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STALEMATE?

RECENTLY some prominence has been given in the press to the possibility of a "stalemate" in Korea. The term, unless rightly limited in application, suggests misinterpretation and misunderstanding.

It is true that a tactical stalemate might come about on the ground, with both land armies incapable of decisive action. But there is not and can not be a stalemate in the progress of the war as long as air forces are committed to a relentless campaign of interdiction and destruction in the enemy's rear.

The situation that has developed in Korea is opposite to stalemate. In Korea the United Nations ground forces find themselves engaged with an enemy against whom a tactical decision seems difficult to obtain. The numerical superiority of the enemy on the ground is offset by the technical superiority of the U.N. forces both on the ground and in the air. On the other hand the technical and mechanical superiority of the U.N. ground forces is limited in effectiveness by rugged terrain and the primitive characteristics of the opposing forces. As the enemy pushes away from his Yalu border, his extending supply lines permit successful interdiction. He can then no longer hope to build up or maintain a force of decisive capability. Yet should the U.N. forces eventually force a ground withdrawal, they will then at the same time shorten the enemy supply line and afford air forces a diminishing opportunity for interdiction. At some point near the Yalu a balance can be expected, and once again the tide of withdrawal might change.

The inescapable conclusion is that air power is the decisive factor in a situation such as exists in Korea. If an opponent is incapable of achieving air superiority even in a localized area, then he is forced to absorb on the ground an incessant rain of systematic disruption and destruction. No force, however well disciplined or however primitive, can endure it indefinitely.

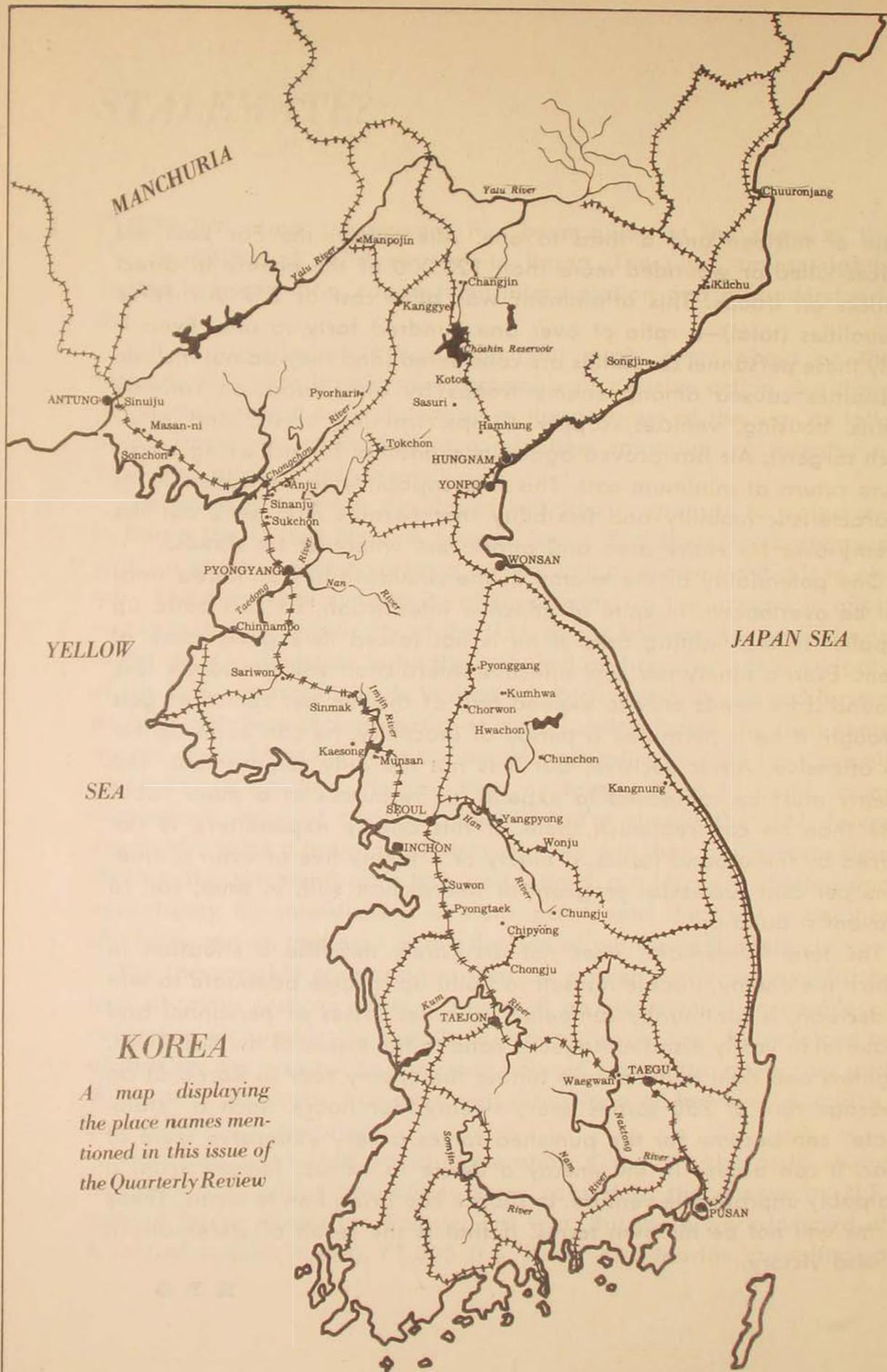
Much has been said about "Operation Killer" in Korea. In round numbers one million casualties were caused to the enemy by U.S. ground forces during the first year of war. But these were inflicted at a cost of approximately 75,000 U.S. Army and Marine casualties—a

