aircraft maintenance), have averaged only 62 per cent of requirements.

The following table of skilled airmen shortages in the 5 and 7 skill levels on 31 December 1955, and projected to the end of fiscal year 1957, illustrates the developing lack of "quality" in the manning of the 137 wings by the time they are attained:

	December 1955	June 1957
Hard core	34,475	57,192
Soft core	41,902	38,961
Total	76,377	96,153

Concept of the West German Air Force

DR. LEWIS J. EDINGER

HERE lies an Air Force dead and buried, we hope forever." Thus ran the epitaph that Wing Commander Asher Lee wrote for the Luftwaffe in 1946. Ten years later the phoenix is rising from the ashes. Once more a German Air Force is taking to the air, its wings clipped and its flight carefully circumscribed. As the following discussion will show, the Air Force is likely to play a subordinate role in the new West German military establishment. German military traditions and political considerations, as well as the rapid pace of technological developments, will in all likelihood influence the future development of the new Air Force as much as present NATO and United States plans for the role it is to play in the global military posture of the Western alliance.

Despite the fact that a good deal has been written on the subject of West German armament in recent years, reliable and detailed information on the subject is rather limited. German military leaders have said little or nothing, presumably not only for reasons of security, but because rearmament is the subject of intense political dispute in West Germany. I have not sought to present a detailed analysis of the nature and mission of the new Air Force. Rather this is a more or less speculative discussion of some of the problems likely to arise in connection with the creation of the new Air Force.

NATO's Need for German Forces

It is both interesting and revealing that in so many recent articles and statements West German armament is equated with the creation of a new army. The Air Force is mentioned only in passing. This attitude appears to be a natural outgrowth of the long dispute over the advisability of West German armament.

For almost five years military planners and political leaders inside and outside the German Federal Republic argued the question, and in these discussions the subject of a new German Air Force played a very minor role.

The North Korean attack of June 1950 provided the impetus for Western plans to reverse the previous policy of keeping West Germany indefinitely demilitarized and disarmed. The exposed position of West Germany was dramatized by the North Korean sweep down the peninsula against the token army of South Korea. Western military resources had to be diverted from Europe, and the Western European nations were themselves so weak militarily that only Britain was able to make a genuine contribution to the United Nations forces in Korea. This evidence of weakness was sobering, especially since the explosion of the first Soviet nuclear device in 1949 had signaled the passing of the U.S. monopoly on air-atomic power.

Western political and military leaders, particularly in this country, interpreted the attack on South Korea as a clear warning that the forces of Communism might soon launch an attack against Western Europe through West Germany. Seven undermanned Western divisions on occupation duty in Germany were confronted by twenty-two first-class Soviet divisions and a rapidly expanding East German militarized police force. It was estimated that at least twenty additional divisions were needed in Europe to provide a minimum counterforce to Soviet power. Political animosities and hesitation were overridden by sheer necessity. Without the help of substantial German ground forces the Western powers were believed incapable of defending Western Europe against a Soviet attack.

The "forward strategy" which the planners at SHAPE developed in 1951 as the only practical way to prevent the conquest of Western Europe by the Soviets apparently assumed that substantial Allied ground forces disposed east of the Rhine could delay an attack long enough to permit the West to mobilize its full strength. "Adequate" and "highly trained covering forces" were to fight a more or less conventional holding action, trading space for time by a "defense in depth" of West Germany, until the full weight of Western power could be brought to bear upon the aggressor. Without German forces Western strength appeared utterly inadequate to meet these requirements.

United States Secretary of State Dean Acheson proposed the creation of West German armed forces at the meeting of the foreign ministers of the three Western occupation powers in

September 1950. Better than five years were to elapse before the first Germans donned uniforms. Various attempts were made to reconcile conflicting national viewpoints on the need for and the nature of West German armament—including the stillborn European Defense Community proposal—until a final formula was written into the Paris Agreements of October 1954. The first German units went into training in January 1956.

The plans for West German armament were thus based primarily on the need for ground forces—twelve West German divisions—to make possible a successful defense of Western Europe. The subsequent decision to strengthen NATO forces in Europe with nuclear and thermonuclear weapons was declared by Western military leaders not to detract from the continued need for a German contribution no smaller than the number originally demanded. With the help of twelve German divisions, it was argued, it would be possible to form a covering “shield” east of the Rhine and strong enough to compel a potential aggressor to mass his forces for a breakthrough, thus exposing the forces to devastating bombardment with “unconventional” weapons. On the other hand, Europeans—and particularly Germans—were adverse to the use of such weapons on their soil. They maintained that the addition of German units would permit “conventional” Western forces to check a Soviet attack once an atomic stalemate arose from mutual reluctance to employ “unconventional” weapons. Whether operating in conjunction with American air-atomic power in a global conflict or on a more limited scale in a more “conventional” military operation, German ground forces were said to be a primary requirement if Western Europe was to withstand a Soviet attack. In all these considerations, German air forces were of secondary importance, as an adjunct to the ground elements and a derivative of ground force strategy.*

Composition of the German Air Force

Under the terms of the Allied agreements providing for the armament of West Germany, the new Air Force is to be strictly a tactical force. It is to include no strategic bombardment aircraft and its contemplated combat strength is to consist of about 1000 fighters and fighter-bombers. Present plans call for a total of twenty wings (*Grundeinheiten*), eight of which are to be

*For a discussion of the military and political aspects of the decision to arm West Germany see Lewis J. Edinger, *West German Armament*, Documentary Research Division, Research Studies Institute, Air University, October 1955, *passim*.

fighter-bomber wings, four fighter-interceptor wings, three all-weather fighter wings, three tactical reconnaissance wings, and three transport wings. Slated to become a major component of NATO's tactical air force in Central Europe, the future German Air Force appears designed primarily for counter-air, ground-support, reconnaissance, airlift, and, possibly, interdiction operations.

The new Air Force is likely to be only a pale shadow of the old Luftwaffe. With a first-line combat force of 3750 planes and a million and a half men, the Luftwaffe was in 1939 for all practical purposes an autonomous branch of the armed forces, coequal with the other services. Almost all military aviation and air defense units were under its control. The new 80,000-man Air Force appears destined to be only a minor component of the new German defense establishment. It will have only about one-fifth the personnel strength of the ground forces, include only a fraction of all military aviation, and have no control over ground-based air defense. In addition to the 1300 planes of the Air Force, the other services—primarily the ground forces—are to have direct control over about as many supporting aircraft of their own, including artillery spotters, liaison planes, and helicopters. While the small, 20,000-man Navy will probably have relatively few aircraft attached to it, the Army apparently is to have a large air arm. Each of its twelve divisions plans to have permanently attached to it at least one squadron of supporting aircraft.

A glance at a map will reveal that inadequate air space is likely to limit severely the anti-air capabilities of the German Air Force. Practically all of West Germany and every major target lies within a 150-mile radius of bases in East Germany. In the light of present air-technological developments it seems unlikely that by 1960, when the Air Force is expected to be fully manned and equipped, the air defense of the country can be handled by interceptor aircraft. Even assuming that supersonic fighters, vastly superior to present models, should be in service, their rate of climb is not likely to be sufficient to permit interception of an attacking force before it had come within bombing range of its targets. Moreover supersonic missiles, against which piloted planes would be impotent, are likely to constitute the most serious threat to West Germany by that time. Air defense will probably have to depend primarily upon ground-to-air missiles linked to an efficient air-warning system.

The latest available data on the contemplated organization of the German Air Force supports the impression that, contrary

to earlier plans, its anti-air mission is being de-emphasized. Fewer fighter-interceptor wings and more tactical reconnaissance and fighter-bomber wings are now being planned for. Particularly the ground-support mission of the Air Force appears to be assuming primary importance among the military planners in the defense ministry, most of whom are former command and staff officers of the wartime army.

The senior army officers who have thus far dominated the new German defense establishment are heirs to a military tradition rooted in the ground forces. The great names in German military history are those of ground strategists and the nation attained pre-eminence in the past as a land power. Neither naval nor air power ever achieved a role anywhere near that attributed to land power in German military thinking. From the time of the creation of the Luftwaffe in 1933, senior army officers looked upon it primarily as an adjunct of the ground forces and frowned upon attempts to create an independent air force with strategic as well as tactical capabilities. In the course of the war this point of view eventually determined the employment of German air power. Hitler and his military advisers—mostly army men—used the Luftwaffe increasingly as an auxiliary of the ground forces.

This belief, that air power should primarily provide tactical support for ground operations, has survived in numerous memoirs and military commentaries which former German army officers have written since the end of the war. While little has been heard from veterans of the Luftwaffe, former panzer and infantry officers have maintained that the Air Force failed to substantiate its earlier claims in the course of the war. Air power proponents in general, and those of the Luftwaffe in particular, are said to have overestimated the potentialities of air power. Strategic bombing has been condemned as a senseless slaughter of little or no direct military value, while the Luftwaffe is charged with having failed to meet its responsibilities as a tactical air force. Rooted in military conservatism, this attitude also contains residual elements of intense interservice rivalries during the Nazi era. Under Goering's sponsorship the Luftwaffe was given preferential treatment which, it is charged, proved unjustified in the light of wartime experiences.

Contemporary German military thinking appears to favor a closely integrated military establishment under an over-all, authoritative supreme command for the three basic services. While this "Wehrmacht Concept" was adopted under the Nazi regime in theory, Hitler's and Goering's meddling in military matters

and the ambitions of the proponents of an independent Air Force are held to have wrecked its effective implementation. Now, with the creation of a brand-new military establishment, German planners appear to hope for the fusion of the three services into a true Wehrmacht.

In the present structure of the German Defense Ministry the Air Force occupies a far less important position than in our own defense establishment. The defense minister is to be advised in matters of over-all military policy by a Joint Military Control Council, modeled after our own Joint Chiefs of Staff, of whose five members only one is an Air Force officer. This is the chief of the Air Force. Apart from the chief of the small Navy, the other three members are all Army generals, one of whom is the chairman of the Joint Military Control Council, one the chief of the Army, and the third the chief of the Department of the Armed Forces.

The exact functions of this Department, which occupies a position equal to that of the Army, Navy, and Air Force in the defense establishment, remains to be revealed. There are indications that, as a coordinating agency for the entire military establishment, it may evolve into something akin to the authoritative supreme command envisaged by senior German Army officers. This belief is supported by the fact that it is headed by General Hans Speidel who, along with General Adolf Heusinger—chairman of the Joint Military Control Council—has from its inception been a leading military planner in the new German defense establishment.

Problems in Air Force Build-up

In many respects the leaders of the new German Air Force have certain advantages over those of older air forces. The first major air force to be started from scratch in the air-atomic age will be relatively unencumbered by vested intraservice interests, which elsewhere have stood in the way of radical innovations. There are no antiquated establishments or weapon systems to prevent the Air Force from taking full advantage of the very latest military-technological developments. While air research and development in West Germany will have to bridge an eleven-year gap of total inactivity, new designs are available for adoption by the Air Force. German aviation experts who worked abroad during the long hiatus are ready to make new designs available

to the slowly reviving aviation industry. Modern air weapon systems developed in other NATO countries will also be available. Present plans call for a German combat air force equipped by 1960 with jet-powered aircraft of the latest available design.

Considerable confusion still exists on procurement of aircraft and equipment. For the time being most of it will be provided by the United States under the Mutual Defense Assistance Program. By 1960 its materiel needs will have to be met largely out of German funds. Air Force planners apparently would like to continue to rely upon United States equipment but are encountering opposition from government economic experts and prospective German producers. The former would like to ease the country's large export surplus by buying Air Force equipment from NATO countries with which West Germany has a favorable trade balance. The latter want the government to subsidize a new German aviation industry through large-scale orders with German firms. Present indications are that a compromise solution will be found by placing orders for future equipment with both German and foreign producers. From the military point of view this may increase the problem of standardizing Air Force equipment. Germany's NATO allies also have their reservations about the establishment of large-scale procurement facilities in a "forward area."

The fact that for eleven years West Germany has had neither military nor civilian aviation also complicates the problem of recruiting the 80,000 men needed for the Air Force. There is no partly trained nucleus around which the new force can be built, such as the 20,000 men drawn from the present Frontier Police who will provide a core for the ground forces, and the naval personnel inherited from the noncombatant German auxiliary units formerly attached to the occupation forces. Unlike the ground forces, the Air Force will not be able to use many short-term conscripts. Since it takes as much as two years to train the highly skilled personnel required, Air Force planners believe that at least 85 per cent of the men will have to be volunteers, ready to serve for at least four years and preferably for twelve years or more.

Contrary to reports in the American press that West Germany is full of wartime pilots and airmen ready and willing to sign up, there has been a dearth of qualified volunteers for the Air Force. As of July 1955 only 12,000 applications had been received by the Defense Ministry, most of them Luftwaffe veterans too old for extended duty or otherwise ineligible for service

in a modern air force. Some of the most highly qualified Luftwaffe veterans have established themselves in civilian occupations and are unwilling to abandon these; others, while ready to serve, are politically unacceptable because of their former association with the Nazi regime. In any case not many Luftwaffe veterans are thought physically qualified for flying duty. While it takes only half as long to train a veteran pilot to fly modern jets as it does men with no flying experience, most of the Luftwaffe veterans are already too old for extended service. Air Force training officers believe that up to 60 per cent of *all* applicants for flight duty will fail to qualify because they will not be able to meet "the extremely heavy physical and mental demands" the new Air Force will make upon its pilots. Apart from the problem of finding about 2600 pilots, difficulty is also expected to arise in attracting and retaining skilled, experienced ground-maintenance technicians. West German industry, and particularly the new aviation industry, may be expected to compete heavily for such men in view of a growing shortage of skilled mechanics and technicians in the country.

Probably no more than a few hundred Luftwaffe veterans can be used in the new Air Force, and those will be used as instructors and in command and staff positions. For most of its personnel the Air Force will have to rely upon youngsters who did not see service in the last war and who will be as much as twenty to thirty years younger than the veteran senior officers and noncommissioned officers. A considerable age gap will for some time divide a generation of Luftwaffe veterans, united by the common bonds of wartime service, and a postwar generation largely indifferent toward the traditions and experiences shared by the older men. In a service as yet devoid of any unifying *esprit de corps* and intentionally without any links to its predecessor, such a situation will demand a maximum of tact, tolerance, and mutual adjustment on the part of all personnel.

If the new Air Force is to become a smoothly functioning organization in the four years now contemplated for its establishment, if it is to have an *esprit de corps* consistent with the concept of the "citizen-soldier" envisaged by the creators of the new force, veterans and nonveterans will have to work together in a spirit of mutual respect and cooperation. The older men must be prepared to abandon such ideas and concepts of the past as will prove out of place in the new Air Force. The younger men, on the other hand, will have to come to appreciate the superior experience of their seniors and to respect their mature leadership.

The German Air Force Under NATO

Command and control of the German Air Force promises to be a rather complex matter since it is to be shared between national and North Atlantic Treaty Organization organs. All of the twenty German wings are to be incorporated into the Allied Air Forces Central Europe. Those in southern Germany are to become part of the Fourth Allied Tactical Air Force, now made up of United States, Canadian, and French units under American command. Those in the north are to join the Second Allied Tactical Air Force, presently consisting of British, Dutch, and Belgian units under British command. German officers are joining the staff of SHAPE and its subordinate headquarters in Europe and eventually, no doubt, will assume Allied commands themselves.

In terms of NATO global planning, the German Air Force is to become a major component of the tactical air forces in Europe. Under the Allied agreements providing for the arming of West Germany, the deployment of the German air units, like the rest of the German military formations, is to be determined by the Supreme Allied Commander Europe (SACEUR) in accordance with NATO operational plans, "after consultation and agreement" with German authorities. These units are not to "be redeployed or used operationally" without the Supreme Commander's consent and SACEUR is also to have "control over the organization and training" and logistics system of the German forces. Secretary of State John Foster Dulles explained to the Foreign Relations Committee of the United States Senate in 1955:

Under this plan the West German forces are expected to be so integrated into the other forces in Europe under the command of SACEUR that as a practical matter it would be almost impossible to detach them and have them operate as an independent national force . . . They will be so interlocked that a separation for separate purposes would, as a practical matter, be impossible.

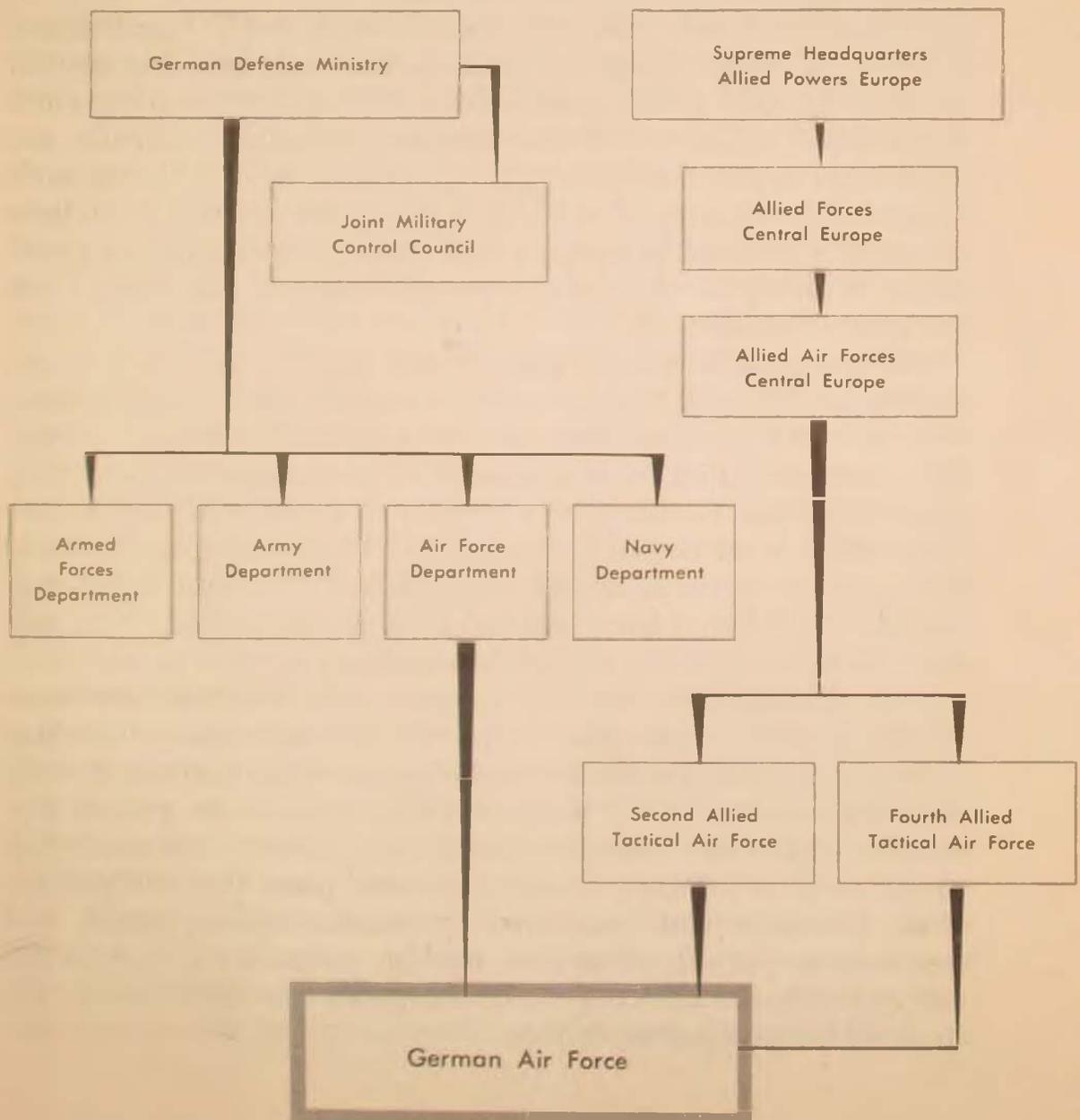
Heretofore NATO organs have only had the right to recommend—not to command—actions of national units in time of peace. Only the future will reveal the exact extent of their control over the German units. Present indications are that in peacetime German authorities will retain considerable direct control, while SHAPE and its subordinate commands will concentrate on tactical and strategic planning. In case of war the NATO commanders are to assume direct command.

With the admission of the German Federal Republic to the NATO alliance a new element has entered into the formulation

of Western plans for the defense of Europe. West German military men no doubt will submit to close scrutiny the plans previously formulated without their participation, examining them in terms of their own conception of their country's security needs. In general they will seek assurances that plans for NATO global strategy will take account of West Germany's specific interests.

In the more technical problems of joint NATO planning and operations, participation of the West Germans will no doubt

Command and Control of West German Air Force



call for a certain amount of mutual adjustment. The prevailing spirit and practice of close international military collaboration, which NATO inherited from the wartime alliance against Germany, will be quite new to the Germans. German soldiers have no real tradition of collaboration on equal terms with Allied forces. They will bring to their tasks certain preconceptions which may not accord with current military concepts of the alliance. As noted previously, many German military men continue to adhere to narrowly continental, ground-oriented military doctrines, while NATO strategy has increasingly been oriented toward an air-atomic global strategy. The military leaders of the only NATO power with experience fighting the Russians may well have some ideas of their own on the most effective way of dealing with a Soviet attack on West Germany, ideas that may conflict with current NATO concepts.

Purely technical differences pertaining to NATO tactical and operational plans will be overcome by patience, tact, and mutual adjustment. The problem of successful West German integration into NATO is likely to depend less on how quickly German soldiers learn to get along with their colleagues from Allied nations than on "the amount of confidence which the Germans . . . have in NATO's strategical plans." And in this respect, it may prove easier to satisfy German military men than political leaders and the general public.

Contemplated NATO strategy and plans for the employment of "unconventional" weapons and air-atomic power in the defense of West Germany have been widely criticized in West Germany. The Western Allies, it is claimed, are planning to expose both parts of divided Germany to nuclear and thermonuclear devastation. Much of the country, it is said, would be made uninhabitable and millions of its inhabitants would be killed and maimed if present NATO strategic plans had to be put into effect. Not only West German political leaders but military experts as well have argued that German national security considerations have thus far been pretty well ignored by Western strategists. If their country is to make an effective contribution to the common defense task, they insist, NATO plans will have to take far greater cognizance of German interests and defense needs. Above all this means to them military arrangements and plans that will provide West Germany with maximum protection against attack and devastation, yet will be flexible enough politically to permit the country to loosen its NATO ties if such action would further the cause of German reunification.

German Reactions to NATO Plans

The strategic planning that prompted the arming of West Germany envisioned the combat mission of the German Air Force to be the providing of tactical air support to NATO forces in Central Europe, in close cooperation with other elements of the alliance such as the United States Strategic Air Command. While SAC would strike at the enemy interior, German and other Allied tactical air forces in Europe would be charged with erecting an air barrier against the advance of enemy ground units and at the same time participating in mopping-up operations directed against advancing enemy units. Presumably this would be the plan of operation whether West Germany was attacked directly or whether the initial attack was directed against some other member of NATO. Thus the training and deployment of the German Air Force in peacetime would be governed by the over-all strategic concepts of NATO war plans, and its wartime employment would be directed according to the global needs of the Western alliance.

Whether West German ideas on the training, organization, deployment, and use of their Air Force will necessarily correspond to those of United States and NATO military leaders remains to be seen. As has been indicated in the preceding discussion, there are reasons for feeling that present NATO plans and concepts are not altogether what the West Germans would wish them to be. These plans fail to assure many West Germans that their country, as a forward area in any East-West battle for Europe, would not become a battlefield or a wasteland in case of war. They do not seem to provide the Germans with a satisfactory solution to a limited, conventional attack from East Germany, mounted perhaps by satellite forces. They seem to many West German observers to commit German forces to automatic suicide in case war should break out between the United States and the Soviet Union. Some Germans feel that it would be better if their country retained the freedom to limit itself to defensive actions, employing conventional forces and weapons, as long as the exchange of major blows was restricted to the territory of the major contestants. In any event they would prefer to see West Germany retain greater control over the deployment and employment of its forces than is now indicated.

These problems illustrate some of the issues likely to be raised by West German political and military spokesmen during the next few years. German military traditions, security considerations, and political problems may well force modification

of certain concepts regarding the organization, training, and deployment of the new German Air Force now held by NATO and U.S. military planners. What appear to be specifically German needs are likely to loom more important in the minds of the leaders of the Federal Republic than plans for a global defense structure of the Western alliance. Tact, flexibility, and a willingness to compromise will be required, both in the councils of NATO and in the German military establishment, if the new Air Force is to make a real contribution to the strengthening of Western military power.

Research Studies Institute, Air University

Lord Trenchard, Architect of Air Power



DR. HARRY H. RANSOM

“You have been the pillars of the edifice,” Sir Winston Churchill told a group of top British air officers, “but here is the architect.” Sir Winston pointed to Hugh Montague Trenchard, during and after World War I architect of air power and first Marshal of the Royal Air Force.