ratio of thirteen and a third to one. Alternately, the Far East Air Forces killed or wounded more than 120,000 of the enemy in direct attacks on troops. This attainment was at a cost of 857 Air Force casualties (total)—a ratio of over one hundred forty to one. Even if only these personnel casualties are considered (and they do not include casualties caused among enemy troops by air attacks on railway trains, housing, vehicles, supply dumps, training areas, and other such targets), Air has proved again its capability for achieving maximum return at minimum cost. This is a capability to be added to its characteristic mobility and flexibility that permits it to seek out the enemy over his entire area and attack him wherever he stands.

One potentiality of the enemy in the circumstances of Korea must not be overlooked. In spite of effective interdiction, he can build up supplies in the fighting area if he is not forced to expend some of them. Even a ninety per cent effective interdiction will gradually lose ground if he needs only to expend half of the ten per cent that gets through. If he is permitted a period of inactivity, he can build up for an offensive. Air is decisive, but it is not the only requirement. The enemy must be compelled to expend his resources at a more rapid rate than he can replenish them. If this enemy expenditure is not forced by the ground forces, a ninety or a ninety-five or even a nine-nine per cent successful program of interdiction will, in time, fail to prevent a build-up.

The term "stalemate" does not accurately describe a situation in which the enemy, unable himself to build up a force adequate to win a decision, is continually compelled to suffer losses of personnel and material in vastly disadvantageous ratio to the losses of his opponent. Fighters and light bombers are hitting the enemy rear in Korea at an average rate of 750 sorties every twenty-four hours. Such a "stalemate" can become for the punished forces a very expensive state of war. It can arouse in the enemy a desire to extract himself from a palpably unprofitable venture. In short it can bring him to terms. These terms will not be his own terms. If that is the result of stalemate, it is also victory.

K. F. G.



MANCHURIA

ANTUNG

Sinuiju

Masan-ni

Sonchon

PYONGYANG

Chinnampo

YELLOW

SEA

HUNGNAM

YONPO

WONSAN

Pyonggang

Kumhwa

Chorwon

Hwachon

Chunchon

Kangnung

SEOUL

Inchon

Suwon

Pyongtaek

Chungju

Chipyong

Chongju

TAEJON

Waegwan

TAEGU

Nakdong River

Nam River

Somun River

River

PUSAN

JAPAN SEA

KOREA

A map displaying the place names mentioned in this issue of the Quarterly Review

Tactical Air Doctrine: Tunisia and Korea

ALBERT F. SIMPSON

WHEN the Americans and British invaded North Africa on 8 November 1942, the bulk of the air support for the landings was furnished by carrier-based planes of the Navy. But as soon as Algiers, Oran, and Casablanca had been taken and Algeria and Morocco had come to terms (11 November), the Navy withdrew its aircraft, leaving to land-based aviation the full responsibility for supporting the Anglo-American troops in their drive to seize Tunisia. Concurrently planes of the Royal Air Force's Western Desert Air Force, with some American help, were coordinating with the British Eighth Army as it pushed Rommel's German and Italian forces westward across the Libyan Desert.

Six months later (May 1943) both the Tunisian and Western Desert Campaigns came to an end with the capture of Tunis and Bizerte and the surrender on Cap Bon of the last enemy troops in Africa. In that period the Allies did more than merely conquer a vast expanse of territory and liquidate a substantial part of the German-Italian military machine. Out of the North African Campaign there came results of far-reaching importance. Tunisia became a springboard from which the Allies quickly took off in a northward sweep that successively overran Pantelleria, Sicily, Sardinia, Corsica, and Italy. The Mediterranean was opened to shipping, restoring England's vital but heretofore fragile life line to the East and ensuring a heavy flow of American war material to Russia. The Combined Bomber Offensive, established at the Casablanca Conference in January 1943 with the objective of destroying the Axis capacity to wage war, became a reality; by the fall of 1943 the Eighth Air Force, based in England, and the Fifteenth Air Force, based in Italy, were sending heavy bombers to the farthest reaches of Hitler's Europe. Cooperation between the Americans and British had been developed to the point where the major commands were interleaved with personnel of the two nations. Old methods of waging war had been cast aside or had been refined and new lessons had been learned—lessons which would prove of inestimable value in the invasions of Sicily, Italy, Normandy, and Southern France and in the subsequent exploitations

which, with the terrific impact on the enemy of the Allied air offensive, would force the Germans and Italians to the surrender of May 1945.

Of all the lessons none was of greater significance in the successful prosecution of the war than the lesson of how to employ air power properly in a tactical situation.

When the British First Army and the American II Corps pushed into Tunisia during the last half of November 1942, they were supported, respectively, by Royal Air Force planes of Eastern Air Command and United States Army Air Forces planes of the Twelfth Air Force. The tactical units of these two air organizations were directly responsible to the ground commanders. At that time the doctrines of air support in the U.S. Army were based on War Department Field Manual 31-35 of 9 April 1942, *Aviation in Support of Ground Forces*. The outstanding characteristic of this manual was its subordination of air forces to the demands of ground forces and to the purely local situation. By the provisions of the manual the air support commander functioned under the Army commander ("an air support command is habitually attached to or supports an army in the theater"), and aviation units could be "specifically allocated to the support of subordinate ground units." The manual conceded that attacks on the enemy's air force might be necessary (when other forces were inadequate or unavailable) and that local air superiority was to be desired. It thoroughly offset those concessions by stating that "the most important target at a particular time will usually be that target which constitutes the most serious threat to the operations of the supported ground force" and by giving to the commander of the supported unit the authority to make the final decision as to target priorities and as to whether a particular air support mission would be ordered. The destruction or neutralization of enemy air was regarded as no better than a secondary role for the air arm, and even then the responsibility was conceived as a defensive one in which the air arm flew a protective umbrella over those sectors designated by the ground forces to receive support.

Inasmuch as command and the employment of air power are indivisible, it was quite certain in November 1942 that under the provisions of FM 31-35 tactical air power would be used in North Africa when, where, and how the ground forces wanted it to be used and that the units and planes of the Twelfth Air Force stood to be parceled out—whether for offensive or for defensive operations—among the ground units, to the detri-

ment, if not the destruction, of the air arm's great qualities, flexibility and concentration.