The emergence of air power as the dominant military weapon can be credited to no single “architect.” But three names must head the list of military aviation pioneers: Douhet, Mitchell, and Trenchard. Giulio Douhet died in 1940 and Mitchell in 1936. With the death of Lord Trenchard in London on 10 February 1956, the last of the great triumvirate is gone.

Douhet, Mitchell, and Trenchard, operating within different political and geographical environments, each encountered stubborn opposition to acceptance of the concept of unified air power. Douhet spent a year in jail as penalty for the way in which he advocated his radical views. Mitchell was found guilty of unorthodox military behavior by an Army general court. He left the Army in 1926 and continued his colorful fight for air power in civil life. In Great Britain, despite the formation of the “independent” Royal Air Force and a separate Air Ministry in 1917-18, the battle to gain for air power its proper place in the formation of strategy and in the military structure was fought—as Sir John Slessor has recounted—“tooth and nail against the most powerful, the most determined, and I am afraid, sometimes the most intemperate obstruction by the forces of military conservatism.” Trenchard was in the forefront of this battle. His career was no less stormy than those of Douhet and Mitchell.

Trenchard’s contributions may be divided into three categories: formation of an independent air force in Britain in 1917-18 and fight for a sepa-

rate mission for air power in strategic warfare; influence on the early development of United States air power through contact with Brigadier General William Mitchell; and post-World War I contribution to British air power as RAF chief and later as the elder statesman of British air power.

The First World War

When in 1912 at the age of 40 Trenchard decided to learn to fly, the Royal Flying Corps was designed as an auxiliary unit of the Army. Army "Co-operation Aircraft" was the term for most of the airplanes then in operation. Reconnaissance and artillery observation were the only functions considered legitimate for aircraft.

A meteoric rise in rank brought Trenchard the field command of the RFC in France in 1915. At first he was preoccupied with the primary mission of his command, close support of the Army. Aerial reconnaissance played a vital role in the stagnant trench warfare. The Allies and the Germans battled in the air to put out each other's "eyes." Because of radical developments in aircraft and armament air superiority changed hands four times within two years.

But in June and July 1917, a somber year for the Allies, a new dimension of war appeared. Formations of 14 and 21 German Gothas, twin-engine bombers, raided London in daylight, inflicting casualties and considerable damage. The public cry for retaliation was widespread. The needling of members of His Majesty's loyal opposition in Parliament prompted reconsideration of the role of air power.

Should air power be unified? Was there an independent mission for aviation? In London in the summer of 1917 these questions were acute. The Navy was inclined to answer "No" to the first. The Army was skeptical about the implications of the second. Trenchard's answer to both was a booming "Yes!"

As often happens when military opinions conflict, the politicians sought an answer by committee. Prime Minister Lloyd George was the nominal chairman, but the committee was actually headed by Lieutenant General Jan Christian Smuts. The second report of this committee (the first one dealt with air defense of London) is called "the most important document in the history of the creation of the Royal Air Force." Thus two soldiers who had fought on opposite sides in the Boer War, Trenchard and Smuts, came to play a vital role in the unification of British air power in 1917.

The Smuts Report, submitted to the War Cabinet on 17 August 1917, called for an independent Air Ministry and a separate Air Staff. The committee concluded that the air service was no longer "merely ancillary to naval and military operations." It had a mission of its own: "Unlike artillery

The Editors thank Lady Trenchard, the Air Ministry, and the Imperial War Museum for finding and furnishing the photographs (copyright) accompanying this article and for their kind permission to publish them in the *Air University Quarterly Review*. Further publication of these photographs will require special permission of their owners.

an air fleet can conduct extensive operations far from, and independently of, both Army and Navy. As far as can at present be foreseen, there is absolutely no limit to the scale of its future independent war use. And the day may not be far off when aerial operations with their devastation of enemy lands and destruction of industrial and populous centres on a vast scale may become the principal operations of war, to which the older forms of military and naval operations may become secondary and subordinate."

Trenchard was recalled to head the newly formed Air Staff. Sir Douglas Haig, skeptical of some of the report's recommendations, protested Trenchard's removal from France. He wrote to London: "I cannot affirm my conviction too strongly that the removal of Trenchard's *personality* at the present juncture will be most prejudicial to the fighting efficiency and the morale of the R.F.C. in France."

The personality of "Boom" Trenchard, so-called for his foghorn voice and explosive nature, burst upon London like one of the Kaiser's bombs. After only a few months as Chief of Air Staff he resigned as a result of a basic policy disagreement with the civilian Air Minister. Public consternation, further resignations—including that of the Air Minister, Lord Rothermere—and heated discussions in the House of Commons followed. But the RAF had officially come into being on 1 April 1918, and Trenchard was not long out of service. On 6 June the Air Ministry created a strategic bombing group known as the Independent Air Force, under the command of Major-General Trenchard.

Trenchard later described the object of his independent force as "the breakdown of the German Army in Germany, its Government, and the crippling of its sources of supply." But the handful of bombing squadrons at his disposal and the limited capabilities of contemporary aircraft prevented any attempt at a systematic knockout of vital industry. Trenchard wrote, "At present, the moral[e] effect of bombing stands undoubtedly to the material effect in a proportion of 20 to 1." Like Douhet and Mitchell, Trenchard exaggerated the effect of bombing upon civilian morale. But the official British history concludes, "In the light of our own later knowledge it would be difficult to suggest how the few independent bombing squadrons might have been more effectively employed."

In the closing weeks of the war Trenchard was appointed commander of a planned Inter-Allied Independent Air Force. The mission of this force was "to carry war into Germany by attacking her industry, commerce and population." Although still largely a paper organization when the Armistice came, it represented a historic step in the evolution of the strategic bombing concept, with Trenchard at the center of the stage.

From 1914 until the end of the war Trenchard was the leading military figure in the history of British air power. But his work had just begun.

Trenchard and Billy Mitchell

Measurement of Trenchard's influence on the development of air power must take into account the significant impression he made upon General Billy Mitchell, chief publicist and catalytic agent in the formative years of

Marshal of the Royal Air Force the Viscount Trenchard 1873-1956



Subaltern in India, 1897

In his long, vigorous career Lord Trenchard served Great Britain in many capacities, most notably as founder and mentor of the RAF. Following Army duty in India and Africa, Trenchard turned to flying in 1912 at the age of 40. He advanced rapidly, became field commander of the Royal Flying Corps in 1915, was briefly chief of the new Air Staff, and in 1918 pioneered strategic bombing as head of the Independent Air Force. From 1919 to 1929 Trenchard commanded the RAF as its first Marshal. In retirement he used his organizing ability as Commissioner of Police, London (1931-35), and Chairman of the Board, United Africa Company (1935-53). Always — in the House of Lords, in writing, and as “grand old man” — he was advocate and mainstay of the air power he had fostered.



In Nigeria as Brevet Major, 1907



With Queen Mary, France, 1917

H.Q. Staff, Independent Air Force, 1918





Commissioner of Police, 1931-35



Tour of RAF in France, 1940



With Montgomery at El Alamein, 1942



Visiting aircrews
in North Africa, 1943

United States air power. Mitchell must have had Trenchard in mind when he wrote in 1925: "The British air force is composed of men who have complete confidence in the future of aviation and who can visualize what is going to happen and what aviation can do and should do instead of what it cannot do and should not do. . . ."

World War I first brought Mitchell, then a major, in contact with Major-General Trenchard. The British airman's personality made an indelible impression. Writing in his diary in May 1917, Mitchell said, "It has never been my pleasure to work with or know a man that I more greatly respect, or in whose judgment I have more confidence." Mitchell also recorded in his diary in 1917 a Trenchard saying: "The great captains are those who think out new methods and then put them into execution. Anybody can always use the old methods." After examining Mitchell's diaries and personal papers, one of his biographers concluded, "Probably no one throughout his life had a greater influence on Mitchell's aviation views than General Trenchard. . . ."

During a tour of British air stations at the front in 1917 Trenchard gave Mitchell a copy of a memorandum on the use of air power. They found themselves discussing, as a "perfectly practical thing" (so Mitchell records in his diary), the idea of strategic bombing of Germany's industrial centers. The concept of an "independent" strategic role for aviation was apparently implanted in Mitchell's mind by Trenchard. It grew into a principal article of Mitchell's faith in his fight during the 1920's and early 1930's for a separate air force in the United States military structure.

The two air pioneers maintained contact in the postwar period. In Europe on an official aviation survey, Mitchell visited Trenchard in 1922 and learned details of the air force structure being built by the British air chief. Unable by 1925 to win over U.S. leaders to the "new methods" of warfare, Mitchell pressed his controversial tactics until they led to his own court-martial and resignation from the service. Shortly after his departure from the Army, he wrote to Trenchard, "I became so fed up with the way things were being conducted, I thought I could do more outside the service than in it, so I am making a lecture tour of the country and shall keep up the fight for a United Air Service until we get it." This candid correspondence suggests the close bond between Mitchell and the British airman.

Mitchell died long before his goals were achieved, yet it is clear that through him Trenchard's influence was profoundly felt in the United States.

The Interwar Years

Interservice disputes after World War I were no less bitter in England than in the United States. At issue among the British was the warborn independence of the RAF.

As Chief of Air Staff from 1919 to 1929 Trenchard championed the separate air force. He devoted his boundless energy to protecting the integrity and independence of the RAF, to building the fundamental training institutions needed to supply skilled personnel, and to developing air doctrine.

Trenchard fought three formidable adversaries during his tenure as Air Chief: the Admiralty, the War Office, and economy-minded political leaders. Postwar retrenchment decimated the RAF. Meanwhile the Navy and Army worked to regain their own air services.

The famous pioneer outlined the basic concepts for a postwar RAF in a memorandum issued by the Air Ministry on 13 December 1919: "The Force may in fact be compared to the prophet Jonah's gourd. The necessities of war created it in a night, but the economies of peace have to a large extent caused it to wither in a day, and we are now faced with the necessity of replacing it with a plant of deeper root."

Trenchard favored men over machines, being aware of the rapid development of aviation technology and realizing that an air force with the finest machines cannot function without trained men. His plan for a deeper rooted RAF was to produce a small but highly efficient technical force, kept dynamic by the continuous flow of men proficient in the various branches of military aviation. Despite criticism for not giving primary attention to aircraft, he concentrated on building permanent barracks and schools for the training of officers and men—pilots, mechanics, and other technicians. The establishment of the cadet college at Cranwell, Apprentice Wings at Halton, and the Staff College at Andover were but a few of his accomplishments.

Trenchard did not like to be called "Father of the Royal Air Force," but few historians of air power dispute his paternity. Trenchard argued that he did not "invent" the doctrines of air power, but his voice was one of the first raised with authority to proclaim them.

A basic principle which Trenchard expressed in his 1919 memorandum was air power "independence." He set forth his views further in an address at an Air Conference in October 1920, reproduced in *The Army Quarterly* (April 1921). There he stated that "the work of the Air Service either on land or sea, in spite of its many and various aspects, can only achieve its greatest efficiency if regarded and carried out as a single co-ordinated effort." He also defined his concept of true military unification: "All bombing, even when carried out on very distant and apparently independent objectives, must be coordinated with the efforts that are being made by the land and sea forces, both as to the selection of objectives and as to the time at which the attacks shall take place."

Under Trenchard's regime an imaginative and unique application was made of air power. In 1922 the RAF was ordered to maintain domestic order in Iraq. This mission enabled Trenchard to carry out with some success the bold experiment of "air control," or "substitution" as it was sometimes called—the use of air squadrons rather than ground forces to maintain control of an area. The experiment was successful enough to bring later assignment to the RAF of "air control" over Palestine, Transjordan, and Aden. The method also was employed on occasions on India's Northwest Frontier.

Upon his retirement as Air Chief in 1930 Viscount Trenchard became the elder statesman of British air power, serving its cause as an outspoken member of the House of Lords and as a frequent contributor of widely read letters to the *Times* of London.



Lord and Lady Trenchard attend the RAF Review held for Queen Elizabeth in 1953. In the twilight of his life Lord Trenchard could justly be proud of the Royal Air Force, Britain's first line of defense, to which he gave form and life.

World War II

As builder in the 1920's of firm RAF foundations Trenchard deserves much of the credit for the superior performance of Churchill's famous "so few" in the crucial Battle of Britain. The *Times*, not given to extravagant journalism, stated at the time of Trenchard's death that if he "had not taken up flying when youth had already passed him, the Royal Air Force would not have been the bulwark of Britain that it was in either war."

Trenchard took an active interest in the air forces during Hitler's war, visiting hundreds of RAF and USAAF units in Britain and abroad. But he contributed more than pep talks to the boys. In the 1942 Washington policy disputes over the emphasis to be given strategic bombing of Germany, the long experience of the British on the giving and receiving end of bombing and particularly Trenchard's personal experience carried great weight in Washington's war councils. A paper prepared by Trenchard arguing that air power should be concentrated for strategic bombing and not sliced up into penny-packets for various land operations was widely circulated within the War Department and considerably supported the views of American airmen.

During the war Trenchard distributed a number of pamphlets at his own expense, including such titles as *The Effect of the Rise of Air Power on War* and *The Principles of Air Power in War*. According to Sir John Slessor these

"did a great deal to bring home the vital importance of air power to many influential people in this country and in America."

In one of these papers Trenchard set forth his "four great principles of air power":

(1) To Obtain Mastery of the Air, and to keep it, which means continuously fighting for it. (2) To Destroy the Enemy's Means of Production and his Communications in his Own Country, that is by strategic bombing force. (3) To Maintain the Battle without any Interference by the Enemy, which means to enable the Commanders to build up the colossal supplies and reinforcements necessary for the battle, and to be able to maintain them without interruption by the enemy. (4) To Prevent the Enemy being able to Maintain the Battle, that is, to prevent him being able to build up adequate supplies for his Armies or Navies or Air Forces.

Significantly, Trenchard declared that the above principles "were implicit in air power as used even in the war of 1914-18." They were, he said, "conceived on the day the Air was conquered."

Trenchard's Contribution

Trenchard's faith in air power never faltered. Since 1912, when he first climbed into a stick-and-string Farman biplane to learn flying, Trenchard's biography has been interlaced with the history of air power. Comparing their roles, it may be said that Douhet was the theorist of air power, Mitchell the publicist and catalytic agent, and Trenchard the organizational genius. Trenchard's contribution was not eloquence, which he lacked, but energetic action. His young airmen of the old Royal Flying Corps used to say, "Boom never seems to sleep." Now after 83 years Hugh Trenchard sleeps at last.

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Air Power and World Affairs

COLONEL WILFRED J. SMITH

PRESSURES of the cold war that dictate the necessity of maintaining segments of United States air power away from home on foreign soil have given rise to a new concept of officer competency. This new concept considers that Air Force officers should possess a high degree of proficiency in international relations, including an intimate understanding of cultures radically different from our own. It is a concept that has grown out of the idea that the true effectiveness of air power, globally dispersed, depends not only on the answers we give to purely military problems but also, to a large degree, on how thoroughly we understand important nonmilitary factors and adjust to their demands.

The value of such understanding to the science of airmanship is recognized in some circles. In others there are, understandably, honest reservations regarding the propriety of military men engaging in things political. I suggest that we review some of the ample testimony to the importance of nonmilitary factors in the accomplishment of our global air commitments in the political, geographical, and cultural environments in which one segment of the USAF overseas, the Seventeenth Air Force, finds itself.

The Seventeenth Air Force is operating in an area of critical importance, where American air bases have been located to preserve the peace or, if necessary, to prosecute a war. The Seventeenth assumes its prescribed responsibilities in Morocco, Algeria, Tunisia, Crete, Greece, Italy, Libya, and Turkey. Its bases and installations provide important support to the NATO alliance and, indirectly, to friendly nations associated in the Baghdad Pact.

The strategic significance of this vast slice of the Middle East cannot be overestimated. The region serves as a land bridge to connect the continents of Asia, Africa, and Europe. Fabulously rich in oil fields under development, richer still in resources yet

untapped, the Middle East represents interests we would not want to lose in peace or could not afford to sacrifice in war.

The Middle East is a region of dangerous weaknesses. Since national independence has been a recent experience for many countries in the area, political immaturity and an acute shortage of leadership elites constitute a sizable handicap. In terms of social development, backwardness is more often the rule than the exception. Illiteracy among the masses is generally prevalent and will continue to raise problems for years to come. Economically the "have nots" vastly outnumber the "haves," and steadily mounting birth rates continue to increase population pressures. The masses are imbued with an overpowering urge to acquire a higher living standard than their national resources will presently provide. The clamor of their demands is urgent. At the same time there is a growing conviction that the last vestiges of alien control must be eliminated, and rampant nationalism is proclaiming that colonial holdings are anachronistic.

As these pressures have mounted over the years, the Middle East has quarreled itself into a power vacuum. World War II accelerated forces already at work. The loss of British and French prestige aggravated the deteriorating situation, and French retention of only her North African holdings, plus the withdrawal of British forces from the Suez Canal Zone, served only to dramatize the extent of the vacuum created. The U.S. Air Force has, by its physical presence in the region, had the effect of bolstering the sagging Western influence in the Mediterranean and constitutes what well may be a significant advance in the interests of the Free World community.

Commanders in the nations where the Seventeenth Air Force operates face varied and special problems. It is essential that each commander understand the basic conditions that motivate governmental policies and underlie popular aspirations in the nation in which his base is a tenant. We occupy our bases solely through agreements that spell out in detail the terms of our tenure. We cannot be indifferent to situations which affect our hosts, and, as tenants, we are intimately involved in local situations. It is manifestly impossible for us to live unto ourselves, and any tendency to adopt an attitude of "splendid isolation" would be both unwise and unrealistic.

A primary example of this fact is to be found in French Morocco, where the pressures generated by political developments have recently become acutely evident. The initial decision by the United States Air Force to construct an important complex of

bases for the Strategic Air Command coincided in point of time with mounting tension developing between France and her native Protectorate peoples. Month by month the toll from terrorism mounted, and Moroccan boycotts of French products assumed nationwide proportions. The situation became even more precarious during the summer of 1955 when a campaign of guerrilla attacks was inaugurated against the French. It was plainly evident that the struggle was exclusively a Franco-Moroccan quarrel in which we were not involved. Anything less than the strictest neutrality not only of our Government but of each American in Morocco would have been a potential match to a powder keg. Also for the American community of approximately 12,000 military and their dependents, there was always a statistical chance of suffering inadvertent, wholly unintentional injury. The situation required numerous restrictions on off-duty activity for Americans in Morocco which, while inconvenient, succeeded in preventing trouble.

The issues in dispute involved the rights of Moroccans to administer their own affairs. By virtue of their own history and traditions, Americans are inclined to support a fight for freedom. By nature we have an instinctive sympathy for the underdog. Any discussion of local affairs during the dispute, however, would inevitably have generated resentment on the part of both the French and the Moroccans. To preclude such developments, American personnel were directed to maintain an attitude of absolute neutrality and to avoid any discussion of controversial topics that might offend Moroccan or French sensibilities. Compliance with this directive of the commander was uniformly excellent, offering an outstanding tribute to the ability of an American community to adhere to discipline.

The Moroccan bases were obtained solely through the French, legal custodians of Sherifian foreign affairs under the terms of the Treaty of Fez signed in 1912. It was this treaty, the abrogation of which has been the primary objective of the Nationalists, that established the Protectorate Government in Morocco. Everything points unmistakably to the fact that when U.S. representatives begin renegotiating for the air bases our business will be done with Moroccans.

Labor management only recently became a real problem area in Morocco when laws forbidding native workers to organize were revoked in September 1955 and the first Moroccan labor unions were formed. Immediately their offices were swamped with applications. One of the first acts of the new labor leaders was to

organize the Union of American Base Employees. United States installations in Morocco employ some 10,000 local people in accordance with the policy of the "Native Son Program." Although we utilize the labor, the French Quartermaster Corps hires, performs security checks, and acts as paymaster. Moroccan labor was unconvinced that the Air Force was required under the terms of Franco-American agreements to work *only* through French channels in dealing with labor matters. Leaders of the Moroccan labor movement were unfamiliar with the fine points of the law and acted as if they cared less.

This spring the Union of American Base Employees called a general strike against all of our installations. Although the strike lasted but four days, it understandably presented us with problems affecting many of the low-priority portions of our mission. It is to our credit that, through patience and understanding, a peaceful solution was reached and the strike ended as quickly as it did.

Only time will reveal what the future holds for the U.S. Air Force in Morocco. A Moroccan government in possession of full sovereign powers can be safely expected to be friendly and to feel that the continued presence of U.S. air power is mutually desirable. But new problems will inevitably arise, and they too must be solved by patience, good will, and a firm resolve to retain an abiding sense of humor.

In Greece the Air Force has from the beginning enjoyed the finest relations in dealings both with governmental officials and with the public. It cannot be assumed, however, that even the deepest reservoir of good will is inexhaustible. Although the pro-Western faction of the Greek government was recently victorious at the polls, the winning margin was ominously slim. Greek resentment of her NATO ally, Turkey, still persists. The emotion-packed Cyprus issue, which has sparked sporadic demonstrations against the British, has also given evidence of anti-American feeling. The Greek press, which has consistently expressed only the friendliest feelings for the United States, has on occasion shown a disposition to make common cause with left-wing papers which consistently clamor for a severance of NATO ties and a Greek policy of neutralism.

Unless there is a sharp reversal of recent trends, the position of U.S. military forces in Greece can become quite difficult. An uncooperative government could seriously restrict the scope of present operations by redefining existing agreements to the possible detriment of future mission accomplishment. For example, governmental approval for continued American control of important

communication centers can be withdrawn and the privileges we presently enjoy under the existing Status of Forces formula sharply curtailed.

Seventeenth Air Force responsibilities in Italy are concentrated in administering base facilities set up for USAF rotational units deployed in keeping with our NATO commitments. Air Force teams also assist in training Italian Air Force personnel in a variety of technical skills aimed at improving proficiency in air defense.

Air base facilities in northern Italy are situated in areas that have the heaviest concentration of Communist voting strength. In spite of this the reaction of the general public to the presence of USAF personnel never has been notably unfriendly. Communist hostility has so far been expressed mainly by crude drawings of the hammer and sickle on village walls and by Communist press diatribes against "Wall Street War Mongers." But the long-term outlook in Italy is clouded by political uncertainties that can be dispelled only by steady and marked improvement in national economic stability. Italy's ability to meet her NATO commitments and the welcome she will continue to accord to USAF military assistance will depend heavily on the political complexion of her future governments.

The Libyan picture is one of bright lights and shadows. Our tenure of Wheelus Air Base in Tripoli is secured by a long-term agreement. Its extensive facilities, convenient location, and ideal flying weather contribute to make Wheelus one of the busiest and most important bases under Seventeenth Air Force administration. Units stationed in Europe regularly deploy to Libya for gunnery practice or to participate in NATO maneuvers. At least a score of tenant organizations are always on hand to enjoy the support that the base provides and an average of 11,000 transient personnel use Wheelus facilities each month. Wheelus also airlifts vast quantities of military equipment required throughout the Middle East, and maintains a system of round-the-clock air defense for local protection and for air security on the southern flank of our NATO allies.

The pressure of political events in Libya will inevitably exercise a profound influence on the conduct of our Air Force mission there. While presently Libya is inclined strongly toward collaboration with the West, no assurance can be given that this happy state of affairs is permanent. Libya is handicapped by a shortage of qualified officials and technicians. To meet the needs of the Libyan government large numbers of Egyptian lawyers,

educators, and trained administrators have been employed. Egyptian publications, popular programs from Radio Cairo, and cultural missions have strongly influenced public opinion. The attraction that Egypt exercises as a neighbor and a fellow Arab state is considerable. Libya cannot be expected to remain indifferent to the emotional reaction which the Arab-Israeli dispute engenders.

Libya is an area where the push and pull of contending forces will be felt, and the nation will be forced to make choices in which her interests and her emotions may conflict. Libya can expect to be wooed ardently by two suitors, each bearing gifts. Indications are that the courtship will be strenuously pursued.

Establishment of a Soviet Embassy in Tripoli in February 1956 was understandably interesting to us in the Seventeenth Air Force. Our base at Wheelus can be likened to a show window where a wide assortment of U.S. Air Force activity is on display. The situation poses a test for "coexistence" that will be well worth watching.

Turkey has clearly indicated her pro-Western preference by membership in NATO and the Baghdad Pact. Although there is no question of Turkish determination to meet her commitments, here again economic resources are painfully inadequate. We must not forget that a gallant ally with a stout heart and a slim pocket-book will require wise and sympathetic treatment. The Seventeenth Air Force is doing its full share in giving important logistical support to Turkey in keeping with the terms of our commitments in the NATO alliance of free nations.