Events in Tunisia soon proved this to be true. To be sure, in the last half of November while the Allies were driving to within sight of Tunis, the matter of doctrine for tactical air operations was of minor importance. The Anglo-American air force was too scattered, its airfields for combat operations too few, and its logistics too thin for it to play an important role in the face of the German Air Force's advantages of numbers, concentration, and numerous (and all-weather) airfields—irrespective of what the Allied air doctrine may have been. Nor did the doctrine get a fair testing in December, for then rain, mud, and a stalemate on the ground kept air operations to a minimum. Even so, there were indications that the tactical set-up left much to be desired, as, for example, on 4 December when an entire squadron of RAF Bisleys (Blenheim V's) was lost in an unescorted attack on an airfield, the mission having been ordered by the ground commander over the protest of the RAF wing commander.¹

In January, as the ground forces on both sides became more active, the Allied tactical air arm had the strength, the fields, and the logistical support necessary to play a major role. But it consistently failed to throw the scales in favor of the Allied armies for the simple reason that it was being misused. For example, on one occasion a ground commander insisted that fighters patrol his battle sector for two days to prevent an expected attack by Stukas. The commander did not seem to appreciate that the patrol, at best, would not have enough planes to interfere seriously with the anticipated attack and, what was more significant, that the patrol could be undertaken only at the expense of other and more important activities: a light bomber attack against the Stuka bases, reconnaissance of enemy troop movements, and use of the fighters against hostile land targets. Again, when on 18 January the Germans struck the French (who were in the center of the battle line), Twelfth Air Force did not fly any missions in the area, although it was within easy range. At one point II Corps, which controlled the Twelfth's XII Air Support Command (XII ASC), refused a French request for air reconnaissance on the grounds that it had no responsibility or interest in the area, while the RAF's 242 Group, which did have geographical responsibility, gave only minor help, even after British and American troops came to the aid of the French. II Corps reported that the German Air Force controlled the skies.² This situation resulted in the hasty

creation of the Allied Air Support Command (AASC) under Brig. Gen. L. S. Kuter which was charged with controlling the two tactical air organizations, XII ASC and 242 Group, and with coordinating air operations on behalf of First Army, II Corps, and the French. Admittedly this was a stop-gap arrangement, but the setting up of AASC did mean—on paper, at least—that XII ASC had been detached from the operational control of II Corps and that a step had been taken toward the proper utilization of air power.

There were other unfortunate results of the misuse of the Allied air arm. While the tactical air elements were occupied with local operations, the Germans were left almost entirely free to build up their ground and air forces in Tunisia. Throughout November and December the enemy, disturbed only mildly by Allied offensive air operations, poured men, supplies, and planes into Tunisia. Even in January, when the Allied air arm had the strength and the location to strike hard at the enemy's lines of supply and at his air power, the ground forces' persistent employment of the bulk of the air force in a defensive role allowed the enemy's build-up to continue with but little interference. And having built up its air strength, the Luftwaffe's planes were able to move freely up and down the front, concentrating when and where they wished and striking in force against the limited opposition which localized air units could muster. II Corps and First Army complained that enemy aircraft, especially Stukas, bombed and strafed troops almost at will. Air Force reports reveal the difficulties encountered in trying to fly reconnaissance missions, protect bombers, and attack enemy troops and communications when the Germans had control of the air and when a large part of the Allied fighters were being used to provide umbrellas over the various ground units."

One trouble, of course, was that each ground commander naturally looked upon his own immediate front as the one area of real importance and felt that the air forces in his area ought to be used exclusively for his benefit. As far as the ground commander was concerned, the situation on his immediate front was habitually too serious to permit "the diversion of the air units allocated to support his ground forces from their direct support tasks to distant air force missions." It was not that the ground commanders did not feel that air superiority was necessary. They wanted air superiority, but they also wanted the air war which could secure that superiority to be fought by someone else's air units.

Another trouble was that the ground commanders neither understood nor appreciated the capabilities and limitations of air power. As General Montgomery put it "a ground commander can no more effectively control air forces than an air commander can control ground forces. If either of them try to control their opposite number, full advantage will not be taken of the outstanding characteristics of the other force."