In light of these and other conditions the Seventeenth Air Force is undertaking its military mission while supporting the broad national objectives outlined in our foreign policy. While the difficulties of concerting military and diplomatic programs in this diverse and troubled region are enormous, it is imperative that they be overcome. It will demand the utmost in patience and tenacity, but the magnitude of the stakes at risk justifies any amount of effort.

THE MEDITERRANEAN unquestionably represents a field of unique promise and special priority to the Soviet Union. Control of this area by the Soviets would provide a vital contribution toward achieving the Communist goal of global domination.

Lenin once wrote that "the road to Paris lies through Peking and Calcutta." In 1949 the Soviet Union secured Peking and by

1954 had thrust deep into Southeast Asia. The ensuing months were needed to digest Red gains in Asia and consolidate vantage points acquired. During this period it must have appeared obvious that India, dominated by Nehru's neutralism, offered no significant barrier to future Red advances. So Calcutta could be bypassed and the march of Soviet imperialism could be directed toward the Middle and Near East. Quite possibly Soviet planners saw that Cairo, not Calcutta, would more advantageously advance those goals envisaged by Lenin.

In any event 1955 witnessed the launching of a massive Soviet attack on a front from Afghanistan to the Atlantic shores of Africa. The instrumentalities of political, economic, and psychological warfare were invoked with telling success. Recognizing the strategic significance of the entire area, Soviet policy has embarked on a program of attacking separately each national entity by tactics best calculated to influence that particular nationality. Kremlin strategists have entered the lists on the side of North Africa nationalists, have championed the Arab League cause in the Israeli dispute, and have offered many and diversified assistance programs on a "no strings attached with a premium in every package" approach.

A diamond-studded "Khrushchev" prize should be accorded to Mr. Solod, the recent Soviet Ambassador to Egypt. It was largely through his efforts that Premier Nasser was wooed away from a policy of spasmodic neutralism and that the Red star began its rise over Egypt. As a result the Northern Tier Alliance of Turkey, Iraq, Iran, and Pakistan was leapfrogged and its politico-military significance greatly diminished. Arms shipped to Egypt and through Egyptian channels to her military allies in Syria and Saudi Arabia now threaten a drastic shift in the balance of power between Israel and her neighboring Arab states. Consequently the Tripartite Agreement of 1950, by which England, France, and the United States rationed the delivery of military equipment to the Middle East, has been virtually nullified. Ambassador Solod, his task accomplished, recently left for the U.S.S.R. and a new post as head of the Middle Eastern section of the Soviet Foreign Office. But before his departure Solod had planted the seeds for a new political alliance sponsored by the Soviet Union among Arab League states and had given a valuable assist to ensuring the establishment of a Soviet diplomatic mission in nearby Libya.

To a complacent West the massive Soviet attack in the Middle East has come as a rude shock which does not square with cherished estimates. It has long been regarded as axiomatic that material-

istic Marxism would prove anathema to all peoples of Islamic faith. The fact that a Communist member of the Syrian National Assembly was able to win a resounding political victory in 1954 by a margin of 16,000 Moslem votes had not been regarded as a matter of particular significance. In addition Soviet skill in wooing native peoples with themes tailored to local consumption was badly underestimated. Thus Soviet influence has grown apace by means of shrewdly adroit propaganda depicting the U.S.S.R. as a friend of the underdog and the champion of Arab nationalism. By consistently lending moral support to the cause of North African independence the Soviet Union has been able to acquire new stature in the minds of Moslem peoples. The Koran teaches that "the enemy of my enemy is my friend." Soviet propaganda has loudly inveighed against "colonial-minded war mongers."

The Soviets also have been eminently successful in encouraging age-old grudges. On a broad front they have widened existing breaches and opened up new points of cleavage. The Cyprus problems, Egyptian rancor over establishment of the Baghdad Pact, and the mutual hatreds involved in the Arab-Israeli feud—all have presented ready-made situations for Soviet exploitation. The detailed story of Soviet successes is understandably beyond the scope of this study, but its over-all implications are as germane to the cold war as they may be to actual military conflict.

IT is highly possible that we may be forced to live under conditions of the cold war for many years to come. Thus there are subtle dangers which Air Force officers should be prepared to recognize. Chief among these is a tendency to regard the current situation as one of normalcy because the pattern has now grown so familiar. Also we can be beguiled into the belief that the smiling visage so recently displayed at Geneva genuinely betokens a *modus vivendi* of peaceful coexistence. But as professional military men we cannot permit ourselves to be lured into a "business as usual" attitude, for the penalty of such thinking can well ensure defeat in battles yet unfought and even ultimately spell the end to national security.

Any thesis that the cold war is actually a truce or that it represents a situation of suspended animation is dangerously fallacious. It is more accurately a period of stress wherein the crises are usually less glaringly apparent than in times of conventional military campaigns. Actually the advances and retreats of con-

tending forces in a cold war are often more tellingly meaningful than the ebb and flow of warring armies. This point needs to be stressed: it is hypothetically true that the victor in a cold war may never have to resort to all-out employment of conventional military forces to ensure final victory. This is a chilling thought, and one that military men must analyze and ponder carefully.

With each passing day the requirement for a restudy of Air Force thinking grows more pressing. In the past there may well have been too much emphasis on the exclusively military character of an officer's training. Unless steps are taken to improve the acuity of our military-political vision, the results can well prove disastrous. Much of the effort already expended and the vast sums spent in construction of overseas bases can be wasted if the implications of the current world struggle are not carefully appraised.

The problem confronting the overseas commander has two major aspects relatively equal in importance. One involves the question of how we conduct our human relationships, up to and including those between nations. The other pertains to the type of military posture we build and maintain.

Serious-minded Air Force officers on overseas assignment generally will agree that it is essential to give serious attention to the trends of national sentiment as they develop within the countries where our bases and installations are established or being built. In none of the countries is the situation static. We have learned that a pronounced pro-Western orientation can overnight be replaced by an attitude of chilly hostility. Each sovereign nation jealously guards against any real or imagined violation of its prerogatives. The most meticulous care must be exercised to avoid affronting highly sensitive national susceptibilities. Where religious customs and cultural habits are so vastly foreign to American ways of life sympathetic understanding must be the inspiration for all of our conduct. The continuous task of educating Americans stationed abroad and policing their daily living to ensure against the danger of inadvertently giving offense requires unremitting attention.

It is difficult for us to see ourselves as we appear in the mental image of those with whom we are allied. All too often the American tendency to be hearty and friendly is interpreted as ostentatious braggadocio. What to us are only normal standards of daily living may appear highly extravagant to the peoples in other lands. The barrier of language and the disparities which characterize our cultural background tend to raise barriers against mutual

understanding. Unless practical steps are taken to maintain good rapport between American military and the host peoples, treaties will be of no avail and forces unfriendly to the Free World will have won another victory through our default. Fortunately much progress has been made in the field of community relations. "On duty" foreign language instruction is only one of the many important programs used in promoting mutual understanding between our forces and host peoples.

There is still an urgent requirement for us to assess the vulnerabilities that threaten our bases and other overseas installations. The military danger of sudden air attack is well appreciated by most air officers. In the past the demands of economy and other circumstances frequently demanded the construction of highly critical facilities in close proximity to each other. The targets thus exposed to an enemy attack are highly vulnerable. It should not necessarily follow that the same mistakes be perpetuated in construction designs currently being developed. The traditionalist will grumble and complain that although some risks may be involved they are not commensurate with what dispersal would cost in money. Unquestionably construction costs might double or possibly treble in dollars cost, and it is true that a military installation, if laid out on the lines of a civilian plant, would result in monetary savings. But the military man must ask himself whether his primary concern is one of building for peacetime occupancy only or for wartime utilization. If the answer is the latter, then any design that neglects the necessity for dispersal is false economy.

We should also ask ourselves whether we might not have been too exclusively preoccupied with the threat posed by aerial bombardment. An honest answer might reveal that we have failed in some measure to consider the nature and specific characteristics of *all* the weapons an enemy might employ. As American airmen we may instinctively feel that an air strike is the most common-sense method of blasting an enemy air facility into radioactive fall-out. Certainly it is a final solution, but is it necessarily the *only* means of attack that will totally immobilize a target? It would serve no purpose to attempt to categorize the many means that might be used to neutralize our power to conduct our military mission. Especially in overseas areas we must be prepared to cope with local sabotage that could suddenly render vital equipment inoperative and crews unable to man the aircraft in which they have demonstrated a high degree of proficiency. The timing of such an event could come without warning and by design could coincide with the first few minutes of some future D-day. Whether

a catastrophe of such a magnitude ever does occur is largely your responsibility and mine because there is much that we can do to prevent its ever happening.

Until the day dawns when new weapons and strategies are available, the maintenance of air power on a global basis will continue to require the utilization of installations on foreign soil. In the meantime the problems associated with maintaining overseas bases in a state of wartime readiness will make increasingly heavy demands on our resources. Much will depend upon our ability as Air Force officers to recognize the true nature of these problems. More will depend on our success in solving them. The realism that we bring to the conference table and the validity of the assumptions built into our planning will contribute materially to the role which air power can play both at home and abroad.

As professional military leaders we cannot afford to engage in compartmentalized thinking, concentrating exclusive attention on operational matters. All Air Force officers must have an intimate appreciation of the nonmilitary elements underlying the strategy and tactics of a cold war. There is a distinct possibility that the familiar words of Clausewitz have been given a new twist since hostilities ended in 1946. It may well be true today that "politics are now an extension of war by other means."

Headquarters Seventeenth Air Force

In My Opinion . . .

ALLIED AIR POWER HAS OUTGROWN OUR MAAGs

MAJOR WILLIAM R. STEWART, JR.

TODAY'S air forces of many of our Allies are like a crowd of teenagers. Reborn during the last ten years, they have developed muscles they do not quite know how to use. Heretofore wanting only to be identified with the group, they are now becoming conscious of their individual desires and destinies. Youthfully confident in their abilities, they are still regarded as upstarts in their own national councils.

The Mutual Defense Assistance Program, commonly known as MDAP, under which our country furnishes military aid to friendly nations, now faces the problem of helping Allied air power through its adolescence and into maturity. The Military Assistance Advisory Groups (MAAGs), local agents of MDAP in each country, are proving ineffective for this job. Designed to assist the rebirth of Allied air power, they are not able to cure growing pains. MDAP air forces want to start flying by themselves but find that under our MAAG system they are supposed to remain helpless fledglings. In Europe particularly, the physical presence of MAAGs is restricting the growth of NATO air forces.

It is time to find a way of encouraging Free World air power to spread its wings instead of holding it under the constant spoon-feeding of our MDAP baby-sitting service. This does not mean that we should abruptly cut the ties between Allied air power and the MAAGs. But we should realize that Allied air power is growing up and that the role of MDAP must change from that of nurse to that of youth counsellor.

The MAAG Program

Not to sentence MAAGs to oblivion too lightly, let us see what they really are. In 1949 the United States set out to stop the spreading tide of international Communism. Our strategy abroad fixed on enclosing the Soviet bloc in a tight ring of Free

World nations—a policy of containment. Much of the success of this policy depended upon how effectively our friends could develop their capacity for self-defense. To help them, we concluded separate Mutual Defense Assistance Pacts with each nation. We were to provide military equipment and training they had to have but could not themselves furnish. Our efforts would be administered through teams of military experts established in each country as part of our diplomatic colony. These teams are our MAAGs.

The MAAGs were assigned two basic responsibilities. First, they would be the channel through which our aid would flow. Each nation would decide what forces it would commit to the defense against Communism. Then it would determine what equipment and training it could supply in activating these forces. The shortfall would be requested from the United States through the MAAG. The MAAG would ensure that the request represented a bona fide deficiency. On the basis of their findings, they would deny it or approve and forward it for programing action. This procedure was followed whether the request was for a fleet of million-dollar aircraft or for five cents worth of nuts and bolts.

Second, the MAAG would observe how the country used the equipment after we supplied it. MAAG representatives would make frequent visits to inspect and even live with units in the field to acquire firsthand knowledge of what was happening. Their job would be to observe, not to command or give advice on the employment of units.

Each MAAG has always been convinced that it is a unique military unit. There is a great deal of truth in this, since national considerations vary widely for each MAAG, and it is only common sense to reflect these differences in the organization and workload of each MAAG. With this general caution it may help to understand what MAAGs are if we examine a fictional one as typical of them all.

The organization of a MAAG is simple. Three basic sections deal with the three military forces—land, sea, and air. Each section consists of a small group of officers working in their specialties, such as training, supply, signal, or armament.

The MAAG's environment is definitely unusual. The men must find their own housing in a strange country and must live on its economy. They rarely have a post exchange or a commissary. They use offices in a rented building several miles from the Embassy. The Ambassador is their boss but most of their orders come through military channels. The MAAG chief is their immediate

supervisor, but they receive technical guidance from the Department of Defense, from joint theater commands, and from logistics agencies operating in their area. They are on very good terms with a few key officers in the Allied military service they are responsible for. Most of their work is channeled through these personal contacts.

Despite their vital role the work of our MAAGs has not been generally publicized. They are almost unknown to the man on the street. Their efforts are followed by relatively few military people. If brought together in one room, all the men assigned to all our MAAGs would not make a good crowd at a high-school basketball game.

Yet MAAGs could hardly occupy more sensitive posts. In thirty-six Free World nations they are the executive agents of our Government charged with building the military strength of our Allies. They work at national level, and most military leaders in MDAP countries form their basic impressions of Americans from working with their MAAG. The MAAGs' influence on our national budget is tremendous. It is largely from MAAG estimates that Congress has already appropriated nearly 20 billion dollars since 1950 for military aid. The MAAG function is so important that it could not be changed or dismissed without very good cause and without careful analysis of what would result.

The decline of the effectiveness of the MAAGs is not the fault of our airmen who work in the groups. They have done excellent and often magnificent jobs. In spite of rumors that MAAGs are "Garden of Eden" assignments, the duty is actually both arduous and nerve-racking. It is the working environment imposed on these men and the influence of circumstances beyond their control that have undermined the value of MAAGs to the cause of Allied air power.

Before examining the causes for decreasing MAAG effectiveness, we should note that somewhat similar organizations, called Missions, are in quite a different category. A MAAG determines what military aid an MDAP country needs, helps the nation get it, oversees the use of it, and points out better ways of using it. Missions also come under MDAP, but they are much larger units assigned to pitch in shoulder-to-shoulder with friendly armed forces to cover serious shortages in leadership potential, experience, and economic ability. There are Missions in five Allied nations where we consider the stakes sufficiently high to warrant this much heavier investment. The economic and military limitations of these nations will make them largely dependent on

our help for many years to come. Missions, therefore, are excluded from this appraisal.

Decline and Fall of the MAAG System

The major reasons for the loss in effectiveness of our MAAGs are that they have lost most of their stature, they are losing their ability to influence the actions of Allied air forces, and their effort has been diverted from national analysis to detailed book-keeping.

When MDAP started in 1950, the prestige of MAAG personnel exceeded that of our attaches. Allied air forces were composed of a handful of professional officers saddled with obsolete fighting equipment. They were desperate for advice and in a frenzy as to how to create modern air forces out of untrained volunteers and war-ruined national economies. To these airmen MAAGs appeared as personifications of the American spirit and knowledge that had done so much to win the war. With one hand they would point the way to resurgent air power; with the other they would give the strong, helping transfusion of new equipment and training assistance. To the leaders of these fledgling air forces the MAAG was like a television sponsor offering a man a new home to replace one he had recently lost.

It was some time later that they fully appreciated the strings attached to the gift. Imagine the reaction of the man with the new home if the television sponsor called daily to tell him where to build it, how to build it, and what furniture to put in it. Suppose then the sponsor tried to tell him how long to sleep every night, what kind of oil to use in his furnace, and what kind of party he was to give for all his neighbors every Monday night. Finally, cap this off with the appearance of a new representative from the sponsor telling him to jerk out his oil furnace and put in gas heat. It is no wonder that under corresponding conditions the prestige of our MAAGs began to slip.

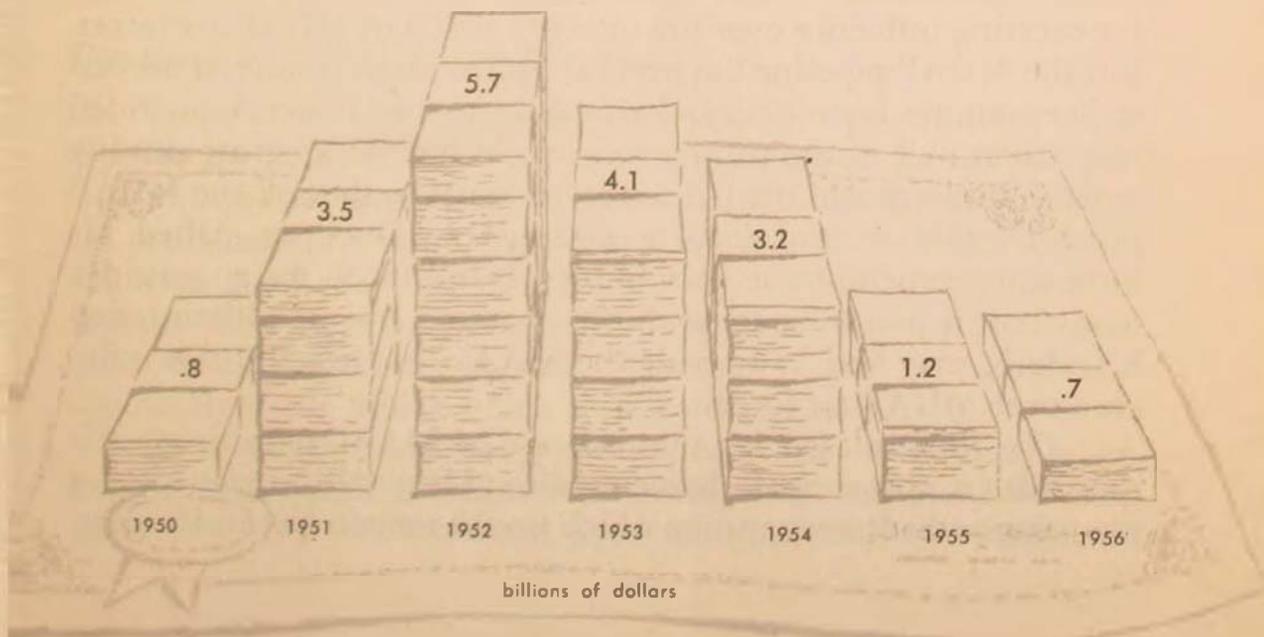
The main brace supporting the MAAG stature has always been the belief of the Allied government that it should program military aid through the MAAG. But the current trend in programming involves direct contact between friendly heads of state and our own. A look at our appropriations for foreign military aid explains this change. U.S. annual appropriations for MDAP soared from 1950 through 1952 and thereafter plummeted. Faced with a money squeeze, our Government had to centralize decisions as to how much military aid we could program, what kind it

should be, and where it should be given. Allied governments have recognized this trend and are now appealing directly to Washington instead of through our MAAGs. Newspaper accounts suggest that military aid was high on the list of every European prime minister and South American president who visited the United States last year. Nothing is wrong with doing business like this, but the resulting blows to the local MAAG's prestige have been enormous.

Another reason for the decline of MAAG stature has been the lack of backing from outside agencies. The MAAGs themselves have contributed to this condition by their steadfast individualism. Forced to stand alone as a buffer between the United States and an Allied government, they must often choose their path with delicate care. Sometimes they must place our national interests above the interests of one of our military services. Yet as the local agents of a major United States program, their effectiveness and standing are hurt if they cannot act with the assurance that our own interested executive departments and theater agencies will support them.

For example, when an Allied air force has geared its training and base construction programs to the receipt of jet fighters on

Annual MDAP Appropriations for Military Assistance



a certain date, the MAAG's standing is compromised when it must attempt to explain a year later why these new aircraft still have not arrived. On the other hand, it is just as aggravating for a MAAG to tell a NATO air force that shipments of radar sets are being held up because the country is not yet capable of using them, only to find that the radars were delivered three days ago.

Of particular concern are visiting American dignitaries who fail to coordinate their actions with the local MAAG or Embassy. A visiting military leader in South America who loudly states unfriendly opinions of Allied officials in their presence or a dignitary on a trip to Europe who proclaims himself as an expert on what is going to happen to an industrial facility are fictional but suggestive examples. Touring VIPs who visit foreign air forces and industrial sites and who, without coordination, state opinions, make commitments, or disclose information that may be sensitive have frequently undermined the local MAAG.

The decrease of MAAG ability to control or influence Allied air power is a second major reason for their waning value. Comparing friendly air forces again with the man who got the free house, the latter is so disgusted by now with the donor's restrictions and conflicting advice that he wants to build an entirely new home. It may have to be more modest, but he wants it to be completely his own this time. As a result he is going to try to throw off the controls placed on him by the old arrangement.

In the past the major bulwark of the MAAG's ability to control was that it sat astride the supply pipeline from the United States to the MDAP air force. By holding up requisitions for needed supplies a MAAG theoretically could compel an Allied air force to adopt changes in organization, administration, or logistics procedure. This checkrein gave MAAGs a powerful tool for exerting influence over the internal affairs of MDAP air forces. But the MDAP pipeline has never supplied all the material needed to keep an air force going. In most countries it never provided more than half of the supply source. As our Allies grow steadily more self-reliant and the United States starts to shut off the MDAP pipeline, this control feature disappears. Once an Allied air force starts expending its own money, it is difficult for an outsider to say how it should be spent, however sound and well intentioned his advice may be. As a result the MAAG has less and less influence over MDAP air forces.

The third reason for the decrease of MAAG effectiveness is the shift in operational characteristics. Originally designed as a planning and advisory agency which would remain free of adminis-

trative details, it is now predominantly a bookkeeping office. There are two causes of this change. First, many USAF agencies have always felt that the efficiency of MAAGs should be measured by the degree to which they can force MDAP air forces to adopt our own procedures. To gather proof that MAAGs were functioning properly, they demanded more and more data showing how these procedures had been adopted to the betterment of the Allied air force. Of course such thinking ignores the sovereignty of the Allied nation and fails to recognize that its air force must operate under its own laws and regulations. The falseness becomes readily apparent when we put the shoe on the other foot. Imagine the USAF's reaction if a team of Allied officers told us that beginning next week we would have to drop our procedures and adopt theirs. The pressure from such thinking has been so great that the air elements of MAAGs now spend 75 per cent of their working day either preparing or submitting reports. Their attention and efforts are diverted from the more important projects of assessing the ally's air power and of planning how to improve it.

The combined impact of decreased stature, loss of control, and preoccupation with bookkeeping leaves the MAAGs without power. They are vulnerable targets on which fledgling air forces can focus their frustration. Does this mean we should eliminate our air program? No. The Chief of Staff of one NATO air force recently was asked by an American what his reaction would be if MDAP were stopped. He said, "That's easy. We know that when MDAP stops, the threat is over." The threat is not over. We must continue MDAP. The need to further develop the air power of our Allies demands, however, that we replace the MAAG system with one better designed to carry on the altered requirements of the present situation.

Signposts to a Better Aid Program

There is no single remedy. A series of steps must be taken to solve the problem. We can see them better if we list the primary things that must be accomplished under an effective military aid program. The most important requirements are that we (1) maintain good relations with our Allies, (2) encourage them to support their own air forces, (3) help these air forces to take their most effective forms, and (4) improve the command and control structure under which they would be employed.

Good relations do not just happen. They exist only when intelligent, capable men on both sides work very hard to keep them that way. To maintain good relations with our Allied air

forces we must do several things. First, we should remove the MAAGs, since they have become a focus for frustrations, and substitute for them a system of functionally placed exchange officers. These exchange officers should be carefully selected for their salesmanship. They should be field-grade officers with over twelve years' service who have attended the Air Command and Staff School or higher schools. They should be given six to twelve months' training in languages and job orientation. Once on duty they should be given full authority and backing or be relieved.

Second, we must recognize the sovereignty and individual attitudes of our foreign friends by canceling blanket procedures where they are not required by law. We should tailor our arrangements to the specific situation of each nation. This will call for much more alert and flexible dealings on reimbursable aid and the elimination of most logistics reports on Allied air forces now required through MAAGs.

Finally, we need to develop USAF doctrine on how to treat Allied air power. With an approved doctrine on MDAP our awareness of responsibilities to Allied air forces would spread throughout our system and facilitate the picking-up of functions now discharged by MAAGs. Foreign aid programing would be done in the Pentagon as a routine part of all programing. Significant local data would come in via the attaché and exchange-officer systems. Regional estimates would be prepared by our elements on international staffs and theater commands. Administrative organizations would assume the bookkeeping burdens which are rightfully theirs. Allied air forces would arrange for needed support directly with our logistics agencies located in the geographic area.