Besides the establishment of Allied Air Support Command there were other developments in January 1943 which indicated that the Anglo-American leaders had come to appreciate the inadequacy of the organization and the weaknesses of the doctrine which had handicapped the air arm since the beginning of the Tunisian Campaign. Of these developments the most important by far came from decisions made at the Casablanca Conference. The conference took cognizance of the growing fusion of operations by planes based in Northwest Africa and those moving toward Tunisia with Eighth Army (already planes from both sectors were operating against certain Tunisian targets) and the obvious need to put all air elements in the Mediterranean under a single commander in order to improve coordination. It also recognized the desirability of grouping the American and British air units according to their functions, tactical requirements, and logistic possibilities, regardless of nationality. It was the realization of these needs which already had caused General Eisenhower, at the urging of Air Chief Marshal Sir Arthur Tedder, to establish on 5 January the Allied Air Force and to give to its chief, General Carl Spaatz, command over the Twelfth Air Force and Eastern Air Command and to assign to each of these elements specific duties and which, at Casablanca, led President Roosevelt and Prime Minister Churchill and their Chiefs of Staff to order the establishment of a new air command structure for the Mediterranean.

In the proposed rearrangement Tedder was to be Air Commander in Chief for the theater. Spaatz was to head Northwest African Air Forces, which, when activated,* was to include a strategic air force of heavy and medium bombers, with fighter escort, for long-range offensive operations, a tactical air force of light bombers, fighter-bombers, and fighters for cooperation with the ground campaign, a coastal air force to protect ports,

*NAAF was not activated until 18 February.

This logical division into strategic, tactical, and defense commands continued to be used with great success in the Mediterranean and European theaters until the end of the war. But because the division appeared to compartmentalize by functions, the impression has arisen that Strategic and Tactical each engaged only in its own special type of operation, that, for example, planes of Strategic were never used for tactical or quasi-tactical operations or that planes of Tactical never struck at long range at the enemy's war potential.

shipping, and rear installations, an air service command, a training command, and a photo-reconnaissance wing. The tactical arm (Northwest African Tactical Air Force), under Air Vice Marshal Sir Arthur Coningham, would be composed of XII ASC, 242 Group, and Western Desert Air Force.⁷

IN spite of these developments of mid-January there was no immediate change in the philosophy and tactics of American support aviation. Ever since the end of November the ground commanders had insisted on the necessity for aerial umbrellas. So it was that when the Germans again hit the French—this time at Faid Pass on 30 January—and the Luftwaffe's Stukas, even more active than usual, severely punished the U.S. Combat Command D, XII ASC was ordered to fly cover missions over the ground troops. Without enough planes and offensive radar coverage its fighters were severely taxed to provide umbrellas and at the same time fly escort missions, and on 2 February the command suffered heavy losses attempting to protect the wide front.⁸

Two weeks later came the German offensive in the Kasserine Pass area, and for a few days the Allies went through the blackest period of the Tunisian Campaign. But for the air forces the period had in it a bright spot, the arrival of Coningham, a long-time commander of the Western Desert Air Force, who on 17 February assumed command of AASC, which in the reorganization of the following day became Northwest African Tactical Air Force (NATAF).

Coningham brought with him a set of tactical air doctrines which had been developed in the Western Desert Campaign. These doctrines, tested and re-tested during many months of combat and found to be sound, were at sharp variance with the principles of FM 31-35, which had governed tactical air operations in Tunisia. The great difference was that in the Desert Campaign the air units were neither subordinate to nor under the control of the ground commanders. Although operations against the Axis were under the general, over-all direction of Gen. H. L. Alexander (a ground forces officer) as the theater commander, Coningham, the air commander, and Gen. Bernard Montgomery, the army commander, maintained a joint air-ground headquarters. Their striking forces were coequal.

⁷This impression is entirely erroneous. During the remainder of the war Strategic planes acted on a number of occasions in close-support roles, while Tactical planes repeatedly engaged in strategic or quasi-strategic missions. Had they not—had they stuck strictly to their own primary type of operation—they would have sharply reduced air power's two great qualities of flexibility and concentration.

The two commanders worked toward a common goal, each commanding his own force, yet familiar with the others requirements and each collaborating smoothly and effectively with the other.

Coningham's coequal status with the army commander had made it possible for him to use to their mutual advantage the peculiar capabilities of air power. His planes were not tied down to ground units to be used in "penny packets" but were available for use whenever and wherever they were needed the most. They were not wasted on fleeting or unsuitable targets but were available for concentrated blows against vital points. His control over his units permitted him to keep them fully mobile. Flexibility, mobility, and concentration: those were the foundation stones upon which Coningham, with the full cooperation of Generals Alexander and Montgomery and Air Marshal Tedder, had built the Western Desert Air Force into a powerful and successful striking force. It was adherence to those principles, together with the authority to control his own units, which had enabled him to gain and to hold air superiority, without which he could not have efficiently aided the ground forces. In turn air superiority eliminated the need for air umbrellas, permitted the extensive use of fighter-bombers in offensive operations, and made possible the aerial interdiction of lines of communication and the isolation of the battlefield.⁷

Although Coningham took charge of NATAF in the midst of reverses around Kasserine, he promptly gave the Anglo-American air arm a "new deal." He cabled all air commands deprecating the fact that almost all of the operations by XII ASC and 242 Group had been defensive* and announced that there would be no more air umbrellas unless specifically authorized by NATAF. There were targets aplenty, yet the bombers had not been fully utilized nor had the fighters been used offensively. Henceforth the maximum offensive role would be assigned to every mission. An air force on the offensive, Coningham said, automatically protected the ground forces.⁸

During most of the Kasserine Pass affair bad weather held NATAF's planes to a minimum of sorties so that the role of the air arm was small. Even so, a beginning had been made with the new doctrines, for Coningham threw against the final Axis

*In the first four months of the Tunisian Campaign planes of Twelfth Air Force flew around 10,000 sorties. Almost half of these were escort; one-fourth were bombing; of the remaining 2500 close to 2100 were patrols, scrambles, reconnaissance, strafing, etc., while only 400 were fighter sweeps. (Operations of the Twelfth Air Force, 8 Nov. 1942—8 May 1945). These figures show clearly that the Allied air arm was not operating primarily in an offensive role.

thrust all available air resources without regard to previous attachments, causing Eisenhower to note in his Dispatch on the North African Campaign that some of the results of the new organization were "immediately apparent" and to comment that Allied armor now was "strongly supported by air." No longer did each air unit fight on its own with its horizons limited to those of an army or corps commander. Henceforth the Desert-evolved doctrine of air-ground cooperation was in effect. As stated by Coningham, it was:

"The soldier commands the land forces, the airman commands the air forces; both commands work together and operate their respective forces in accordance with a combined Army-Air plan."

In the weeks which followed, the application in Tunisia of the battle-tested doctrines of the Western Desert quickly rectified the misuse of tactical air power which had been so evident in the early days of the Tunisian Campaign. An operational directive of March declared that the only way to give maximum air support to the ground forces was first to win "a high measure of air supremacy." Such supremacy would ensure that the Allied ground forces would operate unhindered by the Axis air arm, while at the same time it would give our own air forces freedom to assist in the ground battle and to attack objectives in the enemy's rear. To obtain this supremacy, the air forces would conduct a continual offensive against the enemy in the air and carry out sustained attacks on his main airfields.¹⁰ General Spaatz put the matter neatly in a letter to General Arnold: "Air support of the ground forces cannot be made effective in the face of air supremacy, superiority, and under certain conditions even parity, on the part of the enemy's air forces. It follows from this that in order for the army to advance, the air battle must be won first." Moreover, said Spaatz, it is evident that "control of the air units must be centralized and cannot be divided into small packets among several armies or corps."¹¹

So it was that when General Patton's II Corps launched an offensive on 16/17 March which took Gafsa, Maknassy, and El Guettar (Operation WOP), NATAF's Tunisian-based tactical aircraft abandoned the old umbrella system in favor of strafing and bombing enemy airfields and ground troop concentrations. Now one-half of all sorties were fighter sweeps. In ten days Allied planes shot down 60 enemy aircraft (while losing only 15) and destroyed 14 tanks and 129 military vehicles—which was a far cry from the score sheets of a month earlier.¹²

It must not be assumed that the new system of "no defen-

sive umbrella" and "take the air fight to the enemy" was joyfully accepted by all of the ground commanders. General Patton, for example, made it quite clear that he did not like the system. In cables to Coningham on 1 and 2 April he claimed that "lack of air cover for our units has allowed [the] German Air Force to operate almost at will" and that his forward troops, supporting units, and division command posts had been "continuously bombed." But Coningham stood firm. The complaints of the ground forces, he said, were "inaccurate and exaggerated," and he made it very clear that the tactical air arm would not go back to the old system of defensive umbrellas and of parceling out air cover over special sectors but that, on the contrary, it would continue to fight offensively as the best means of aiding the ground forces. A meeting between the two men, featured by Coningham verbally giving the volatile Patton as good as he got, led to a satisfactory understanding of the new air doctrine.*¹³