A program of this type would be more efficient and would free many officers for other jobs. At the same time we could continue our observation of how friendly air forces employ the equipment we give them. We could use our attaches as observers, supported by our exchange officers since their assignments require such knowledge anyway. As an additional advantage, having Allied exchange officers work with us would allow us to present them with our ideas, fully and at leisure.

It is essential that our foreign aid program encourage Allied air forces to assume their own support as soon as possible. The Department of Defense made one of its greatest strides forward in policy formulation on MDAP matters in January 1955 by directing MAAGs to recommend ways and means of terminating free spare-parts support to MDAP countries. Concurrently our

representatives on international staffs were ordered to stimulate coordinated manufacturing of supplies in MDAP countries. This is the last big job which our MAAGs must do before their connections with Allied air power can be severed. To do it properly, they must consider the financial and technical aspects of developing a spare-parts cutoff plan as well as the problems of selling the plan to their MDAP air force. The timing of the program is very important. The danger to it is that Congress may cut off United States financing before the MAAGs can carry out their role.

The objective of helping an Allied air force take its most effective form has two basic aspects. First, the MDAP air force must commit itself to selected weapon systems. Most Free World air forces cannot maintain large fleets of all types of aircraft. They must pick those types best suited to their national security requirements and international commitments. Our elements on international staffs are in an excellent position to offer advice on this subject because they are functionally placed in national and international military organizations, rather than looking in from the outside as do our MAAGs. For the same reason they are better located to cope with the other aspect of achieving effective air power—keeping air force units modern and well-trained. MAAGs had almost no responsibility in this area.

The final aim of our foreign aid program—to improve the command and control structure for the employment of Allied air power—would be definitely aided by eliminating MAAGs. In the past, as far as international staffs are concerned, MAAGs have simply reflected the attitudes of their MDAP air forces. They had to if they wanted to be welcome locally. As a result their influence was frequently at odds with that of USAF elements in places like SHAPE.

The international staffs already have the facilities and the desire to assume control of the development of Allied air power, and we should help them. Each year the amount of control exercised by these staffs grows greater and the number and size of training maneuvers increase. They are working hard to establish the administrative and communication arrangements which will allow positive command jurisdiction. With MAAGs out of the picture the command and control channels in international defense organizations would become more clearly defined.

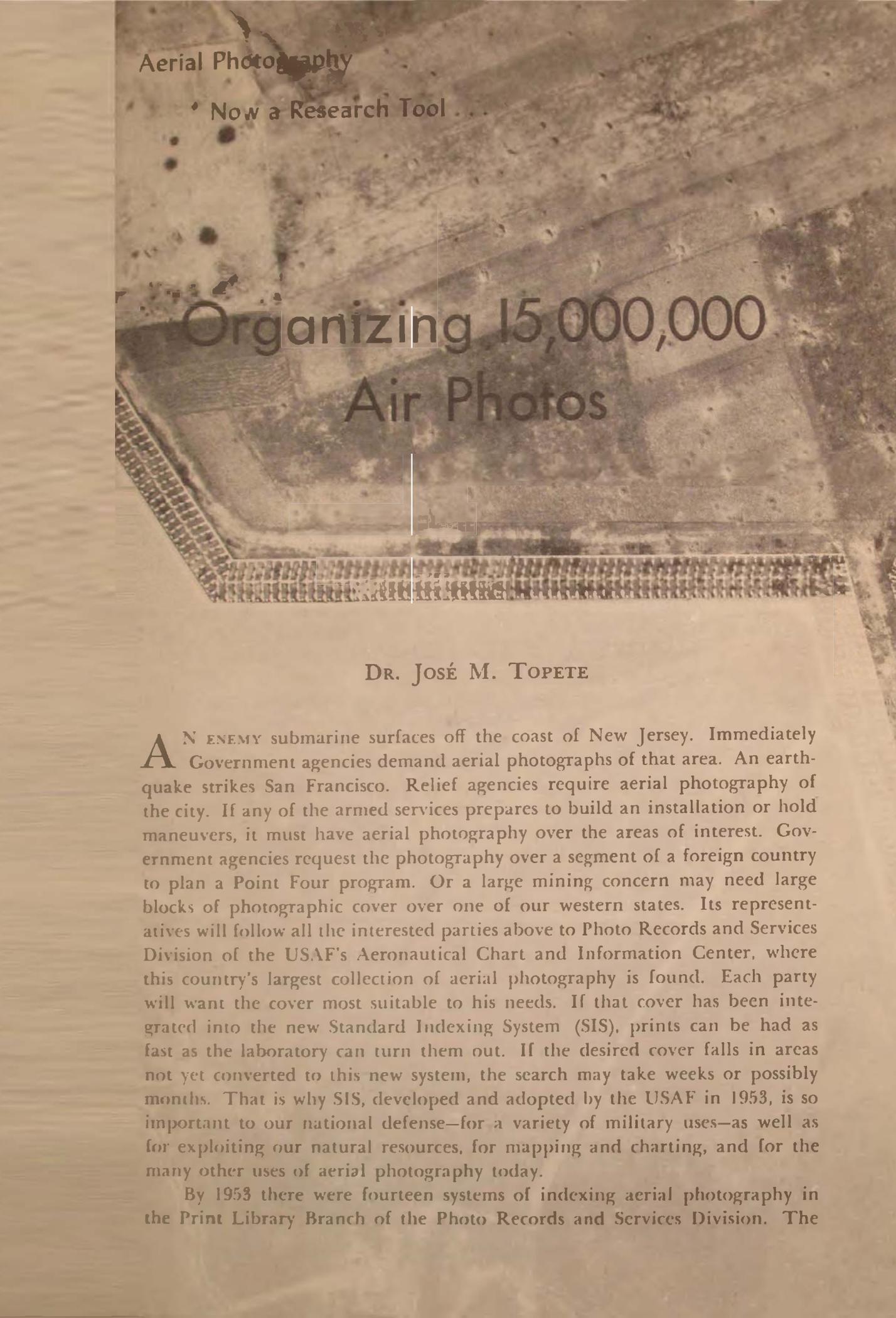
By encouraging this trend we will lose neither our position nor recognition of our efforts. American airmen like General Norstad are in key command or staff positions in the defense organizations with which we are most concerned. With our full

support they can be much better spokesmen for our cause. They are in a much better position to influence standardization than are our separate MAAGs. Through them we can more actively promote a common philosophy of planning and can achieve better coordination.

By putting our elements on international staffs into the MDAP program and support cycles, the international staffs can become more widely and consistently influential than would ever be possible with the present MAAG system. These staffs will reduce our investment in foreign aid because they have better information on regional economics than do the individual MAAGs. They can integrate base construction and special weapons programming with which MAAGs have never been concerned. Even little things can help, such as continuing indefinitely to issue technical publications on MDAP equipment but centralizing control of their circulation.

EVEN though the working environment of each MAAG varies widely, the pattern I have outlined seems to apply generally. The MAAGs are doing the best they can under serious handicaps, but this best is not good enough. There is need for serious reappraisal of their value to Allied air power. If we realize the need now, we still have a little time to plan an orderly shift to a system better equipped to help the air power of our foreign friends to mature. If we do not reorganize, we risk the breakdown of MDAP, the loss or jeopardy of a multibillion-dollar investment, and the failure of our policy to stop the creeping expansion of Communism.

Command and Staff School

An aerial photograph of a coastal area, possibly a harbor or bay, with a grid overlay. The grid consists of thin white lines forming a rectangular pattern over the water and land. The text is overlaid on the top left and center of the image.

Aerial Photography

Now a Research Tool . . .

Organizing 15,000,000 Air Photos

DR. JOSÉ M. TOPETE

AN ENEMY submarine surfaces off the coast of New Jersey. Immediately Government agencies demand aerial photographs of that area. An earthquake strikes San Francisco. Relief agencies require aerial photography of the city. If any of the armed services prepares to build an installation or hold maneuvers, it must have aerial photography over the areas of interest. Government agencies request the photography over a segment of a foreign country to plan a Point Four program. Or a large mining concern may need large blocks of photographic cover over one of our western states. Its representatives will follow all the interested parties above to Photo Records and Services Division of the USAF's Aeronautical Chart and Information Center, where this country's largest collection of aerial photography is found. Each party will want the cover most suitable to his needs. If that cover has been integrated into the new Standard Indexing System (SIS), prints can be had as fast as the laboratory can turn them out. If the desired cover falls in areas not yet converted to this new system, the search may take weeks or possibly months. That is why SIS, developed and adopted by the USAF in 1953, is so important to our national defense—for a variety of military uses—as well as for exploiting our natural resources, for mapping and charting, and for the many other uses of aerial photography today.

By 1953 there were fourteen systems of indexing aerial photography in the Print Library Branch of the Photo Records and Services Division. The

number of negatives had reached the 16,000,000 mark. There were close to 100,000 mosaics and photo indexes, and new prints were being added at the rate of 2,000,000 a year. Searching for aerial cover in the Print Library Branch was costly in man-hours, and success frequently depended on the individual experience and initiative of the searcher. Because of the numerous systems in use the searcher could not be sure that the indexes were accurate when they indicated the area that a sortie was supposed to cover. The actual prints had to be ordered to be certain that the areas of interest were covered. This practice greatly increased the size and number of print orders, running up the costs of operation and overtaxing the facilities of the photo laboratory.

In the meantime demands for aerial photography by Government agencies had increased with the acceleration in global planning and intelligence. Prompt service became imperative. It was evident that delays in obtaining existing aerial cover over certain critical spots could be costly to our planning of national defense. The problem of locating adequate cover accurately and quickly was solved by USAF personnel in the Print Library Branch, resulting in the development of a comprehensive system of indexing aerial photography. By order of the Secretary of Defense this indexing system has recently been made the Standard Indexing System for all the military services.

Aerial photography is not new. An excellent aerial photograph of Boston was taken in 1860 from a balloon. As early as the Civil War, aerial

Since the days of World War II the defense of the United States has become a global task. As was indicated by the creation of the Defense Department, global defense is a task that requires the combined resources of all the military services. In intelligence work, in planning, in mapping, and in many other military activities, aerial photography is one of the basic research tools. Yet aerial photographic cover of the United States is held by eight U.S. agencies in five departments, with over-all control exercised by the Geological Survey of the Department of the Interior. There are besides at least sixteen commercial companies with important aerial photography holdings.

Extensive photographic cover of foreign territory is held by the military services of the Department of Defense. The largest single collection of U.S. and foreign cover is held by the USAF in its Photo Records and Services Division. Long called the "Central Film Library," and for years trying to live up to that name, this office has been recently designated by the Secretary of Defense as the Air Force Central Print and Index Library. Using a new system of indexing aerial photography developed by the Air Force and called the Standard Indexing System, the AF Central Print and Index Library is now revising the indexing of its own vast holdings and will soon become the repository for records of all Department of Defense aerial photographic holdings. The Army and the Navy have been directed to consolidate their photographic indexes into the one master collection of the Air Force Central Print and Index Library. When this centralization of aerial photography has been completed, the Department of Defense will have a single film library, indexed according to a single system for easy, efficient, and rapid use.

photography was used for military intelligence. During McClellan's Peninsular Campaign Professor T. S. C. Lowe, a civilian balloonist employed by the Union Army, took pictures from an altitude of 1000 feet that clearly revealed Confederate artillery placement and deployment of infantry and cavalry.

The Army continued to experiment with aerial photography. In 1895 it sent a camera aloft over Governor's Island in New York attached to a large kite. Fifteen years later the Army made more experiments with aerial photography from one of the first planes. One of the first good aerial photographs was made from a Wright brothers plane in 1911 at the Army Flying School located at College Park, Maryland.

World War I made aerial photography a military necessity by displaying the advantage that photo intelligence gave over opposing forces. The World War I aerial camera was a converted Graflex camera made of wood, with a magazine holding twelve 4x5" glass plates. Some of the glass-plate photographs it made are still on file in good condition.

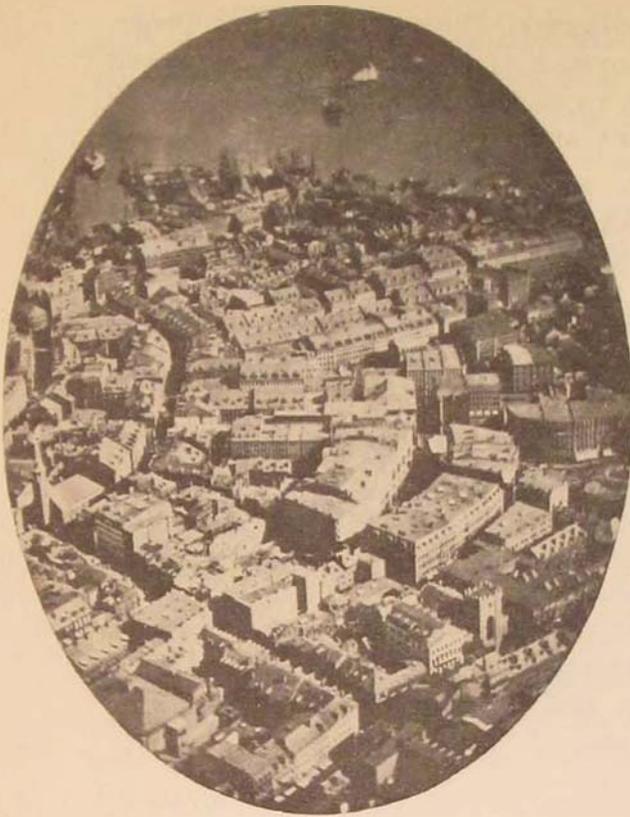
The growth of aerial reconnaissance demanded better maps and charts. Conversely it was the use of aerial photography that revolutionized all known maps and charts. Military intelligence and mapping became two of the most important uses of aerial photography.

PHOTO Records and Services Division has its roots in the "Army Aviation" photo file which was established in 1918 with a one-man staff. This collection of still and motion pictures pertaining to Army aviation grew through the years, but before 1935 the volume of photography was small. Most of it was photography of the United States and its territories. There was no problem of storing or indexing it. Pictures were plotted on a few map sheets, and research to locate existing cover of the United States or its territories and possessions required only a minimum effort. In the late 1930's Air Force observation squadrons began a larger aerial photographic program. As the photography accumulated, a new system for its indexing and cataloguing was developed. This new system was not extended to include previous photography.

Just prior to World War II, Army Air Corps photographic squadrons did a substantial amount of aerial photography in connection with various mapping programs. Another indexing system was devised to meet the new demands, but again no effort was made to reindex all the collection. The beginning of World War II and the tremendous expansion of the Army Air Force reconnaissance program increased by many times the quantity of aerial photography to be indexed, catalogued, and stored. Other systems of indexing were developed and use was even made of machine records. But again only portions of the collection, the last acquisitions, were indexed in the new systems.

Shortly after World War II the Army Air Forces and later the USAF engaged in a number of aerial photographic mapping and charting programs that produced a further tremendous increase in the volume of photography

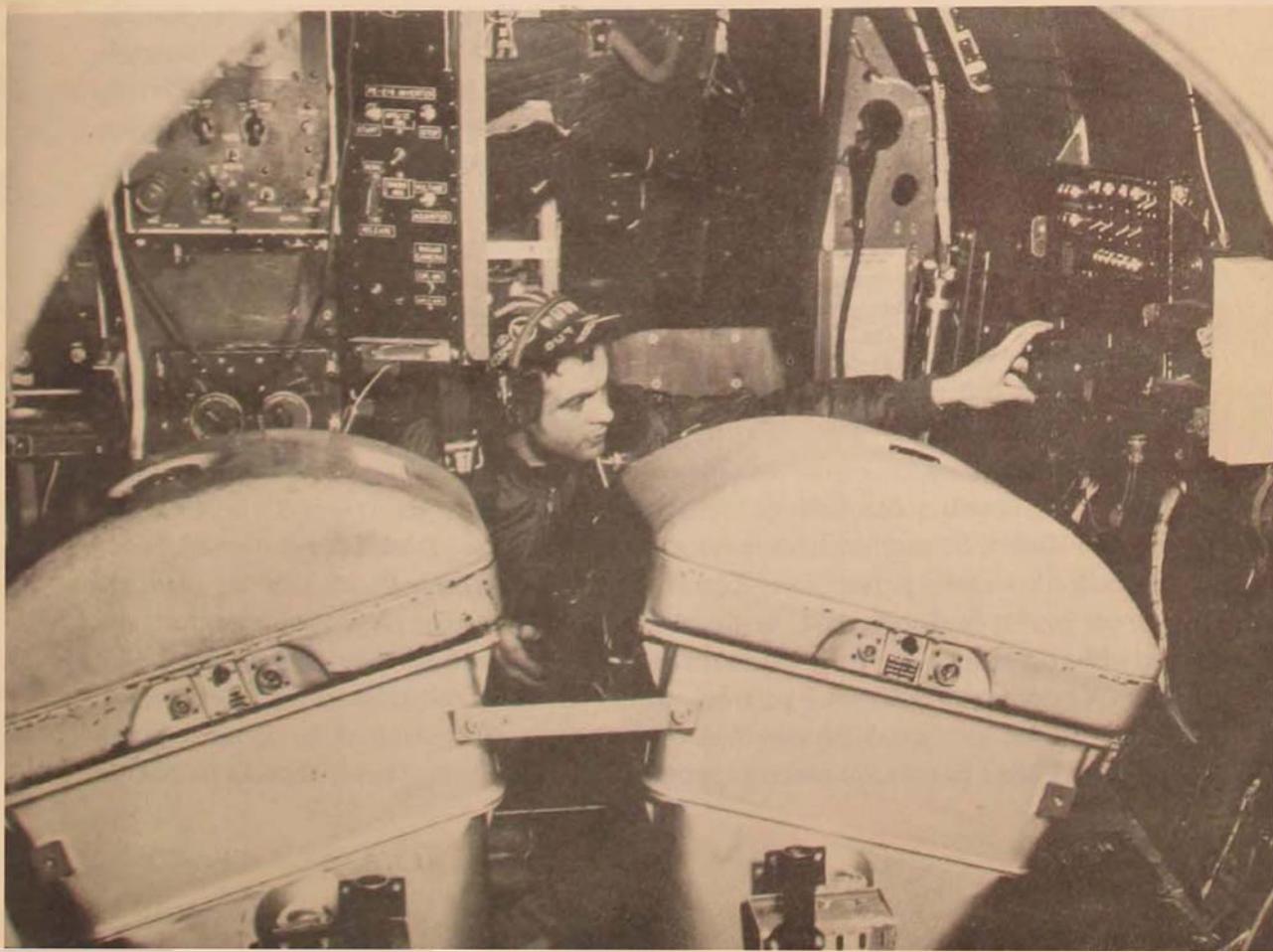
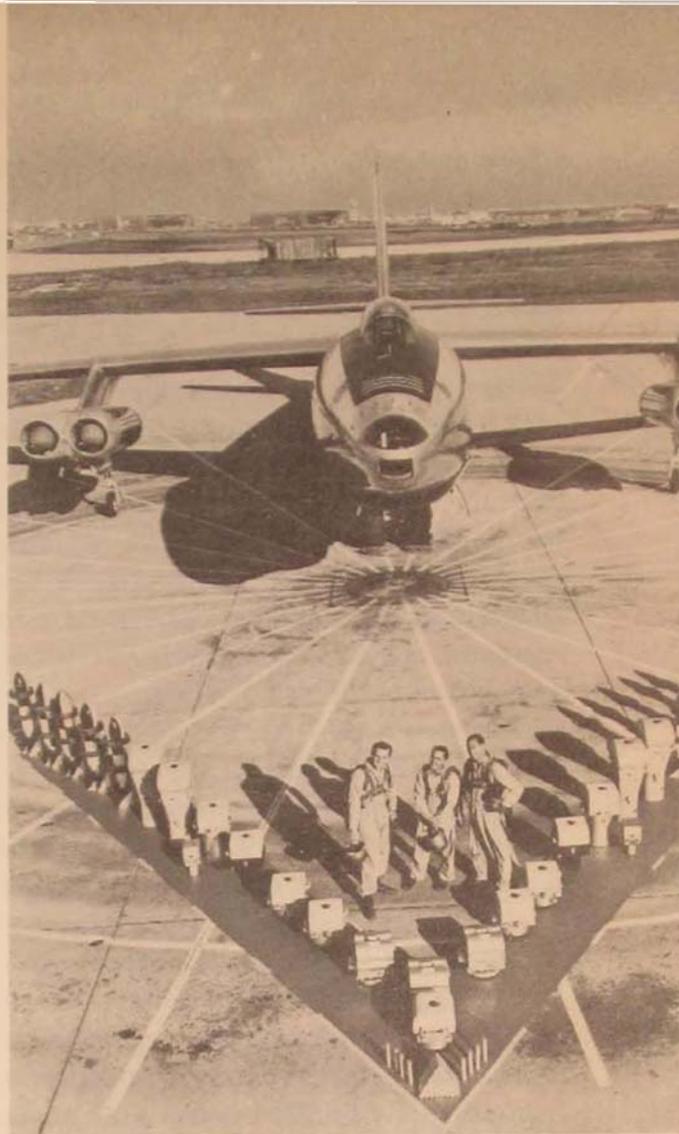
Progress in Aerial Photography



Aerial photography is approximately one hundred years old. One of the first aerial photographs was taken in 1860 from a balloon over Boston, with part of the city and the harbor captured in good detail. During the Civil War aerial photography had some use for military intelligence, and balloons were floated to serve as observation platforms. In 1895 the Army experimented with photography from balloons and kites. By 1910 aerial photographs were being taken from the first military aircraft. The observer (shown below) is ready for an oblique shot with a hand-held camera using a Poynter's Negative. The camera for taking vertical shots is mounted on the side of the aircraft. Both cameras had to be operated manually by the observer, who photographed targets as they came into range.



Modern military aerial photography has come a long way from the primitive efforts shown on the opposite page. The crew of an RB-47 can select any seven sets of cameras from an extensive array. Selection depends on the target, the types of cover desired, and the purposes for which the cover is to be used. In addition to the sixteen cameras available for choice, there are cartridge flares (cylinders in the foreground) and flash bombs (rear) for use on night missions, as well as two photocell-operated shutter-trip units. In the air the cameras are operated electrically. Sandwiched between two huge aerial cameras in an RB-29, the operator sets the intervalometer that controls the length of time between the exposures and synchronizes the cameras.



to be indexed. Adaptations of previous indexing systems permitted the indexing and cataloguing of this new photography. For many reasons, primarily lack of manpower and funds, it was never possible to develop a completely satisfactory indexing and cataloguing system. Yet the military and civilian use of aerial photography increased a thousandfold during this period.

By this time at least fourteen different systems of indexing were being used at Photo Records and Services Division, now grown into a large organization of six officers, six airmen, and 256 skilled civilians. The great bulk of the film library and the conflicting systems of indexing made it impossible for the staff to service the increasing military and civilian demands for photographic cover. There was a critical need for a system that could integrate all photographic cover in one simple but comprehensive index geared to a standard map scale. Discussions of a new system revolved around one question: would card indexing, capable of being processed by machine, be preferable to plotting the photography on maps and transparent map overlays? Plotting represents the actual area of the photograph over the earth's surface on a map or overlay of a given scale. Card indexes, no matter how well cross-referenced, were at best simply a locator system and never gave the actual cover of the photograph. Any card index still required viewing of the picture before final selection. Also for full effectiveness a card file system would have to index every print.

In 1953 the Photo Records and Services Division held over 107,000 rolls of aerial mapping, charting, reconnaissance, and radar photography. These represented approximately 16 million exposures of aerial photography and approximately 98,000 mosaics and photo indices. That same year there were 23,530 requests for service. These services included many types of photography: mapping—vertical; charting—vertical and oblique; reconnaissance—vertical and oblique; special intelligence—dicing, bomb strike, strip (Sonnet), color film, radarscope, historical prints, and prints from the active Air Force Personnel file. The filling of these requests in 1953 called for an impressive effort by the photographic laboratory:

Prints made (all sizes)	1,418,733
Duplicate negatives	311,343
Slides (many in color)	5,800
Photostated copies	1,081,138
Ozalid prints	431,537

The number of research visitors to the Print Library Branch had also increased. During the first eleven months of 1953, visiting researchers to the Print Library Branch of Photo Records and Services Division numbered 6744. During the same period the Research Section of the Print Library Branch alone performed research, with available photo coverage information, to satisfy 1051 requests from Government agencies and the general public.

A new profession—the photographic research analyst—had developed with the increase of aerial photography. Research analysts had to have a good knowledge of photogrammetry, geography, and the agencies that held cover,

together with their filing systems. They had to know the indexes in which various collections of photography were catalogued, not only card systems and machine records but notebooks, special collections in steel drawers filed by degree square and country, special plotting projects made in the field, and photography plotted on a bewildering variety of different scale maps: 1:200,000; 1:250,000; 1:300,000; 1:500,000; 1:1,000,000; 1:2,000,000; 1:6,000,000; 1:8,000,000; 1:12,000,000; and 1:19,000,000. By this time a great effort had been spent to index most of the holdings on the 1:1,000,000 scale, using USAF Aeronautical Charts.