THE new air organization and doctrine did not mean that henceforth the tactical air arm would act independently, without regard to the wishes or the needs of the ground arm, or that it would act without the most careful and thorough coordination with the ground forces. On the contrary the developments resulted in far better cooperation than had previously been the case in Tunisia, cooperation of the Western Desert Air Force—Eighth Army sort. For the tactical air arm was there to further the ground campaign, and neither then nor later did the air commanders forget that fact nor did they fail to work hand-in-glove with the ground commanders.

The first requirement was air superiority, both general and local. NAAF began to send its heavies and mediums in increasing numbers against the German Air Force. Soon the Western Desert Air Force, now entering southern Tunisia with the Eighth Army, joined the planes of XII Air Support Command, 242 Group, and Tactical Bomber Force† in attacks on enemy airfields that started the Luftwaffe on a retreat leading from Gabes to Tebaga to Sfax to the Enfidaville-Pont-du-Fahs bridgehead to the temporary safety of fields in Sicily. On 3 April

*Gen. Mark Clark, busy setting up Fifth Army, tried to reestablish the old system but was checked by Kuter and Coningham. (Memo, Kuter to Detachment, XII ASC to Fifth Army, 10 March 1943, and letter, Coningham to CG, NAAF, 23 March 1943.)

†TBF was established late in March as a means of combining in one headquarters all USAAF and RAF bombers available for army cooperation.

planes of XII ASC topped off their new-found mastery of the once troublesome Stukas by shooting down 14, after which the Stukas left Africa for good. In the week of 5-12 April, in Operation FLAX, XII ASC shot down an estimated 200 JU-52 transports and escorting fighters. This assault on the enemy's aerial supply and evacuation line culminated on 18 April in the so-called "Palm Sunday Massacre," when WDAF P-40's with Spitfire escort sent from 50 to 70 JU-52's and 17 fighters crashing into the sea between Tunisia and Sicily. The slaughter ended on the 22d when 21 ME-323's and 10 fighters were shot down.¹⁴

Meanwhile the bombers of Northwest African Strategic Air Force, bothered only moderately by the dwindling Luftwaffe, were smashing ports and shipping in Tunisia, Sicily, and Italy. At the same time they aided Tactical to knock out enemy airfields in Tunisia and, ranging farther afield, wrecked airdromes in Sicily and Sardinia and on the Italian peninsula as far north as Naples and Grossetto.

Concurrently the tactical air arm's smaller planes went all-out offensively. In March and April fighters flew more than four times as many sweeps as they had flown in December and January. This increase in sorties coincided with a change in the ratio of air victories from two to one in favor of the enemy to two and a half to one in favor of the Allies. Similarly Allied claims of enemy tanks and military transport destroyed were more than doubled.

As a result of these operations, when General Eisenhower's armies launched an all-out offensive on 22 April, the Allies had complete air superiority. Their planes were required for escort duties and attacks on the GAF in such small numbers that they were able to devote virtually all of their attention to furthering the ground advance. Even at the beginning of Eisenhower's offensive Spaatz' planes were flying a thousand sorties a day, hitting airfields, towns, headquarters, rail lines, and roads and sweeping over the entire battle area in strafing and bombing missions. At no time did the Allied ground forces have to worry about the Luftwaffe, even though the troops massed at assembly points moved vehicles along the roads almost bumper to bumper, or advanced across open country. Paced by the Allied air arm, Eisenhower's armies drove relentlessly forward until, on 6 May—a day when Tactical and Strategic laid on two thousand sorties—the German defenses before Tunis collapsed. On 7 May Tunis and Bizerte fell. Ground and air action then

cut the remnants of the Axis Army into small pockets, and on the 13th the last Germans surrendered.¹⁵

After the campaign General Eisenhower wrote:

"The new administrative and operational organization successfully solved one of the basic problems of modern warfare—how to apply air power most effectively to the support of land operations. Direct support of ground troops is naturally the method preferred by the immediate military commander concerned, but this needs to be supplemented by assaults on the enemy's bases, on his lines of communication, and on his factories, which are beyond the immediate range of the local commander's vision.