Photo Records and Services Division was also pressed to keep up with the incoming photography from the field. Each operational theater had developed its own system of photo indexing, none of which coincided with the central system. Reindexing was an almost impossible task, since some 2,000,000 prints came in each year. Only by ingenious methods of cross-indexing did the Print Library retain control to the point that cover could be obtained from these myriad systems and that incoming photography was catalogued for use.

Usage of this plotting system, plus other experiments in standardization, convinced many researchers that a system based on plotting was preferable to any devisable card system. But the 1:1,000,000 scale had revealed its unsuitability for extremely accurate plotting and the legends accompanying its use were not providing all the pertinent information about the photography.

In the meantime the Print Library Branch had been working on a new common indexing system that would solve all technical problems and give complete and accurate plotting information.

To determine the efficiency of the existing indexes against the proposed new system, a large test was run. The problem: to find one set of stereo cover—a run of photos each overlapping the next in coverage so that stereoptican devices will derive a third-dimensional effect from two images of the same objects—for each of two hundred and sixty-eight targets. Three contact prints covering each target were to be printed. Coverage information in Photo Records and Services Division was researched. It was found that to be sure of covering a target under existing systems, an average of 15 exposures had to be printed from each of three photo sorties. To fill this requirement, a total of 36,000 prints were produced at a cost of \$0.25 per print. This order alone cost \$9000. It was found that if an accurate, practical, and uniform graphic indexing system, such as the proposed new system, were available in conjunction with an operational print file, the total number of prints necessary could be reduced to 1608, for which the printing cost would be only \$402. These figures did not include the additional expense of the excessive research time expended under the existing system in rummaging through all the file systems and in selecting several sorties for each target.

A staff study was therefore prepared and forwarded to recommend adoption of the new Common Indexing System. On 13 April 1954 the Air Photographic and Charting Service approved the Standard Indexing System (called until then the Common Indexing System) and directed that the indexing proceed with priority over every project in the Photographic Rec-

Reduction to One System—the SIS

Before adoption of the Standard Indexing System, Photo Records and Services Division had fourteen systems for filing aerial photography. To locate photographic cover was costly in both man-hours and funds. Efforts to integrate the sixteen million exposures of aerial photography and ninety-eight thousand mosaics and photo indexes into one simple but comprehensive index revolved around finding the better type of system: card indexing or plotting the photography on maps and map overlays. Card indexing was rejected because the researcher still would have to view the actual cover after locating it. In 1953 members of the Print Library Branch developed a system of indexing based on a uniform map scale of 1:250,000 and a basic filing unit of a quadrangle covering a one-degree square of earth surface. This new method, labeled the Standard Indexing System, reduced the numerous methods to one system, increasing speed, economy, and thoroughness of search. The sketch below contrasts the old and new systems. The researcher now secures from SIS binder files the binder containing acetate overlays on which is plotted the best cover of that one-degree square (upper right). From the plot and the data at the top of the acetate he can order prints of individual exposures or examine the photography himself by asking for the "view" set in the Aerial File (lower right). This new system provides instant service from Air Force holdings of aerial photography.

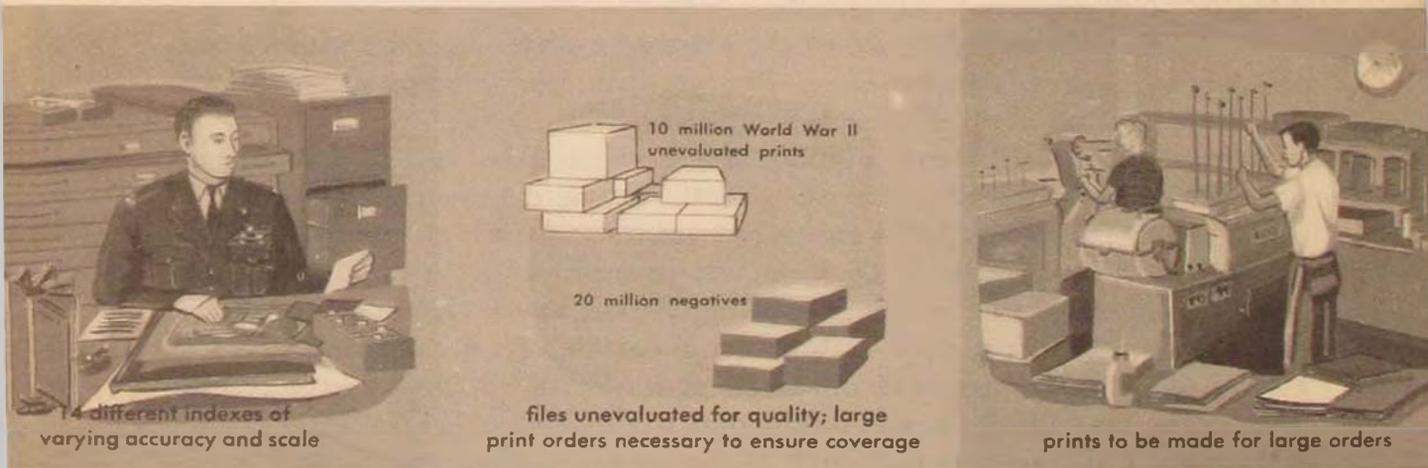
Old System

(as of 1 Dec 1953)

search: five days

locate: two days

deliver: weeks, months



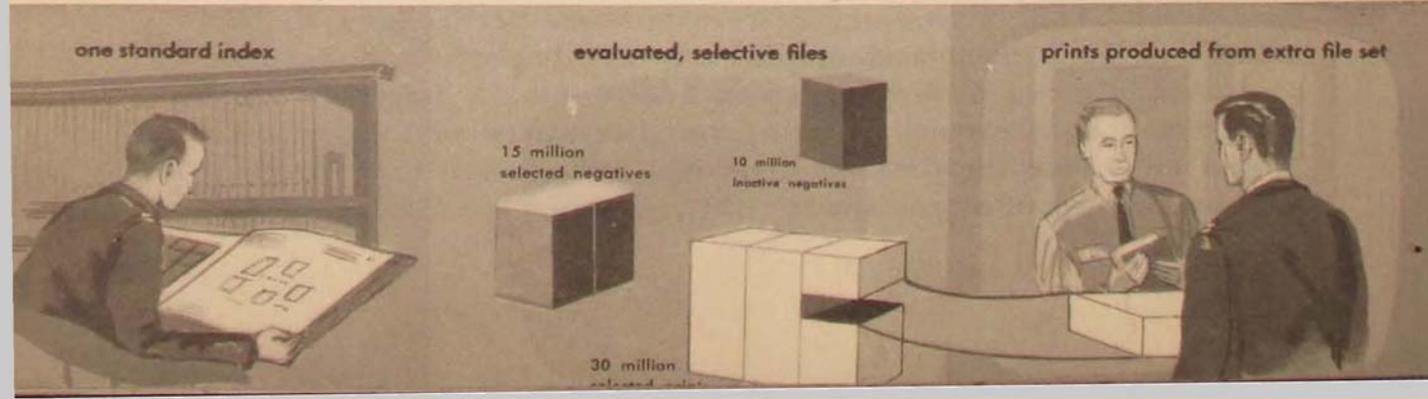
Standard Indexing System

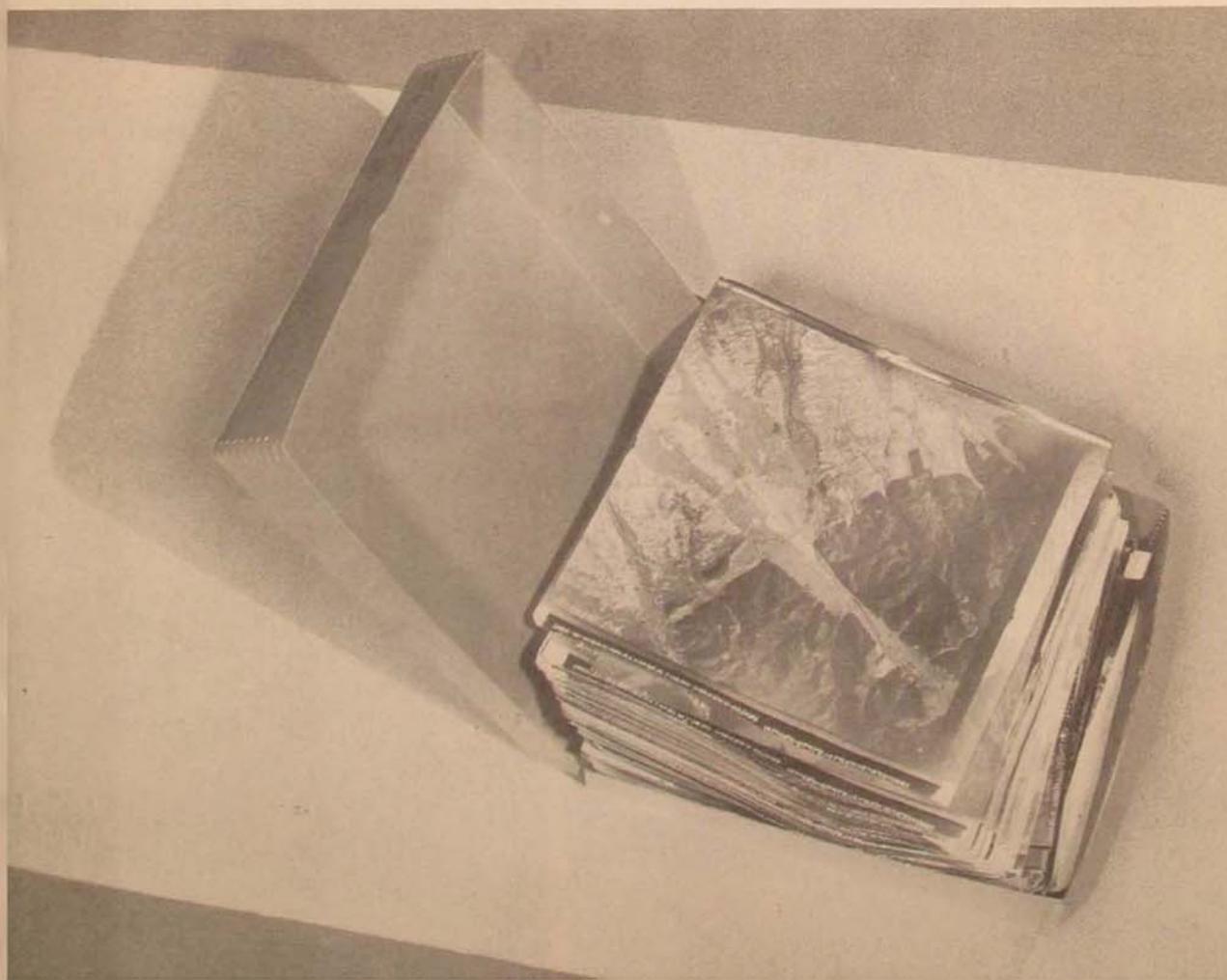
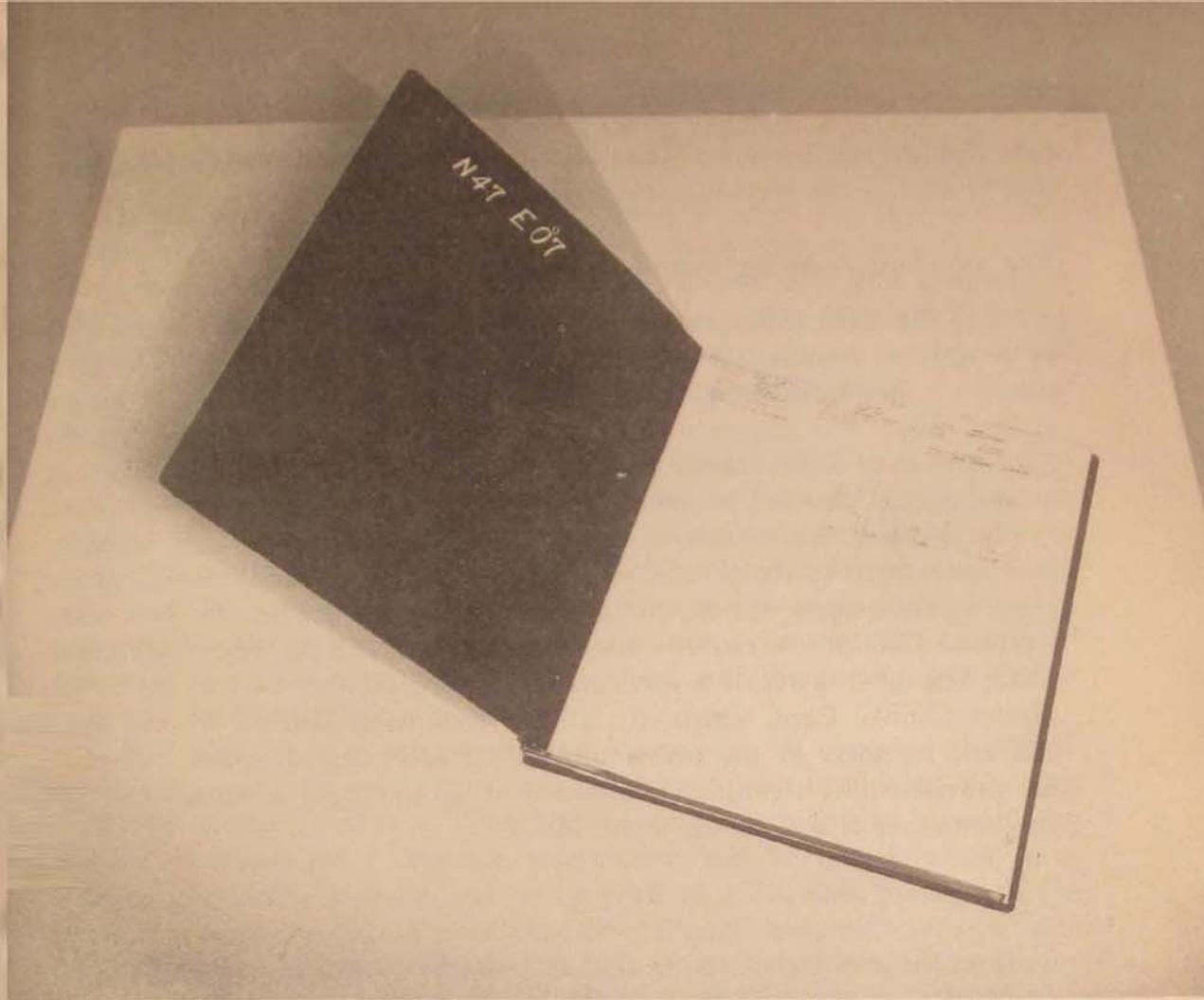
(as of 1 Dec 1958)

search: one half day

locate: one half day

deliver: immediately





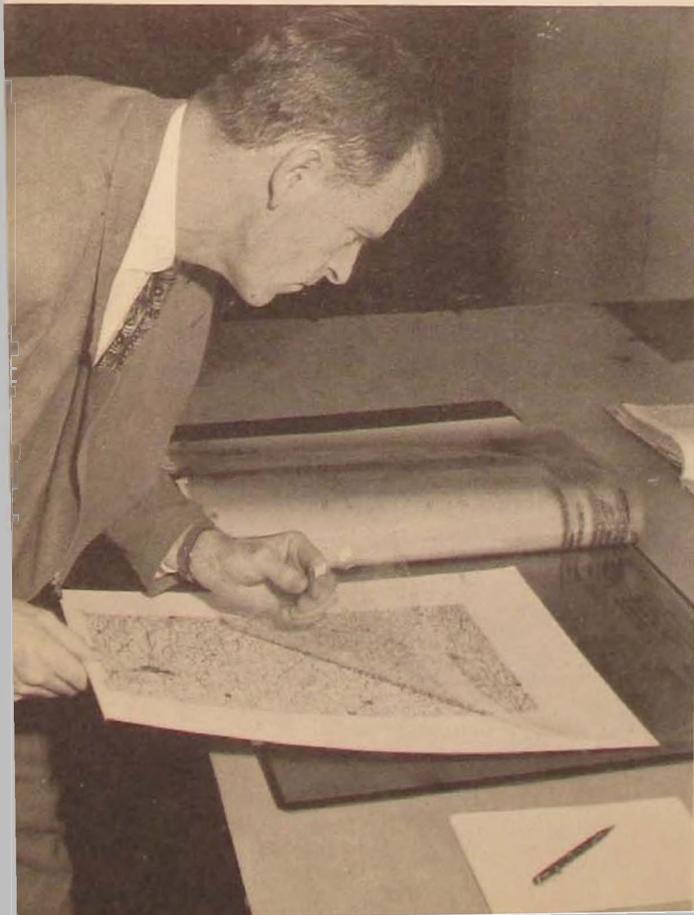
ords and Services Division. Thus ended many years of USAF experimentation in cataloguing and indexing aerial photography.

The Standard Indexing System

The Standard Indexing System consists of a library of albums arranged by geographic coordinates to cover the land surface of the earth. In each album are filed transparent acetate sheets, each covering a one-degree square of land area. The acetate sheets are keyed to a map or chart of 1:250,000 scale, and each sheet bears a plot showing every fifth consecutive exposure of any part of the best sorties that cover sections of the one-degree square.

In addition to the plotting, other identifying data and related information are entered to the printed format at the top of the acetate, such as the type of photography, the organization originating the photos, the date, scale, location, classification, etc. If a researcher wants to find the degree squares in which the other parts of a particular sortie are plotted, he may go to the Master Control Card, which lists all degree squares touched by the sortie and the numbers of the prints plotted on each degree square. The SIS has provisions for a constant evaluation of its holdings, to ensure that only the best cover is kept in the active files.

After locating the one-degree square that includes his target, the researcher (left) requests that degree-square binder from the SIS binder files (right). By positioning under the acetates the basic map or chart of the area—always filed in the binder—he determines from the overlays the photographic cover that will best suit his needs.



How the System Works

If the research analyst desires photographic coverage of a particular area or target, he first determines the one-degree square that includes his points of interest. If he knows only the place name, he can refer to a gazetteer to find the geographic coordinates. He can now go to the Standard Indexing System binder files and draw the binder containing acetate overlays of all the best photography flown over that one-degree square area. A chart or map is already on file with the book.

Extracting the chart or map, the research analyst positions it, in register, under one or more acetates in the binder until he finds the type of photographic coverage to fill his requirements. The acetates are arranged chronologically by year, with the sheets on top showing latest coverage, and within each year by type of photography (mapping, charting, or reconnaissance). All acetates are in exact register with the others because the preprinted bisecting meridian (vertical registration line) and the prepunched binder holes have a fixed relationship.

The plotting is so precise and the information so complete that individual exposures, or stereo pairs, can be ordered with confidence that they will cover the indicated area. When the indexing now in process is completed, mosaic or photo index coverage information will be found in the same binder, graphically indexed, but overprinted in a different pattern. If the researcher wants to make a more detailed evaluation before ordering a print or if reproduction is not absolutely necessary, he may view the photography by ordering the prints from the "view" set in the Aerial Print File. The "Print File Number" in the upper right-hand corner of the acetate overlay is the locator file number for the prints of that particular sortie and camera.

World-Wide Index

An adjunct of the SIS is the World-Wide Index, a general source of cover information for all the holdings of the SIS and other available cover found in other U.S. Government agencies and commercial photographic companies. This system of composites is keyed to the USAF Strategic Outline Charts covering the world. The World-Wide Index is broken into several series. One gives a fast reference of all available photography, broken into five-year periods and into types of photography, including scales. Other series give the status of planned photography. Besides giving a quick look at holdings available in the SIS and elsewhere in the United States, it is also a great aid to future planning and guards against duplication of photographic efforts.

Plotting and Indexing of Radar Photography

USAF radar photography is being plotted and indexed in a manner somewhat similar to aerial-camera photography, using symbols to designate various range settings and distances.

Radar photography is plotted on a transparent sheet keyed to a World Aeronautical Chart at a scale of 1:1,000,000. Because the radarscope views

such a large area on the ground, this photography is plotted in composite form, together with all pertinent information that is necessary for its use for military purposes.

AIR Force Regulation 95-18, 30 June 1954, spelled out the Standard Indexing System and made it applicable throughout the Air Force. Together with AFR 95-4, AFR 95-6, and AFR 95-7, it constitutes authority for Photo Records and Services Division. Compliance by field organizations with AFR 95-18 will greatly facilitate the work of national defense.

Once the facts were known and the benefits derived from the new indexing system had been demonstrated, the Chief of Staff carried the matter a step further and invited the attention of the Department of Defense to the new system. Realizing that only by a Defense-wide effort could all aerial photography be made available to each agency in the Department, the Secretary of Defense, in Department of Defense Directive No. 5160.6, of 11 July 1955, created the "Library of Aerial Photographic Indexes." This directive makes the Secretary of the Air Force responsible for the maintenance of a reference library of aerial photographic indexes, to be known as the

Advantages of the Standard Indexing System

- Makes possible the selection of specific photographic exposures with maximum speed, simplicity, and accuracy, with minimum expense, and with no need for reference to other indexing systems
- Affords easy and rapid accessibility without prior reference to chart or map indexes
- Facilitates file maintenance with positive control of all material
- Provides an index which can be rapidly and economically duplicated to fill specific requirements for photo coverage
- Supplies photo coverage information that can be cross-indexed to an operational print file
- Enables systematic evaluation of the photo indexes to determine what photography and indexes should be added to or deleted from an operational print file
- Establishes a selected cumulative file in the basic unit of the index — the degree-square binder

Central Print and Index Library (new name for Photo Records and Services Division) for the application of the Standard Indexing System to all its aerial photography. It further directs the other military services to furnish indexes of their mapping, charting, and intelligence aerial photography to the Air Force Central Print and Index Library for integration into the new system.

The centralization of all Department of Defense indexes of aerial photography under the Air Force Central Print and Index Library and the standardization of indexing mark a great step in the annals of intelligence and mapping progress, promising major benefits in efficient service and economy. In time the centralization of all aerial photographic information under one roof in the Central Print and Index Library will serve the same purpose for aerial photography that the Library of Congress and its Union Catalog do for books—a comprehensive file with all aerial photographic holdings recorded in a practical, consistent index. It is a logical step in interservice cooperation, strengthening and making more efficient the long-standing informal arrangement by which the Army, the Navy, and all other Government agencies have been working with the Air Force for the interchange of aerial photography. The result will be greater security in our national defense.

Air University Quarterly Review

... Air Force Review

AIR FORCE HEADQUARTERS: ITS MISSION AND ORGANIZATION

COLONEL L. F. LOESCH

and

COLONEL C. R. LOW

THE dynamic and global aspects of United States Air Force operations have in recent years focused widespread interest on a broad range of improvements in aircraft performance, aircrew skills, and airlift supply support for mobile combat units. Equally important, though not so much an object of public attention, has been the concurrent effort by the Air Force to improve its organizational structure. The goal is to provide an effective framework of control for all principal military missions of the Air Force and for all its critical support activities.

The character and dimensions of Air Force organizational requirements are highlighted by special aspects of Air Force operations: a military and civilian personnel strength of more than 1,000,000; a materiel system that must procure, store, and distribute over 1,200,000 separate line items of supply; a world-wide pattern of deployment; and a mission that requires the maintenance of strategic bomber, tactical, and air defense forces in a constant state of combat readiness.

The problems of planning, coordinating, and supervising the programs for all elements of this vast striking force are largely without precedent or contemporary equivalent. The developments in our organizational concepts must be widely understood if we are to make further progress in this area. For Air Force personnel directly involved in organizational planning, such an understanding offers a point of departure for adjustments to present and future requirements for change. For all Air Force personnel, regardless of specialty, a review of these concepts and patterns should be helpful as a guide for day-to-day operations and as a basis for constructive recommendations.

The Air Staff

THE principal definitive guidelines for the structuring of Headquarters USAF were spelled out in the Air Force Organization Act of 1951. This act called for the formation of an Air Staff to render professional aid and assistance to the Secretary of the Air Force, the Under Secretary of the Air Force, the Assistant Secretaries of the Air Force, and the Chief of Staff. Further specified in the act are the duties of the Air Staff:

- To prepare such plans for the national security—and the use of the Air Force for that purpose both separately and in conjunction with land and naval forces—and for recruiting, organizing, supplying, equipping, training, mobilizing, and demobilizing the Air Force, as will assist the execution of any power vested in, duty imposed upon, or function assigned to the Secretary of the Air Force or the Chief of Staff;

- To investigate and report upon all questions affecting the efficiency of the Air Force and its state of preparation for military operations;

- To prepare detailed instructions for the execution of approved plans and supervise the execution of such plans and instructions;

- To act as the agents of the Secretary of the Air Force and the Chief of Staff in coordinating the action of all organizations of the Air Force establishment;

- To perform such other duties not otherwise assigned by law as may be prescribed by the Secretary of the Air Force.

To carry out this five-point mission, the Air Force Headquarters, which constitutes the Air Staff, is organized around four basic concepts: functionality, flexibility, decentralization, and simplicity. There is little argument that the over-all structure of the Air Force and of each segment within this vast organization should be designed around basic Air Force functions. The fallacy of basing an elaborate organizational structure on mere tradition or on vague ideas of symmetry and propriety has been demonstrated many times. Thus it was decided that the organization of Air Force Headquarters would be judged by the way it served to get its work done, rather than by its conformance to tradition or resemblance to other military organizations past or present.

The second concept is flexibility in meeting new conditions. As applied to organizations this often expresses no more than a pious hope that each new requirement can somehow be worked into the old organizational structure. In the Air Force, flexibility implies a practical acceptance of two important facts: first, that it is sometimes impossible to do a new job effectively under an old organizational setup; and second, that our organization must be able to absorb frequent minor changes as well as infrequent major changes without disturbing its basic framework or requiring changes in the law.

Decentralization, the third concept, aims at achieving the maximum delegation of authority and control. The most obvious results of our efforts to delegate authority and control are seen in the relatively small size of Air Force Headquarters, the broad functions and responsibilities of the Air Force commands, and the extensive responsibilities of Air Force commanders and deputies.

Simplicity and clarity in our organization not only helps our own people

The United States Air Force exceeds the largest American private corporation in annual operating budget, in number of people employed, and in value of its holdings. It is charged with the unparalleled responsibility of Free World defense. The problems of administering this vast force and discharging its mission are unprecedented in scope and are without contemporary equivalent. Their resolution depends upon the vitality and operating soundness of its nerve center, Air Force Headquarters. For the benefit of Air Force personnel Colonel L. F. Loesch, Secretary of the Air Staff, Hq USAF, and Colonel C. R. Low, Secretary of the Air Force Council, Hq USAF, describe the mission and organization of Headquarters USAF.

but also aids others to understand it. The concept of simplicity seeks to ensure direct and clear lines of authority as well as logical groupings of functions and duties. In the titles of our commands and offices we have tried to use terms that best describe the functions to which they apply.

In addition to defining Air Staff functions the Air Force Organization Act of 1951 clearly sets forth the lines of command authority: "Under the direction of the Secretary of the Air Force, the Chief of Staff shall exercise command over the Air Defense Command, the Strategic Air Command, the Tactical Air Command, and such other major commands as may be established by the Secretary . . . and shall have supervision over all other members and organizations of the Air Force."

The line of command authority thus proceeds directly from the Chief of Staff and the Vice Chief of Staff to Air Force commanders. The Chief of Staff has a number of principal advisers and assistants who report directly to him: the Surgeon General, The Inspector General, The Judge Advocate General, Assistant Chief of Staff for Installations, Assistant Chief of Staff for Guided Missiles, Assistant Chief of Staff for Reserve Forces, the Scientific Advisory Board, the Air Adjutant General, the Secretary of the Air Staff, and the five Deputy Chiefs of Staff. Each deputy within his immediate sphere of activity, as shown on the organizational chart, exercises a certain amount of authority for and in the name of the Chief of Staff. The deputies, however, are not in the chain of command and exercise no direct military command in their own names except in matters specifically delegated by the Chief of Staff.

Commands in the Air Force also are organized on a functional basis. Commanding Generals of these major air commands report directly to the Chief of Staff and each exercises military command over all personnel assigned within his organization. Through this system the headquarters of each field command may perform many Air Force-wide functions. Because such commands are functional and do a complete job for the whole Air Force, they can operate with considerable independence—much more so than if they were organized on a geographical basis.

The accompanying chart of the Air Staff depicts the manner in which the Air Force Headquarters is organized. There is no attempt to maintain the fiction that only the Chief of Staff talks to the commanders. Although the authority of the Headquarters is derived from the legal authority of the Chief of Staff, it can be and is delegated to deputies and directors.

It is traditional that the Chief of Staff devote personal attention to every serious problem that arises. This became impossible long ago. Hence the five Deputy Chiefs of Staff have a level and breadth of responsibility far beyond that of staff officers in the early days of G-1, 2, 3, and 4. Although the deputies are staff officers and not commanders, they are more than merely advisers to the Chief of Staff—they assist him and act for him. In exercising his authority and in executing his responsibility the Chief of Staff requires the assistance of an entire team, not merely the advice of a staff. Deputies of the Chief of Staff may speak for the Chief at any time and on any matter within the broad fields of their responsibilities.

The shaded area on the organization chart reflects the military top management, or executive group, of the Air Force Headquarters: the Chief of Staff, the Vice Chief of Staff, the Assistant Vice Chief of Staff, and the five Deputy Chiefs of Staff. The chart could also be drawn to show the deputies as part of the immediate office of the Chief of Staff. It would then indicate that the deputies, along with the Vice Chief and Assistant Vice Chief of Staff, are actually a part of the functioning entity of the Chief of Staff and that the Chief of Staff is, in a sense, eight men instead of one.

But in any sense the deputies are not commanders. Neither are they a part of any fixed channel of communication or command. It is not necessary that all matters originating within the Air Staff pass through their offices. The deputies simply represent and act for the Chief of Staff in certain areas of his responsibility. For example, as the representative of the Chief of Staff for operations, the Deputy Chief of Staff for Operations supervises in general the work of the five directors in that field. He does not necessarily direct them in detailed performance of their work. If the Director of Plans has a problem requiring the assistance of the Director of Requirements, he goes directly to that office. It is not necessary for him to go through any channels leading through the Deputy Chief of Staff for Operations and the Deputy Chief of Staff for Development. The Headquarters is not divided into compartments that deal with each other only through formal channels of contact. Under the old-fashioned system, which required such formal channels, the work demanded of our Headquarters today would not get done.

It has always been Air Force policy to delegate authority and to spread areas of responsibility as far as possible from the center and from the top. The principle we have followed is that a decision should be made at the lowest level having access to essential information on the matter in question. An action agency may often secure this information from other units on the same organizational level in other Deputy Chief of Staff areas without having to consult a higher authority.

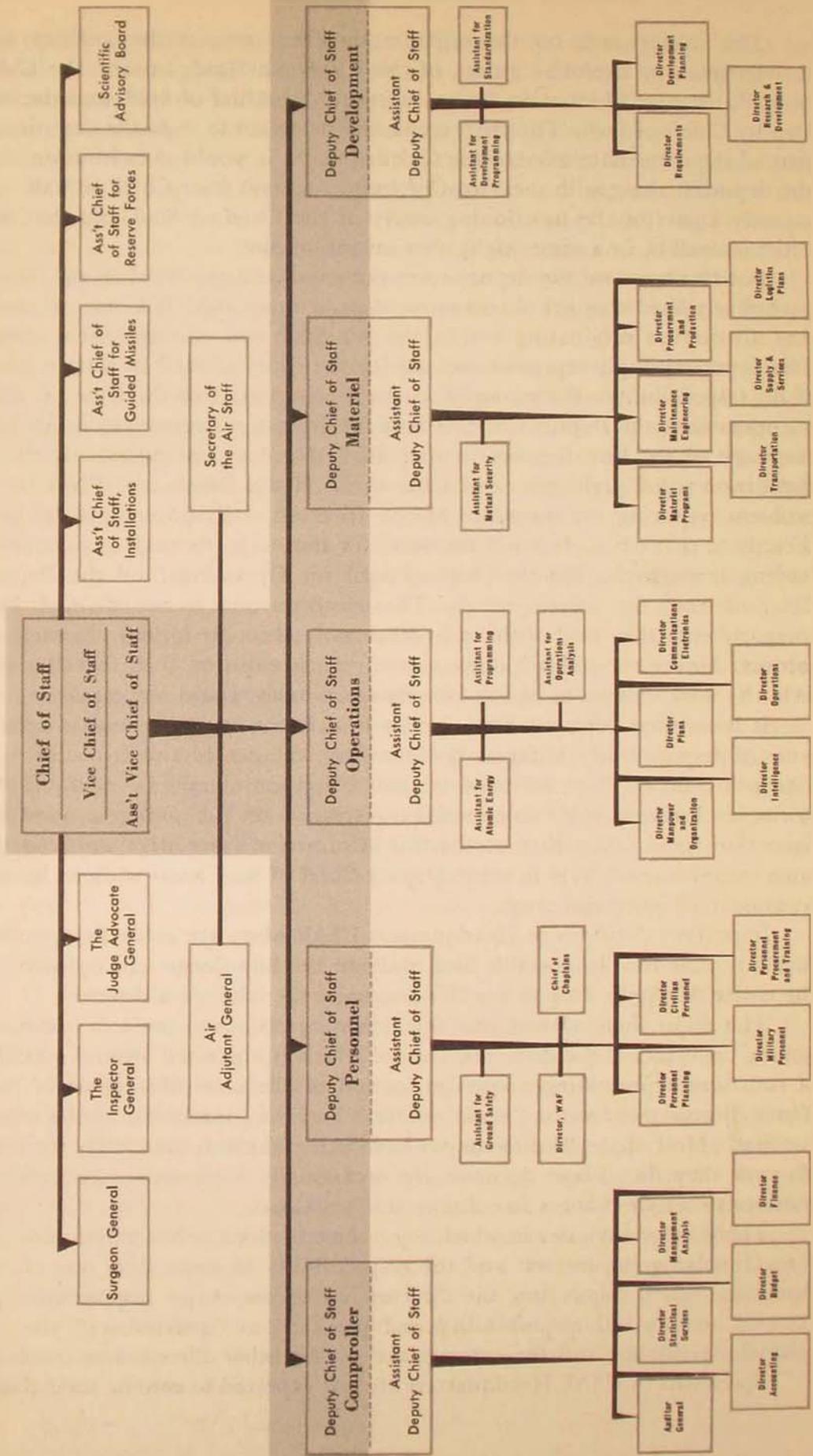
Important decisions in Headquarters USAF often are made by the office that can most readily assemble and evaluate the knowledge and opinions of the entire Air Staff. In practice this is usually the office of a director.

The major share of work that the Headquarters has to perform is divided among the offices of the directors, each of which is organized around a family of functions representing a specific portion of the total Headquarters' job. These directorates are the "working level" and the foundation of the entire Air Staff. Most of the 24 directorates have titles that indicate clearly the type of work they do. These agencies are occasionally increased or reduced in number to satisfy changes in mission and workload.

There are many cases in which a job must be done or a decision must be made involving the interest and the responsibility of more than one of the directors. When this occurs, the director having the major responsibility or interest accepts full responsibility and proceeds to "quarterback" the job with the assistance and the concurrence of the other directorates involved.

Specialists in USAF Headquarters are not expected to confine their think-

Air Staff Organization



ing, their understanding, or even their actions to their specialty. They are constantly involved in the processes of finding the proper relationship between their specialty, the work of the Headquarters, and that of the entire Air Force. It is for this reason that we have fought so hard to avoid splitting the Air Force into compartments of separate action and separate interests. We do not want to get to the point where we have to go all the way to the top to find people who think and act for the Air Force as a whole.

No attempt is made to organize directorates uniformly so that they are of equal size or even of equal importance. We try to make the organizations fit their jobs rather than to make jobs fit the organizations. Thus as functions and as requirements change, the organization is changed to take care of them. We try to keep such changes to a minimum.

It can scarcely be said that the Air Force organization is revolutionary. If its predominant characteristics had to be expressed in a single word, the best term would be "simplified." We have maintained a single and direct channel of military command, but we have also frankly increased the traditional responsibility and authority of staff officers to as high a degree as possible without permitting them to usurp the basic prerogatives and responsibilities of command.

As a necessary adjunct of this plan we have encouraged each command or staff level to assume maximum responsibility. It is also a part of our plan to insist upon the informal team method for solving problems, preferring this to rigidly defined areas of responsibility and prescribed channels of contact. In staff work we seek to achieve the "Chief-of-Staff" type solution rather than the "specialist" type. Each participating specialist shares the total responsibility for the final result of each staff effort, instead of being held responsible only for his prescribed and limited contribution.

The Air Force Council

IN building and operating the USAF the Chief of Staff realized the need for a group of senior generals to give him advice on major problems. It was his desire that these individuals be assigned as active members of the Air Staff and not an "ivory tower" group without additional responsibilities. He therefore directed the establishment of the Air Force Council as his chief advisory body. The Council is responsible for advising on Air Force policy and courses of action and for providing the Air Staff with policy guidance. The Council is also responsible for maintaining surveillance of the Air Force's capability to carry out its missions.

In discharging its responsibilities the Council reviews Air Force programs, objectives, and policies, and recommends appropriate action to the Chief of Staff. Although the Council is not an action body, at times it will direct certain Council members to undertake actions within the Air Staff.

The Air Force Council is composed of the Vice Chief of Staff, who is Chairman; the Deputy Chiefs of Staff, Comptroller, Development, Materiel, Operations, and Personnel; and The Inspector General, USAF. One or more of the Assistant Chiefs of Staff for Guided Missiles, Installations, or Reserve

Forces will sit as Council members when an item within his area of responsibility is being considered. It is evident that individuals who sit as Council members wear two hats, that of a Deputy or Assistant Chief of Staff and that of a member of the Air Force Council. As a Council member he brings with him his knowledge of the problems in his particular deputation, but he makes his decisions according to his best judgment as a senior Air Force officer. The Air Force Council provides an opportunity for the members to meet, to exchange information and recommendations, and to arrive at timely and necessary solutions to major Air Force problems. The recommendations of the Air Force Council are almost always accepted by the Chief of Staff.

A permanent secretariat has been established and assigned to the Office of the Vice Chief of Staff to review all matters for completeness and appropriateness before they are presented to the Council. A military-civilian organization, it prepares from the Council meetings memoranda for the Chief of Staff; makes necessary arrangements for Council meetings; and, following decisions by the Chief of Staff, prepares the final action memoranda to the Air Staff.

To ensure that complete information is available on matters referred to the Council for action, the Council has established four advisory groups: the Air Force Budget Advisory Committee, the Program Status Committee, the Aircraft and Weapons Board, and the Air Force Installations Board. These groups are composed of Directors within the Air Staff or of Assistant Deputies. The Program Status Committee is the only committee within the Air Staff with the authority to direct action.

In addition to material presented by the advisory groups, the Council considers problems presented to it by the Deputy Chiefs of Staff or, in some instances, by the Chief of Staff. When the Council desires further information before making recommendations to the Chief of Staff, it will direct one or more of its members or its subordinate committees to obtain this information. When items are considered that are of major interest to an Air Force commander, the commander may be invited to attend the Council meeting and to express his recommendations to the Council.

The Council meets normally twice a week, to consider such problems as the Air Force budget, aircraft procurement policies, Air Force force structure and program objectives, personnel policies, and military construction programs. For the Council members, attendance at such meetings takes precedence over other Air Staff activities when the Council member is present in Air Force Headquarters.

In its four and one-half years of existence the Council has made itself an essential part of Air Force Headquarters. While the Air Force could operate without the Air Force Council, it would be much more difficult and time-consuming to arrive at the proper solution to major Air Force problems.

As measured by the job-performance criterion it seems fair to conclude that Air Force Headquarters is operating on sound principles and within a near-optimum framework. Certainly our progress toward the

Fiscal Year 1957 goal of 137 wings and the effectiveness of our forces-in-being show no evidences of retardation traceable to basic defects in organization. To meet future requirements for change and improvement, we are constantly subjecting the organization to surveillance and analysis.

Any assessment of our organizational effectiveness should take into account two important advantages that we have enjoyed from the outset: first, the major organizational breakthrough to an acceptance and consolidation of the general staff—chief of staff concept had been achieved before we became a separate service; and second, the National Defense Act of 1947, which established our autonomous status, gave us ample latitude of choice and decision in developing an organizational structure appropriate to our mission.

In our attention to problems of organization we are constantly mindful that the Air Force's pre-eminence as an instrument of military power is not simply a fortuitous result of technological advance. More than that, it is a product of the best team effort of the best team members we can obtain with an organization that is properly adapted to our task.

Headquarters United States Air Force

THE CHALLENGE OF AIR-AGE EDUCATION IN AMERICA

DR. DONALD W. COX

RECENTLY an American Midwestern school teacher was overheard to remark, "We've gone through all the ages, including the air age, and now, thank God, that's over!" This teacher, along with thousands of others, is under a delusion about air-age education being "over." In reality it is just beginning to show some signs of effectiveness in the few schools where it is encouraged.

Air-age education at all school levels has been lagging in the United States ever since the Wright brothers invented the airplane. We cannot afford to allow this cultural lag to drop far behind technological achievements in the air, for our nation is threatened primarily from the air and we depend on the air for our first line of defense.

Our lack of national air-mindedness was evident at Pearl Harbor in 1941. Even with the publicity of a Lindbergh or a Wiley Post flight and the warnings of a Billy Mitchell, our nation slumbered as far as understanding of air power was concerned. Such is not the case of our number one adversary in the present global ideological struggle. The Soviet Union has been far ahead of us in sponsoring a systematic program of air-age education going back to the days before World War II.

Soviet Air-Age Education — A Challenge to Us

AFTER World War I the U.S.S.R. hired German technicians and pilots to help set up the Soviet Air Force. They used these technical experts in much the same manner as they are utilizing and forcing the services of German rocket experts today in the race for the first operational intercontinental ballistic missile.

The early Soviet leaders noted the lack of national air-mindedness in the 1920's, so they founded an organization called "The Friends of the Soviet Air Fleet" to stimulate the youth and adults of the U.S.S.R. to take an interest in aviation. (It is interesting to note that our own Civil Air Patrol, the nearest American counterpart to the F.S.A.F., was not yet founded at the start of World War II.)

This internal Soviet air propaganda organization soon boasted over two million members, many of whom lectured to Soviet high-school assemblies and helped to set up Aero Clubs for school graduates where fundamentals of aviation, navigation, and engineering were taught. Upon completion of this phase, air-minded students would graduate to a flying phase of the Aero Clubs. Thousands of youngsters would have the opportunity to jump from parachute towers scattered all over the Soviet Union. By 1940 the U.S.S.R. thus had over 100,000 partially trained airmen who were available to help in the war against the Nazis.

The U.S. had no similar mass program to teach youth to be air-minded. The small percentage of present-day AFROTC cadets who enter flying training, or who remain in the service for a career, is a sad commentary on the current lack of enthusiasm for air careers in the minds of impressionable American adolescents.

What is needed is a comprehensive program of air-age education in the public schools and colleges to fill this gap and to prepare our youth to grapple with the problems of tomorrow that the air age has wrought. Let us consider what has been done in American air-age education, what can still be done, and some possible Air Force approaches to ensure that what can be done will be done.

What Has Been Done

THE airline industry, sparked by United Air Lines, which established its Aviation Education Division in 1938, took the first sustained interest in this teaching area. TWA and Pan American followed a few years later with

pamphlets and materials for teachers on air-age education. The aircraft manufacturing industry, strangely enough, did not take an interest in air-age education until the mid-1950's, when Beechcraft, Fairchild, and other companies offered their services for the cause.

On another front the Civil Air Patrol, founded in 1941, helped to instill the importance of aviation education into the minds of youth. Its aviation-education workshops for junior and senior high-school teachers throughout the U.S. are providing a vigorous stimulant to this neglected portion of the typical school curriculum.

The large city school systems like those of New York and Los Angeles are conducting air-age institutes and workshops for teachers with the cooperation of the local CAA, the USAF, the airlines, and the aircraft companies. Field trips are taken to nearby airports, and trips through aircraft plants are scheduled periodically for faculty and students in these cities.

Another milestone in the development of air-age education in the U.S. was the founding of The National Aviation Education Council, a nonprofit organization which evolved from the first National Aviation Education Conference held in 1950. This infant organization received a well-needed shot in the arm in early 1955, when a full-time Executive Director, Dr. Evan Evans, was hired with a budget of \$30,000 a year for three years. This windfall was made possible through a financing gift from the National Aeronautics Association as announced by Vice President Jacqueline Cochran of the NAA in February 1955. NAEC membership has grown to 1300 early in 1956, and the goal is 10,000 members by 1958.

Approaches to Air-Age Education in American Schools and Communities

WITH the impact of aviation on the modern world now being felt more intensively every day, revisions of school curriculums will be taking place to make room for air-age education materials and concepts. From the experiments conducted in many American schools (particularly on the elementary level) it would appear that *integrating* air-age concepts into the present school subjects would be the best method of phasing this vital information into the everyday learnings. A "special subject" approach would be relegated mainly to technical training, as exemplified by the new \$8 million Aviation Trades High School in New York City. In this school such special subjects as jet engines, navigation equipment, and radio and electronic equipment are studied. The more generalized air-age knowledge would be taught within the confines of the present traditional nonaviation courses, such as geography, history, art, mathematics, and English.

Flying a group of children (or adults) and their teachers to distant lands would allow more time to study foreign peoples and their problems on the spot. This method of increasing world understanding, through the help of the air medium, would tend to place a greater emphasis on geography, sociology, anthropology, economics, and political science in the school curriculums than formerly noted.

Adapting science-fiction literature to the schools, for example, space stories pertaining to the air age of tomorrow, has tremendous possibilities for motivating students to look into the future.

There is a need for a mass-appeal aviation periodical geared *predominantly* to the youth of America and written in their language, which could be distributed (at a small voluntary subscription cost) to high-school and college students (with a title such as *The Air Age Weekly*). A publication of this kind could adequately supplement the present high-school political science and literary subscription papers and periodicals like "The Weekly News Review," "Scholastic," and "American Observer" or the material could be included as subsections of these worthwhile periodicals.

The intriguing Japanese aviation magazine *Aireview* might serve as a model for such a periodical. This monthly publishes (well ahead of comparable American publications) designs, drawings, and cutaways of the latest American aircraft. Excellent content material of this kind may be readily adapted from declassified U.S. aircraft manufacturers' photo handouts. It is particularly interesting to note that of *Aireview's* present circulation of 20,000 readers monthly, over 12,000 (or 60%) are *high-school and college-age* students. If such a format appeals to Japanese youth, certainly a similar approach should have mass motivational appeal to American youth.

There appears to be a serious problem of finding effective air-age teachers in the quantity and quality needed. To supplement those few teachers who are "air-minded" through self-interest, a massive air-age teacher training program is needed. The best, most economical, and fastest method to accomplish this end is for the various state teachers colleges, state departments of education, and local school systems to conduct summer and regular-term air-age education workshops. Air-age scholarships provided by the aviation industry would be an excellent incentive for teachers. To be a success, these workshops will need help and aids in the form of proper air-age curriculum materials and resource specialists.

These are but a few of the more basic general approaches to obtaining more and better air-age education in the schools, colleges, and adult community organizations in the U.S.

How the Air Force Can Help in Public Schools, Colleges, and Communities

IF educators could put their hands on adequate written and pictorial material geared to teenagers so that they might supplement their verbal presentations, air power as a fact of life and a motivating force in our world would begin to take shape for the public. Such material is presently lacking in the quantity and quality to make up for the cultural lag in air-age education that presently exists in our schools. What is needed is a series of basic pamphlets and picture manuals on air-age fundamentals, written for different levels of audiences, coupled with authoritative air power films and air-age speakers appearing before high-school assemblies and community gatherings.

These brochures, handouts, and manuals to be distributed by the forty-eight State Departments of Education in approved syllabi to the public schools could take one or more of the following forms:

- Reprints of selected picture articles on various aspects of air power and air-age education from leading magazines, such as *Fortune*, *Harpers*, *Flying*, *Air Trails*, and *Air Force*, which would explain the complexities of air power in simple, direct language. These reprints could appear frequently in regular high-school periodicals like *Scholastic* or could be bound with a hard cover like the AFROTC's "Readings in Military Power" and distributed to public-school and college teachers.

- Distribution and fostering of supplementary textual manuals in public schools modeled along the lines of the new college-approved Air Force ROTC texts, such as *Military Aspects of World Political Geography*. These twin manuals contain a series of interrelated articles and excerpts from books on air power fundamentals that help to depict air power in its proper perspective.

- Reproduction of thousands of study guides (and companion instructor guides) similar to those distributed today to the more than 30,000 inactive U.S. Air Force Reservists in the Reserve General Training Program. These study guides, profusely illustrated with photographs, drawings, and maps, are simply written in basic English, requiring little or no transposing for public school use at a junior-high or high-school level. These guides cover such diverse and interesting air-age subjects as the "Soviet Air Force," "New Concepts of Tactical Air Combat and Aircraft," and "Polar and Arctic Flying."

- Reprints for discussion purposes of selected by-line columns on advances in American military and civil aviation (with appropriate questions and instructor suggestions for teachers added on). These columns on air power topics could be used in conjunction with current events periods to highlight air-age information.

In addition to the written word there are visual, instructional, and personal-appearance facilities to be exploited:

- Distribution and showing of all or part of the twenty film chapters of the "Air Force Story" tracing the development of military aviation from the Wright brothers through World War II. Unfortunately the sequences showing the Korean air war and the latest advances in jet aircraft are not yet produced for showing to military or civilian audiences. Films of this nature can do much to motivate impressionable high-school youths who have not yet made up their minds about a career. Even for those who choose other careers, films such as the "Air Force Story" can do much to teach a true appreciation of the capabilities of air power.

- A program of training teachers in air-power concepts needs to be instituted to carry out the utilization of the aforementioned methods into action in the classrooms. Aviation education workshops of one to two weeks' duration could be held in the cities and towns of America during the summers, patterned after the Civil Air Patrol workshops held during 1954 and

1955. In Utah these educational workshops taught school teachers air concepts with the assistance of 14 Air Force ROTC instructors. Other Air University and Training Command faculty members could help to plan and operate such teacher-training workshops in the future. AFROTC Summer Workshops for their own faculty on 188 college campuses could also include high-school and college teachers who could benefit from the latest knowledge of the air-age.

● Sending a select team of qualified Air Force officers out to speak to high-school assemblies, PTA meetings, and educators' conventions patterned after the old-time circuit-rider preachers, would be a welcome adjunct to this program. That these officers could not be spared from their regular duties for any great lengths of time is obvious, but with the pressing need to get the air perspective across to the public and youth of America, one can look favorably upon this method. With air education lagging in *quantity* and *quality* of voices, who are better persons to do the job than the authorities in uniform—the men who fly the planes?

This year Brigadier General Robert L. Scott, Director of Information Services, USAF, is planning an expansion of last year's successful Operation Hometown, which paid such good dividends for the Air Force:

Operation Hometown is a Community Relations program designed to bring selected Air Force officers back to the high schools from which they graduated, as Commencement Day speakers. It is a program that was conducted on a test basis by the Air Defense Command this past spring with exceptional results. It is considered to be an excellent way to help achieve the above objective.

The youth of America want to know the true facts of the air ocean, its control possibilities and its problems. "Only the airmen and those who work with airmen [including professional civilian experts] can answer those questions," so concludes RAF Group Captain Malcolm Douglas-Hamilton. They must be answered clearly and concisely if our youth and adult citizens are to discover the true meaning of air power and the air age.

Even with this fine program, there appears to be a reluctance on the part of some school administrators and teachers to have uniformed Air Force personnel come into their schools. Better liaison is needed between the USAF and the public schools to improve the effectiveness of air education of the American public.

Last spring Mr. Gill Robb Wilson, the editor of *Flying* magazine and president of the Air Force Association, wrote an editorial on processes for better air education. One of his excellent ideas was to start with a program of thorough indoctrination of state superintendents of schools and other high-level figures in public education. He suggested taking them on conducted tours of various USAF bases around the country so that they may see at first hand what the newest branch of the service is actually doing to help preserve national security. But a typical American high-school principal or superintendent, no matter how enthusiastic he might become after visiting one or more Air Force installations, might have some difficulty in carrying his vivid impressions of our air-power-in-being back to his faculty and students in concrete form. When educational field trips are made by school

people to Air Force installations, such as one made recently by a group of school administrators to the Electronics School at Keesler Air Force Base in Mississippi, a planned system of follow-ups on the part of Air Force personnel is necessary to ensure that the school people convey their impressions and knowledge to their faculties.

The problem of inadequate professional literature is caused partially by the Air Force's inability to use the mass communications media with the same degree of effectiveness as the older services—the Army, Navy, and Marines. A quick survey of these media from an educator's viewpoint bears this out.

Professor Barton Leach of Harvard (an Air Force Reserve brigadier general) noted recently:

The Air Force is really the silent service. Its senior commanders do not write books and articles. As to the war in Europe there are books by Eisenhower, Bradley, Montgomery, Patton, and a host of junior commanders, but none by Spaatz, Doolittle, Vandenberg, Eaker, Twining, Norstad, Weyland, Anderson, or Quesada—and as a result, ten years after, several of these names are not even remembered by the public. No Air Force officer has recounted the strategic bombing effort that brought Japan to its knees—the first time in history when air power was a principal factor in causing a nation to surrender before its homeland was invaded and while its armed forces were intact. The same pattern appeared in the Korean War—some ten books about the Army, five about the Navy, four about the Marines, and one about a single squadron of the Royal Australian Air Force. But not one book about the United States Air Force. Four Air Force generals (Arnold, Kenney, Chennault, and Brereton) wrote World War II memoirs. General Spaatz has written occasionally in *Newsweek* since his retirement. Very recently, Brigadier General Dale O. Smith has published his *U.S. Military Doctrine*, plaintively noting that it took him longer to get it cleared than to write. But that's all. Those responsible for the development of national air power have not made use of the basic instrumentalities of information and enlightenment to get the public behind them.

A few other books have been published since Professor Leach wrote the above analysis in September 1955. General Laurence S. Kuter recently published his *Airman at Yalta*, but like General Smith's book it appeals predominantly to adult audiences. Other books like Ward Millar's *Valley of the Shadow* and William Lundgren's *Across the High Frontier* (the biography of Chuck Yeager) have been published and will take their place as a permanent part of our infant "literature of the air." We need more books on air power, tailored to both adult and to youthful audiences.*

Coupled with this lack of communication of information about air power through the medium of books is the secondary role that the Air Force has been taking in television and the cinema. In the TV medium the Air Force as yet does not have a sustaining public-information program comparable to the Army's "Big Picture" or the Navy's new "Navy Log" series which has made such a hit with the average televiewer. Arthur Godfrey's valuable plugs for Strategic Air Command on his many radio and TV shows need supplementing on the score of the indivisibility of air power by equally effective consideration of the other Air Force combat commands, Tactical Air Command and Air Defense Command. Live TV programs like the "Why Fly?" series that has run for the past 16 months over WBAL-TV in Baltimore are needed. This pioneer series has had the cooperation of the USAF, the

*The Air Force has made a notable provision for encouraging the writing of air books. The Office of Information Services, Hq USAF, now assists in bringing author, idea, and publisher together and in providing assistance in travel, research, and clearance.—Ed.

Air Force Association, the CAP, the airlines, aircraft manufacturers, and school people from its inception in October 1954. Also the excellent portrayal of a jet test pilot and "The Court Martial of Billy Mitchell" on Omnibus (CBS-TV) on Sunday, 1 April 1956, gave the public a glimmer of what TV can do in air-age education.

As for the movies, "The McConnell Story" and "Strategic Air Command" (the most recent Hollywood air epics) still cannot compare favorably with "The Caine Mutiny," "From Here to Eternity," "To Hell and Back," "Battle Cry," or "Mister Roberts" for their relative value in depicting their respective branches of the armed services to the public. The recent "The Court Martial of Billy Mitchell," starring Gary Cooper, presents air power in both a favorable and an instructive light for one of the first times in screen history.

Only in the mass medium of the comics does the Air Force come out ahead, with "Steve Canyon" and "Terry and the Pirates" far outstripping any competition in that field of communication and public relations.

Only when the public understands the complexities of the air age and all its aspects can the Air Force expect consistent, informed support for the entire range of its missions. Our youth and adults want to know. We must help them. A comprehensive air-age education program can be fashioned using some or all of the above suggestions as the proper follow-up of Mr. Wilson's suggestion to get the educators out of their ivory towers and to the air bases.

Squadron Officer School

Books and Ideas . . .

The Airman's Language

DR. WOODFORD A. HEFLIN

I

THE completion of the *United States Air Force Dictionary*, and its publication in June 1956,¹ raises a question of why it was deemed necessary at all for the Air Force to have a dictionary of its own. The answer to this question is to be found in the nature of the Air Force itself, a dynamic entity about which a special vocabulary has been created. Very often this vocabulary has meaning only because of special points of view.

For example, the U.S. Air Force may be looked upon as a *force* or as an *organization*. As a force, it acts upon entities outside itself, exerting influence upon people and events either for purposes of peace or of war. As such, it is a form of power or energy, directable toward achievement of military or national objectives through the use of air vehicles. Also as a force it is controllable by the leaders of government, as well as by a certain self-directive ingredient within itself, identifiable as its own leadership or its will to endure and make itself felt. Legally this force is a creation of Congress, yet Congress did not create it, because it arose from the research of scientists, from the discoveries of scholars, the labor of men's bodies, the production of mines, the fabrication of factories, and the organizing skill of men. It is a contingent force that comes or goes in accordance with how man acts or does not act—an instrument of diplomacy to the statesmen, a national weapon system to the airmen, a product of modern physics to the engineers who design its equipment and weapons.

From another standpoint, however, the USAF is an organization, consisting of units held together by chains of command, with persons assigned as bodies, not as persons. It is the air arm of the national military establishment, consisting, it may be said, of people, airplanes, and other things so organized and cast together as to respond to the will of the American people, a concert of persons and equipment working and moving together. It changes its structure by an act of will exercised by, or in the name of, its commander. It replaces old weapons with new. It modifies its internal structure, not like the cellular changes and growth in a plant or animal, but by deliberate direction. From this standpoint, it is a contingent body, created by the work of the American people.

¹The *United States Air Force Dictionary*, edited by Woodford A. Heflin (Air University, Maxwell AFB, Alabama: Air University Press, 1956), 578 pp. On sale to the public by the Superintendent of Documents, Government Printing Office, Washington, D. C.: \$3.00.

Being these things and more, the United States Air Force can thus be defined in terms of force *or* organization, or in several specific subsidiary ways—each way being related to purpose and context, each consistent with the terms of other definitions (if soundly conceived), yet each having validity only within its own definite limits of purpose or context.

So it is with the things and ideas associated with the Air Force. *Air*, for example, may be defined as a mixture of gases that exists in the atmosphere. But if observed with a different purpose, air may be defined as an element that supports an aircraft in flight, as used in the words *aircraft*, *air drag*, or *air resistance*; or it may be defined as a region above and around the earth, including both the atmosphere and the space beyond, a realm subject to control and dominion by men, as in *air defense*, *air power*, or *air command*; or it may be defined as a force that operates in the air, as in *air unit* or *air observer*, i.e., a unit that belongs to an air force, or an observer who represents an air force. These are each valid meanings of the word, each dependent for validity upon the point of view of the user.

The impact of aviation, of electronics, and of atomic energy upon the modern world is, of course, obvious. That these three developments are, however, aspects of a single new approach to the physical universe that gained verification about 1900 is perhaps not so obvious. But they are. And the language used to communicate with respect to these developments differs from the language of the nineteenth century not so much by the new words and phrases—numerous though they are—as by the particular context in which old words and phrases are used. The *range* of a B-52 bomber, for example, is not the *range* of a howitzer, although connotations of “reach” inhere in both contexts. *Altitude* as used in the phrase *altitude alkalosis* is not the *altitude* of the city of Denver, because attention in the former case is not upon height, but upon scarcity of oxygen, a resultant of height. The *deflection* of a bullet shot from a fast-moving airplane is not the *deflection* of a bullet shot from a parapet into a crosswind, for in the airplane deflection is imparted by the motion of the airplane itself. The *trajectory* of a winged rocket is not the *trajectory* of a cannon ball, for with the rocket the resultant curve in the vertical plane is from motion induced by burning fuel carried by the rocket itself, different in concept from the trajectory made by a projectile that continues in motion after separation from the force that first gave it motion.

These are but examples of what the advent of air power has done to the English language. The process is not new, but the examples are. Thousands of words and phrases are undergoing change in significance as the impact of air power, and of the sciences that support air power, work themselves out upon the minds of men. So rapidly have the changes taken place in the past two decades, and so radical has been the change in approach to the physical universe in the past fifty years, that more and more effort has had to be made to keep pace with any one development. New specialties have been isolated, new textbooks written, new lexicons prepared.

Fundamentally, therefore, the need for an Air Force dictionary resulted

from the particular transformations in certain word connotations that began more or less with the Wright brothers' first achieving powered flight in 1903, or—if given perspective in terms of science—that resulted from the publication of such scientific papers as Einstein's three in 1905, one of which was on the theory of relativity.

As the aviation-atomic-electronic age gained momentum, these transformations deepened and multiplied. Their adoption and incorporation into the language of military establishments was inevitable, because the military potential was enormously expanded by virtue of the new discoveries. The ability of men to communicate upon these discoveries rests squarely upon language, and especially upon the English language, the language of the British and American people.

A dictionary that would reflect this development, therefore, became a logical part of the understanding process. Earlier glossaries and wordbooks had pioneered the way, but none of these had made a bold assault upon the literature to isolate the vocabulary for systematic analysis. Some of these, like Pierce's *Dictionary of Aviation* in 1911,² came too early to take a proper measure of the trends in growth. Some, like the *Glossary of Aeronautical Terms* compiled by the Royal Aeronautical Society in 1919,³ or like a glossary compiled by the National Advisory Committee for Aeronautics (NACA) in 1934,⁴ or like the *Glossary of Aeronautical Terms* by the British Standards Institution in 1949-1951,⁵ confined their word lists to aeronautical terms and left the military applications out of account. Some, like *Termes d'Aviation* by Pagé and Montariol in 1917, or like *Dictionnaire Aéro-Technique* by Louis Henry in 1952, were bilingual glossaries, intended for French and English-speaking aviators or citizens who often find themselves in need of a translating device.⁶ Some, like Vanier's *Dictionary of Aeronautical Terms* (1929), were multilingual.⁷ Some, like a short glossary compiled in 1918 by the Office of the Chief Signal Officer,⁸ or like numerous specialized

²Robert Morris Pierce, *Dictionary of Aviation* (New York: The Baker and Taylor Company, 12 May 1911), 267 pp. Reprinted in 1914 by Languages Publishing Company.

³W. Barnard Faraday (Editor), *A Glossary of Aeronautical Terms* (London: The Royal Aeronautical Society, 1919), 106 pp. Two other nonmilitary glossaries dealing with aeronautical terms that may be mentioned are: (1) *Baughman's Aviation Dictionary and Reference Guide*, revised by Ernest J. Gentile and Charles E. Chapel, 2nd ed. (Los Angeles: Aero Publishers, Inc., 1951), 653 pp.; (2) Assen Jordanoff, *Illustrated Aviation Dictionary* (New York: Harper & Brothers, 1942), 415 pp.

⁴*Nomenclature For Aeronautics* (Report No. 474), as published in *Aeronautics: Nineteenth Annual Report of the National Advisory Committee for Aeronautics* (Washington: GPO, 1934), pp. 605-637. This glossary is now being revised under the direction of Dr. Frank Adams, who was a member of the staff of the *USAF Dictionary*.

⁵*Glossary of Aeronautical Terms* (London: British Standards Institution, 1949-1951). Published in three parts: Part 1 (1950), 76 pp.; Part 2 (1949), 29 pp.; Part 3 (1951), 70 pp. The three parts are known as British Standard 185.

⁶Victor W. Pagé and Paul Montariol, *Glossary of Aviation Terms: Termes d'Aviation* (New York: The Norman W. Henley Publishing Co., 1917), 94 pp.; Louis Henry, *Dictionnaire Aéro-Technique: Anglais-Français* (Paris: Imprimerie G. Petit, 1952), 417 pp. Another bilingual dictionary of interest is: Umberto A. Bellini, *Dizionario Italiano-Inglese*, 2nd ed. (Rome: Ministero Difesa-Aeronautica, 1952), 607 pp.

⁷Joseph F. Vanier, *Dictionary of Aeronautical Terms in Abridged Form: German-English-French* (New York: The American Society of Mechanical Engineers, 1929), 141 pp.

⁸*Aeronautical Terms* (War Department: Office of the Chief Signal Officer, 1918), 29 pp. The format size of this glossary is 4x6". In the same year the Army Air Service published another wordbook, the *English-French Glossary of Aeronautical Terms* (Army Air Service, 1918), 78 pp.

glossaries concerned with such subjects as navigation or observation,⁹ were published strictly for Army or other military use.

During the time that these lexicons were being published, general dictionaries, both abridged and unabridged, reflected trends in the development of air power only in part. Their approach to the task of defining usually followed traditional lines, and although a constant stream of new words and phrases was incorporated into their word lists, many others considered indispensable by persons in the Air Force were not included. In 1951 I made an analysis myself of three competitive commercial dictionaries used on the college level. This analysis, among other things, bore upon matters which are pertinent to the problem before us. *Air*, for example, was well defined in most respects by all three, but the meanings of *air* as used in *air warfare*, *air power*, *air superiority*, *air photograph*, or *air offensive* were not incorporated into any of them. One of the three listed *airlift*, the others did not; one listed *superfortress*, the others did not; one referred to *strategic materials* in an illustration, then did not define *strategic* so as to explain the phrase. None of the three defined *airman* fully. *Mach number* appeared in only one of the three; *jet engine*, *jet airplane*, and *jet* (short for either *jet engine* or *jet airplane*) appeared in only one. The verb *solo* appeared in only one. *Airborne* appeared in two, but not in the third. *Echelon*, as used in *air echelon*, *sea echelon*, and *ground echelon*, was inadequately treated in all three. *Atomic age* was in two of them, but not in the third; *atomic pile* was in one, but not in the other two; *chain reaction* was in all three, but treated adequately in only one. *United States Army* was in two of them, but not in the third; *United States Navy* was not listed in any one of them; but *Marine Corps* was in all three!

These findings, by themselves, reflected no great discredit upon the dictionaries concerned, because by comparison with the tens of thousands of other terms that were properly and adequately treated, they were but a drop in the bucket. The purpose of these dictionaries was of a general nature to provide for the needs of college students, business secretaries, and the general user, not specifically for Air Force users. Furthermore no one can expect a dictionary to catch up all words and phrases over which it might have purview. Yet the findings were significant so far as the people in the Air Force were concerned, for they were but samplings of many other words and phrases that needed special treatment for Air Force purposes.

As already indicated, the problem of providing this treatment lies in the approach. Nowhere else is this better understood than in the armed services, for in them a compelling motive is ever present to regard everything in terms that will make for the military security of the United States. This is an extremely practical point of view, and a strong tendency prevails, especially in the Air Force, as well as in the missile branches of the Army and

⁹These glossaries are often appended to reports of special studies, but some are issued as special publications. Recent among these latter are three deserving special mention: *Glossary of Observer Terms* (Scott AFB, Illinois: Air Training Command Manual 50-5, 1954), 94 pp.; [Alton B. Moody, Editor], *Navigation Dictionary* (Washington: GPO, 1956), 253 pp., published by the U.S. Navy Hydrographic Office; and *Dictionary of Guided Missile Terms*, by the Committee on Guided Missiles of the Research and Development Board of the National Military Establishment (Washington: Public Affairs Press, 1949), 57 pp.

Navy, to see the world through the eyes of those who examine each new scientific discovery for military advantage. This has its repercussions upon language, and the definitions required even for some common words must be oriented to the problems to be solved.

For example, some time ago, under the stimulus of conversations with Brigadier General Dale O. Smith, I undertook to examine several words, including *concept* and *doctrine*. These words are old, but they were frequently finding their way into Air Force literature, and it seemed to General Smith, and also to me, that their use had not always been understood. As a result, I made a review of the literature in which these words appeared, and prepared a memorandum on them. The treatment accorded the word *concept* illustrates the approach. I quote from the memorandum:

First of all, a *concept* is something that is conceived. It has existence in a person's mind. It may, or may not, be taught; but it is not doctrine.

Concepts for the military man are normally of two kinds: Those that are of what a thing is, and those concerned with how to do something.

For example, Copernicus' concept of the universe was of the universe as a phenomenon. The phenomenon had existence whether his concept of it was true or not. Hence, the concept may be judged for its validity by the criterion of trueness to the phenomenon. Similarly, a concept of electricity or a concept of air power is of a phenomenon, and such concepts may be judged for their validity by the criterion of trueness. This is clear when we say, "Hitler lost the battle of Britain because his concept of air power was false." Why do we call it false? Because it was out of harmony with the nature of air power, which, as a phenomenon, had existence quite apart from Hitler's concept of it.

The other kind of concept is concerned with how to do something. Like the first concept, it exists in the mind, but unlike the first, it is not an idea or notion about what something is. It is simply a plan, or a notion, on what to do and how to do it. For example, a commander has a concept of how to fight a battle. His concept is formulated under the stimulus of purpose, but its particular form may be determined by his habitual way of looking at things, or by the vigor of his temperament, or by an order to him from a superior officer. In this sense the Maginot Line was a concept. The concept consists of an over-all scheme of strategy, tactics, and actions, each supported by a series of judgments or decisions, each related to the others by the particular or the over-all objective. The decisions, for example, are to employ materiel in a certain way, or to use certain units or weapons, or to mass in one place and disperse in another—each decision and each action is conceived in advance in the commander's mind. Together they form an entity that is the concept.

Now certain ingredients or parts of the concept on how to fight a battle may be based upon certain other concepts which are concepts of what things are, or concepts of how other things have been. For example, the commander's concept of the nature of war may determine the nature of his decisions on how to fight a battle. But certain other ingredients are also present. Considerations of policy, as in the Korean War, for example, may enter into the concept of how to fight the battle. Thus the concept of how to fight the battle is quite different from concepts of what things are. This is clear when we see that the criterion for judgment is not trueness but practicability. One would not say, "His concept of how to fight the battle was true." Instead one would say, "His concept was good or workable."

The difference, therefore, between a concept of a phenomenon and a concept of a plan of action is not theoretical. In making this distinction we can probably clarify our thinking on war and the use of air power in war. For in air power, from this standpoint, we are dealing with a phenomenon, and our understanding of this is basic to our success in war.

I then went on to comment on *doctrine* and, in part, had this to say: "Doctrines, like concepts, are of two kinds in the Air Force: Those that deal with what to believe or what to teach about phenomena, and those that deal with what to do or how to do something. . . . Thus a doctrine on air power may be a teaching on the true nature of air power, or it may be a teaching on how air power can be utilized."

The treatment accorded such words as *concept* and *doctrine* is usually

not adequate in most general dictionaries. So it is with words like *unit*, *facility*, *function*, *organization*, *target*, and hundreds of others. These cannot reasonably be expected to be treated adequately in a general dictionary. A list of such terms would be long, but an idea of their nature may be indicated by citing a few: *parent unit*, *landing force*, *integrated command*, *coordination control*, *close air support*, *target director post*, *organic aviation*, *altitude anoxia*, *protocol*, *air mission*, *sortie rate*, *air task force*, *barotalgia*, *service ceiling*, *offensive grenade*, *cuban eight*, *whipstall*, *effective sortie*, *war game*, *airman*, *glide* (as distinguished from *dive*), *oxygen station*, *taxi*, *overrun*, *airspeed indicator*, *thrust*, *propeller cuff*, *quadrantal deviation*, *radar bombing*, *ramjet engine*, *Ready Reserve*, *reactivate*, *hyperoxia*, *superquick fuze*, *hydroponics*, *foreign duty*, *Regular Air Force*, *interdiction*, *interim clearance*, *orbiting*, *limited objective*, *conventional warfare*, *silver-tan uniform*, *simplicity* (as a principle of war), *sweep*, *Taunus*, *trapped fuel*, *useful load*, and so on. Like many other terms, these are well known to persons experienced in the Air Force, but they require special definition for recruits, for persons responsible for special missions, or for persons outside the Air Force who have dealings with the Air Force.

That the publication of a special dictionary was a logical way out to provide for such definitions is indicated by the history of military dictionaries. This probably goes back at least to the time of Shakespeare and doubtless reflects the fact that language used in the military must be essentially, and sometimes entirely, understood not only by the hearer or reader, but also by the user, if military coordination is to be achieved.

The earliest reference I have seen to a military dictionary in English is to one of 1616, and this is considered a "forerunner of the kind;" rather than an out-and-out dictionary. William Jaggard, a correspondent of *Notes and Queries* (179, p. 446: 21 Dec 1940) describes this book as follows: "A.B.C. of armes, or an introduction dictionary, whereby the order of military exercises may be understood and readily practised. By J. T.——, gentleman. London: Printed by W. Stansby for J. Helmes . . . 1616. 8°." This book is entered in the Short-Title Catalogue of Books, 1475-1640; one copy is in the British Museum, another in the Bodleian at Oxford. The British Museum General Catalogue of Printed Books (1931) enters it as follows: "The A, B, C, of Armes . . . By I. T., Gent. 1616. 8°. See T., I., *Gent.* Huth 127."¹⁰

A number of other military dictionaries were published during the following centuries. Among them were three of the eighteenth century,¹¹ doubtless published for the interest stimulated by the different wars. *A Military and Sea Dictionary* (1702-1711) appeared during the War of Spanish Succession; *A New Military Dictionary* (1760) appeared during the Seven Years War; and *An Universal Military Dictionary* (1779), prepared by a Captain George Smith, Inspector of the Military Academy of Woolwich.

¹⁰I am indebted to William A. Jackson of The Houghton Library, Harvard University, for another description of this book. It reads: "A.B.C. of Armes, or an introduction directorie; whereby the order of militarie exercises may easily bee understood and readily practised, where, when, and howsoever occasion is offered. By J. T. Gent. 8vo. London, printed by W. Stansby, for J. Helmes, in S. Dunstons Churchyard in Fleet-street, 1616."

¹¹Robert Watt in *Bibliotheca Britannica* (1824) mentions a *Seaman's Grammar and Dictionary* of 1627 and a *Lexicon Militaire* of 1724.

appeared during the War of the American Revolution. Each of these rated attention by the editors of *The Oxford English Dictionary* (1884-1928, 1933), who quoted from all of them. In the next century other military dictionaries were published, and in more recent times still others have been published, undertaken by a variety of persons, some of whom are skilled in matters of language, others of whom, because they felt a compelling requirement, undertook to do a job even if they were inexperienced or unqualified for the task involved.

The current Army dictionary was published in 1953.¹² Its principal forerunner was a dictionary prepared under the direction of Clarence Barnhart, who is one of America's most skilled lexicographers. The Barnhart edition came out as a technical manual of the War Department in 1944 and was the first Army dictionary to be based upon a direct examination of military literature.¹³ It covered some 7000 different terms.

The Joint Chiefs of Staff have also issued a dictionary. This was first published in 1948, but has been revised three times, the last revision appearing in May 1955.¹⁴ This dictionary has limited coverage and deals principally with terms considered of special importance in joint operations.

In the case of the Air Force's dictionary the need for it was first expressed back in 1950. Notable among its backers were Lieutenant General E. C. Whitehead (retired), then Commander of the Continental Air Command, and General B. F. Chidlaw (retired), then Commander of the Air Materiel Command. These and other major air commanders proposed to Headquarters USAF that a proper Air Force dictionary be prepared. The idea was approved by the late General H. S. Vandenberg, then Chief of Staff, and by General N. F. Twining, then Vice Chief of Staff, and was given impetus and direction by the Director of Training, the Air Adjutant General, the Director of Manpower and Organization, and the Inspector General.

II

AIR UNIVERSITY came into the picture when a letter from Headquarters USAF, dated 19 September 1950, asked the command to prepare the dictionary. The first reaction to this letter seems to have been that Air Force terminology could probably best be handled by incorporating it into the dictionary of the Joint Chiefs of Staff. This idea, however, was given up after a canvass was made of the major air commands. This canvass showed that the people in the field had need for definitions of some five or six thousand different terms at the least. Since the JCS dictionary was limited in its coverage, it was obvious that definitions for these Air Force terms could not properly be incorporated into it.

Meanwhile the Documentary Research Division, which is now one of

¹²Issued as a Special Regulation 320-5-1, Nov 1953, 328 pp.

¹³*Dictionary of United States Army Terms* (War Department: TM 20-205, 18 Jan 1944), 312 pp.

¹⁴*Dictionary of United States Military Terms for Joint Usage* (Department of the Army, the Navy, and the Air Force, May 1955), 114 pp. Earlier editions were of 1948, 1950, and 1953.

the three divisions of the Research Studies Institute, was asked to develop a plan for the proposed dictionary and to start working on it. The first job was to make a concerted effort at reading Air Force literature, in order to determine the extent of the vocabulary that required analysis. By this effort some 200,000 quotations were collected. These were to serve as primary evidence for the definitions and also to provide a sound basis for deciding upon the extent of coverage.

During this period a comparatively small staff was organized. Our first task was to determine the concept, then to do those things which we hoped would give the dictionary consistency, usefulness, scope, and depth. For example, the reading of Air Force literature had to be broad enough to provide for proper coverage of the language. To achieve this goal, we enlisted the assistance of several AFROTC lieutenants to help us read the literature and extract pertinent quotations; also several college students were hired on a contract basis to work during a summer; and several officers and civilians on duty at Air University pitched in and collected materials during their off-duty hours. All these people read materials calculated to provide extensive coverage, based on a bibliographical analysis prepared in advance. Throughout, members of the Air University Library cooperated by providing special access to materials during the collecting phase. Likewise, a sample page had to be prepared so as to show every detail, including such matters as type faces and sizes, the use of small type notes, the system of grammar to be adopted, the particular order to be followed in giving information under a given entry, and various other matters which would allow the most to be obtained out of the space that would be available for any single entry.

The quotations that were collected were filed in such manner as to bring their evidence to bear upon the words or phrases that required definition. Definition writing began in the autumn of 1951 and continued through until publication. The editorial staff consisted of five persons, organized within the Documentary Research Division of the Research Studies Institute. Every member of the staff except one had served in uniform and thus had had military as well as some linguistic background.

Every single quotation now had to be read, analyzed, and appraised in terms of Air Force meanings. To do this, the staff not only relied upon its own experience and backgrounds, but upon those of many other persons. Books and other printed matter usually provided the information required to define a term, but sometimes, when no written source of information was available, the staff called upon the specialists to assist them in defining the terms. Well over two hundred persons served in the consulting capacity. Sometimes their contribution amounted to a full-fledged explanation of something, sometimes only to a brief reply to a question on the telephone. Notable among those consulted were members of the Evaluation Staff of the Air War College, members of the faculties of the Air Command and Staff College and the Air War College, staff members of Headquarters Air University, and certain staff members of Headquarters USAF. Throughout, definitions of crucial terms were reviewed by the experts. The phrasing of the

definitions, however, was the responsibility of the Editor, and the organizing and final treatment were entirely of his doing.

The defining phase was, of course, the most painstaking of all. This continued for five years, with many people both in and out of the Air Force not understanding why it took so long. From the beginning, however, not only did the directors of the Research Studies Institute support the project with everything they could, but so also did the successive commanders of Air University. They all understood that a dictionary could not be done in a day.

The proofreading phase was short but strenuous. Tight schedules required for the return of proofs to the printer brought this about. This phase, with any dictionary, is really the final part of the defining phase, for during this period the Editor spots the omissions and inconsistencies that before have escaped his attention. The build-up toward accuracy and adequate coverage comes to a climax, and no one except the Editor and his staff is in a position to bring this about. The manuscript is, indeed, not completed until the last of foundry proof has been returned to the printer.

Despite all efforts that may be made, many words and phrases are bound to be overlooked in the preparation of any dictionary. This arises from the defects in the system of coverage. For this reason, it may be expected that the USAF dictionary will show gaps. These, however, can be closed up in future editions, especially if the users will communicate their complaints to the Editor. In the meanwhile the dictionary should serve within the range of its coverage and also provide a ready framework upon which to make corrections and additions. As it stands it contains some 16,500 entries, of which 3654 are abbreviations both current and historical, with some 30,000 definitions provided. Terms of purely military interest are entered, likewise terms of aviation, aerodynamics, meteorology, electronics, atomic energy, supersonics, business management, and administration—wherever the vocabulary used in these or other fields has become relevant to Air Force operations. Historical terms of interest are also included, and a judicious amount of slang is entered.

Thus the dictionary should be regarded primarily as a guide to usage rather than as a digest of every word and phrase used in the Air Force. Even disputes over words may not always be ended by appeal to its definitions, for the user himself is expected to exercise judgment within the framework of trends and established practice. Furthermore, as stated in the Preface, "it is assumed that the user will turn to other dictionaries for words or meanings not found in the dictionary. The aim has been to supplement rather than to dispense with other dictionaries."

III

DURING the writing of the dictionary many matters of linguistic interest turned up. As already observed, underlying trends toward change in word meanings sprang from the adaptation of the new physics to military prob-

lems. But many particular cases, quite apart from over-all trends, proved of special interest. Four of these may be used to illustrate.

The first is a pattern of usage that may be called "attribute transference." I have in mind such a word as *accessibility*. This word normally applies to that condition of a substance or place that makes it easy to come by or to reach, as in "the accessibility of iron made for industrial development," or "the accessibility of London afforded opportunity for study." But the word is also applied in the Air Force to a capability of an aircraft, as in "the C-131 has good accessibility because it can take off or land on a short runway." Here an attribute considered to belong to a place is assigned to the vehicle that can reach the place.

This same attribute transference appears in the word *visibility*. Normally this word applies to that property of an object that allows the object to be seen, or it applies to the clarity of the medium through which a person may look. But in the Air Force it is also applied to a feature of an aircraft that permits persons seated inside the aircraft to have more or less unobstructed views to the outside, as in "the aircraft had good visibility in the nose." This does not mean that the aircraft can clearly be seen by looking toward its nose; it means that a person sitting in the nose can see out from nearly all sides.

The same thing is true of the word *compressibility*. This normally designates the property of a substance that permits it to be compressed, but in the Air Force it likewise applies to the condition of air or other fluid which is actually undergoing compression, especially of the air around or against an airplane traveling at high speeds, as in "during compressibility a shock wave forms that increases drag."

In each of these cases usage is somewhat off the beaten track, but the new applications are justified by the absence of other ready words for the intended senses.

A second matter for comment is the multiplicity of meanings that attach themselves to words. This, of course, is true of the language in general, and to illustrate it from Air Force example is merely to emphasize that the Air Force language is subject to the same pressures as exist in other English usage. Perhaps the best example of this is the word *air*, already commented upon in connection with another matter. As an attributive this word has as many as 44 different uses in the Air Force, and its combinations are legion.

Another example of this is the word *tail*, as applied to the rear end of an aircraft. In one place it refers to the entire aft part of the airplane, as in "the B-52 came to rest with its tail in the air." In another place it refers to the inside of the aircraft at or near its back extremity, as in "he crawled into the tail and manned the gun." In another it means the empennage, as in "the horizontal tail," or "tail assembly." In another it refers to the underside of the fuselage that is near, but not at, the back extremity, as in "tail wheel" or "tail float." In another it means the direction along a line parallel, or nearly so, to the longitudinal axis of the aircraft from empennage to nose, as in "tail wind." Like hundreds of other words in common usage, *tail* requires context to show exact meaning.

The examples of *air* and *tail* illustrate the constant adaptation of the English language to the needs of those who use it. Adaptation appears to be infinite in its different forms, and nowhere can we look without seeing its manifestation.

A third matter for comment is that of etymology. This subject is as dry as dust to some people, but it can also be fascinating, full of unexpected revelations on the debts we owe to others both in our language and in our ideas. In the fields of aviation and air power we have such debts. Sometimes a man lends his name to a new word, as in the word *mach*, named for Ernst Mach (1838-1916), who experimented with objects in flight at speeds greater than the speed of sound; or as in the word *Immelmann*, named for Max Immelmann (1890-1916), who was noted for an aerial feat he performed, consisting of a half-loop followed by a roll-over to an upright position so as to reverse direction with a simultaneous gain in altitude; or as in the word *stapp*, a force of one G caused by acceleration, named for John Paul Stapp (1911-), noted for his crash survival research.

Or again, a foreigner lends a word from his language to our language. This was particularly the case in the early days of aviation, when nearly all the flyers and aeronautical inventors knew each other, whether they were French, British, or American. Everybody threw in his linguistic two-bits worth, so as to provide vocabulary for the new, exciting adventures they were experiencing. Some words used were already common among them, or nearly so, as with *air*, *altitude*, *motor*, and *gravity*. But other words were not so, and borrowing began at once, especially from French into English. The linguistic debt to these early French flyers and inventors is readily observed in such words as *aviation*, *fuselage*, *aileron*, *nacelle*, *aeronautics*, *empennage* and *monocoque*; it is not so evident in other words, such as *hangar* and *pilot*, which were already in English but were, it seems, reborrowed from the French for their particular aviation senses.

One word of special interest for its etymology is the word *taxi*. This word, of course, was in English before the aviators adopted it, and was applied to a cab for hire. In its older sense it was short for *taxicab* or for *taximeter cab*. The Oxford English Dictionary shows these words had been borrowed into English during the 1890's, the full form *taximeter cab* meaning a cab provided with a meter for measuring the tax or fare for a ride in the cab. But aviation usage was, and is, different. Here the word is primarily a verb, *to taxi*, referring to the action of moving an airplane around on the ground under its own power. What connection, if any, does this usage have with the noun *taxi* as applied to a vehicle?

First evidence on the word in the aviation sense turned up in 1911.¹⁵ The British aviation magazines have many examples of it in this year, the first observed being of 8 June in *The Aeroplane* (page 8): "Why, the only way to get . . . [the] 'bus into the air is to 'taxi' to the sewage farm *remou* and get pulled off the ground by it!" The *remou* of this quotation refers to a strong-smelling updraft of air rising from a neighboring sewer. In *Flight*

¹⁵Much of the evidence on *taxi* was searched out by Mr. R. W. Schmidt. The Editor also asked General Davies to write some of the old-timers about it, including General T. D. Milling and General F. P. Lahm. No one could recollect the origin of the term.

of 1 July (page 572), another early example appears, "He manoeuvred cleverly, and landing near the railway embankment 'taxied' the machine back to the hangars, smiling happily."

The evidence in these magazines shows the term was first used at the Déperdussin Monoplane School at Brooklands Aerodrome, near London. At this school, flying instruction was given on two airplanes. The first of these was not airworthy. It could move around on the ground adequately enough, but could not rise more than a few inches off the ground. This machine was used to teach the controls; it also provided a means for the student to get the feel for an airplane before he took off in the second airplane, which was airworthy. It should be remembered that in that early day, airplanes were without dual controls, so when the student took off, he usually took off solo.

Names, of course, were needed for these two airplanes. The first was dubbed by the students as the "school bus" or the "bus" or the "taxi," partly as a derisive term, but partly in reference to the use sometimes made of the airplane, that of riding in it from one place to another around the aerodrome. The second airplane was called the "brevet machine," because the student received his certificate after learning to fly it. The word *taxi* caught on, and soon was used as a verb. Since a need existed for some word to describe the action of an airplane on the ground before or after takeoff, *taxi* filled that need. Before it was generally adopted, however, other words briefly vied for acceptance. *Waltz* was one of them, used in reference to the zigzag motion of certain airplanes when they taxi. Likewise the uninspired word *roll* was used.

Finally, a comment may be made upon the American adoption of *airplane* instead of *aeroplane*. In the early days of flying, the common word used both in the United States and Britain was *aeroplane*. This was a word coined by combining the Greek *aero*, meaning "air" or "aerial," with *plane*, adapted either from the Latin *planum*, meaning "a flat surface," or from the Greek *planos*, meaning "wandering." But the word *airplane*, formed by alteration of the first syllable, also came to be used, and rapidly gained the ascendancy in the United States, probably because of its easier pronunciation. By 1918 it had been officially adopted by the Army. Curiously enough, *airplane* also had its supporters in Britain, one of whom was the great scholar, W. W. Skeat (1835-1912), Professor of Anglo-Saxon at Cambridge University, who in 1911 recommended that the British adopt it in preference to *aeroplane*.¹⁶ By that time, however, *aeroplane* was too firmly established in Britain to be ousted.

It is also of interest that *aeroplane*, although chiefly used in England, was, in the sense of a winged aircraft (not that of a sustaining surface), introduced into English from the French. But the French had hardly made a loan of it before they decided the British could have it for keeps. They used another word *avion*, the normal French word today for an airplane. *Avion*, of course, is of a pattern with *aviation* and *aviator*, each adapted from the Latin *avis*, meaning "bird."

¹⁶See *Flight*, 21 Oct 1911, p. 918.

IV

IN THIS review of why and how the USAF dictionary was produced, one matter remains to be mentioned—printing production. This is interesting because of the number of new people who contributed at this late stage. It goes to show, perhaps, how complex our society is, for in the last analysis everyone concerned did have something to contribute.

First of all, the manuscript had to be approved by Headquarters United States Air Force. Because of its bulk—some 17,971 slips—it was not something that could be read during a stroll in the park. As a practical matter, the Editor himself had to be responsible for it. Various persons in Headquarters USAF, however, had kept close tab on its terms and definitions, and they had the assurance that approved methods had been used in the build-up. Consequently, when the time came, approval was based principally upon the recommendation of the Director, Research Studies Institute, and of the Commander, Air University.

In the next place, since the dictionary was a Department of the Air Force requirement, printing procurement had to be obtained by Headquarters USAF through the Government Printing Office. At the suggestion of Air University, however, both Headquarters USAF and the Government Printing Office accepted a plan that allowed Air University to exercise close supervision over the details of printing manufacture. This arose partly from the fact that specifications for the type page had had to be established five years before in order to proceed with the defining and editing; partly from the fact that the Air University Press had already worked out the specifications for materials, printing, and binding; and partly from the necessity for the proofs to be corrected and altered by those who had prepared the manuscript.

Under the plan adopted, the Government Printing Office let a contract with the Riverside Press of Cambridge, Massachusetts. The contractor did the type composition and presswork, with direct channels of communication established between the contractor and both the Air University Press and the Editor. This working arrangement made it possible to forward the work connected with the proofs with a minimum of delay, yet permitted the Air Adjutant General and the Government Printing Office to retain ultimate control over procurement.

Publication of the USAF dictionary was announced by Air Force Regulation, No. 5-32, dated 4 June 1956.

Research Studies Institute, Air University

BRIEFER COMMENT

Military and Naval History

Military Heritage of America, by R. Ernest Dupuy and Trevor N. Dupuy, pp. 794, McGraw-Hill, \$10.—

The United States and World Sea Power, edited by E. B. Potter, pp. 963, Prentice-Hall, \$11.75.—

A History of Military Affairs Since the Eighteenth Century, edited by Gordon B. Turner, revised edition, pp. 738, Harcourt, Brace, \$7.50.—

These three recent tomes are well worthy of addition by the Air Force officer to even the smallest professional library. Although the airman will find very little about the nature and impact of air power, as he understands it, even in the relevant later chapters of these chronicles, he may indeed gain from them a wealth of factual information and detailed understanding about the past armed forces of the United States and the wars and actions to which they were committed.

The title chosen by the Colonels Dupuy must be taken literally. Their book is a history of the U.S. Army and, more precisely, its operations—ground operations—from the colonial wars of the eighteenth century to the present. The tactics of all the major campaigns and actions are closely and professionally surveyed and, as well, are oriented against contemporary events and developments in the art of land war. Granting the sharp focus of the authors on their own service and its combat methodology—even in the accounts of World War II and Korea air forces and their operations are given barely more than a passing nod—the military scholarship is professional and sound and the writing is good. The airman can use this book not only as a compendium of Army operations of the

past but also, in its examinations of the campaigns and battles of the Second World War and the Korean War, for illumination of that viewpoint which regards the strategy and the tactical conduct of modern warfare as devolving of necessity from ground forces and their capabilities.

The United States and World Sea Power is a composite work written and edited by the naval history faculty of the United States Naval Academy, sixteen of whom are listed on the title page as authors and editors. In the words of the chief Editor, the resulting textbook is "not so much a history of the United States Navy as an analysis of the *emergence* of American naval power," in which endeavor has been made "to include within the scope of a single work a history of United States sea power and of international sea power, placing the former within the setting of the latter and both within the setting of world history." In conjunction with this comprehensive coverage much attention is given to the development of "six main themes: (1) the influence of sea power upon history, (2) the rationale of strategic decision, (3) the characteristics of successful leadership, (4) the development of naval weapons, (5) the evolution of naval tactics, and (6) the evolution of amphibious doctrine." Accordingly the reader will discover competent technical examinations of a great range of naval campaigns and actions: Trafalgar, the Russo-Japanese War, Jutland, etc., as well as American sea fighting. The extensive consideration devoted to the first five of the six themes enumerated results in an impressive body of technical comment and general conclusion, readily understandable by nonnaval persons and imbued with much food for

thought for all those concerned with armed conflict. As with the work of Dupuy and Dupuy, one perceives much to admire about the scholarship, the professional understanding, and the writing of this book. But the airman, no matter how tolerant of its special viewpoint and its preoccupation with the airplane as an auxiliary instrument of sea forces, will be startled by such unrealisms as its assessment of the Korean War completely devoid of any mention of the operations therein of the United States Air Force.

A History of Military Affairs, prepared for course use at Princeton University, is a collection of collateral readings "concerned with military affairs in their broadest aspect, and only incidentally with matters of a purely military nature," not so much accounts of battles, campaigns, and great captains as "the relationships, trends, and principles which have guided military affairs and the soldiers and statesmen of the last two centuries." Where battle scenes appear, "they are intended to illustrate one of these relationships operating

in a combat situation." The resulting collection is made up by and large of the work of laymen: historians, academicians, statesmen, journalists, and "analysts." Although most of the authors are our contemporaries, much of their story and comment will appear dated in the rising light of the air age in warfare. Nevertheless the volume is worth careful study, not only for the range of opinion and the conceptual background relating to the more precisely military occasions and events more technically described in the two works noted above but also for a documented understanding of how sharply our defense problems of today differ from those of our predecessors. This latter will particularly accrue to the student of air doctrine and capabilities, who will bring to the examination of these discussions an appreciation of the present that they in their collective entirety have largely veiled. Physically the book is a cheapy, printed in two-column typescript and paper covered, but it is full-sized, 7 by 9½ inches, adequately sewed and glued to open flat without damage, and very legible.

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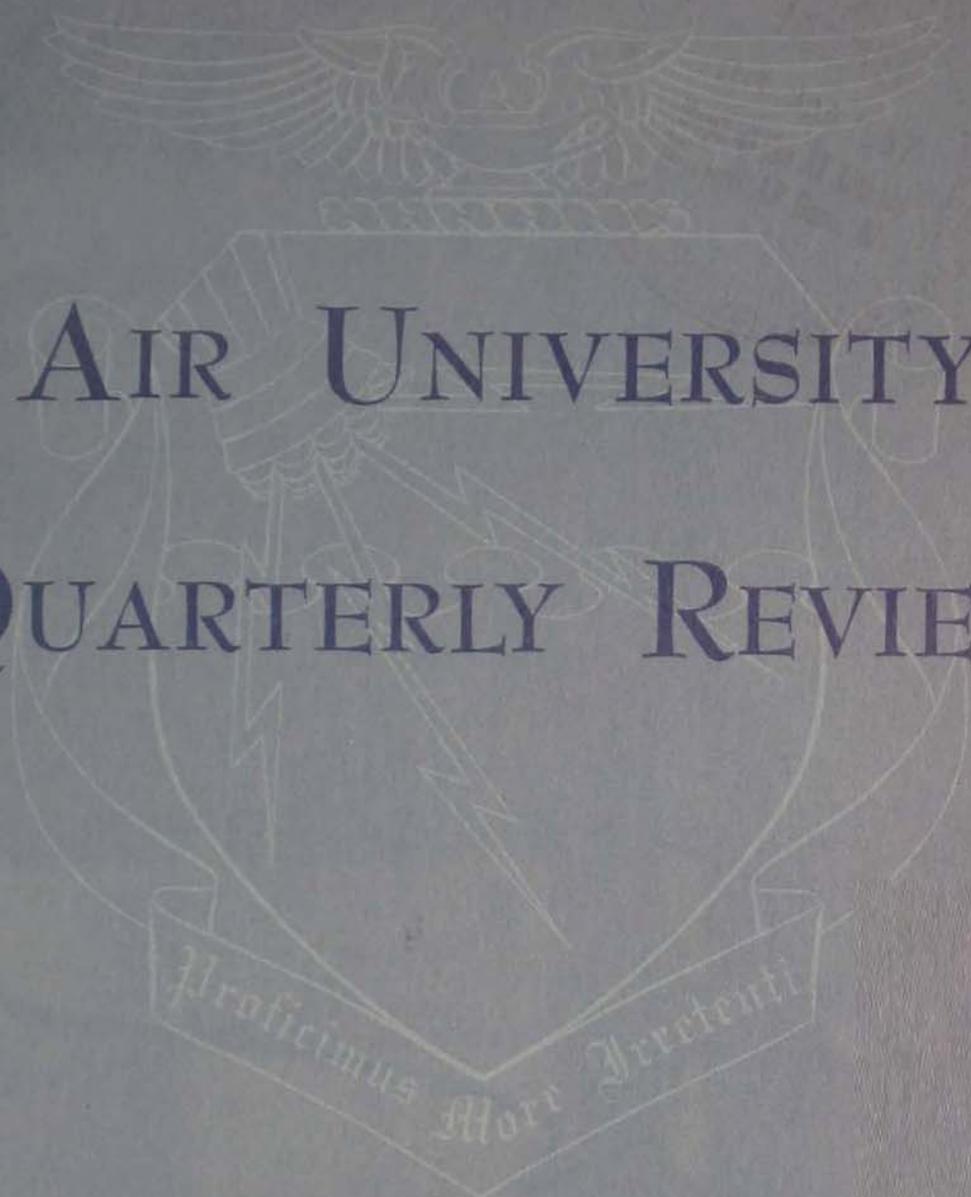
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