"The problem in a given operation is further complicated by the competing demands of individual commanders on a far-flung battle-front, each of whom would naturally like to have at his disposal some segment of the Air Forces for his own exclusive use. To a large extent in our experience the creation of separate strategic and tactical forces resolved the conflict between the immediate needs of the commander for direct air support, and the equally compelling necessity of knocking out the enemy's war potential far behind his lines; but, perhaps, the greatest advantage of our new organization was its flexibility. Aircraft of the different combat formations could be fused in a single mission as the need arose, and as a result the local commander had for direct support the combined weight of the strategic and tactical forces when he most needed it."

In a few short months the AAF in Africa had switched from an unsound to a sound set of principles of tactical air operations and at very little cost had greatly improved the science of air-ground cooperation. That these accomplishments owed much to the RAF goes without saying; but it must not be forgotten that the basic principles of the new air doctrine were ones in which the AAF had long believed and for which it had long struggled. Now that the validity of the principles had been demonstrated in combat, General Arnold wasted no time. Generals Spaatz, Kuter, and Stratemeyer had informed him of what had happened in Tunisia—and what Generals Brereton and Craig had observed in the Western Desert—and Arnold pushed the new doctrine through the War Department. On 21 July 1943 there appeared a new Field Manual, 100-20, *Command Employment of Air Power*. For the Army Air Forces—particularly for its tactical units and its tactical operations—the manual was an Emancipation Proclamation and a Bible rolled into one:

"Land power and air power are coequal and interdependent forces; neither is an auxiliary of the other. The gaining of air superiority is the first requirement for the success of any major land operation Land forces operating without air superiority must take such extensive

security measures against hostile air attack that their mobility and ability to defeat the enemy land forces are greatly reduced. Therefore, air forces must be employed primarily against the enemy's air forces until air superiority is obtained The inherent flexibility of air power is its greatest asset Control of available air power must be centralized and command must be exercised through the air force commander if this inherent flexibility and ability to deliver a decisive blow are to be fully exploited. Therefore, the command of air and ground forces in a theater of operations will be vested in the superior commander charged with the actual conduct of operations in the theater, who will exercise command of air forces through the air force commander and command of ground forces through the ground force commander."

Field Manual 100-20 appeared in the midst of the Sicilian Campaign. But its appearance caused no particular flurry among either the air or the ground commanders who were sweeping the Germans from the island, for the doctrines set forth in the manual had by then been generally accepted as sound. In the months that followed, the application of the doctrines continued to govern the operations of the air forces as they and the ground forces conquered all of Italy from the Strait of Messina to the Alps and as they swept up the Rhone Valley after the invasion of southern France.

THE basic principles of tactical air operations developed in Tunisia and refined in Sicily and southern Italy were adopted and used by the Ninth Air Force and other tactical elements participating in the European campaigns that began when the Allies invaded Normandy in June 1944 and ended in May 1945 with the surrender of Hitler's once mighty war machine. By V-E Day the principles set forth in Field Manual 100-20 had long since become the accepted doctrines of tactical air operations.

A year after the end of World War II, in August 1946, these principles were restated in Field Manual 31-35. During the next four years the organization to integrate air action and ground action effectively, as outlined in FM 31-35, was further refined in field exercises and maneuvers. Accordingly the principles laid down in FM 100-20 and in FM 31-35 were in full effect when, soon after the outbreak of hostilities in Korea on 25 June 1950, the United States Air Force went into action against the North Koreans.

The air war which followed—and which, as this is written, is still going on—has been in many ways a curious one. In some

respects the combat operations of the USAF were duplications of those of the AAF in World War II. That is, the Air Force gained, and held, air supremacy by driving the N.K. air arm from the skies and by battering its landing fields and shooting up its grounded aircraft; it interdicted the enemy's supply lines; it isolated the battlefield; it bombed, strafed, and napalmed troops, posts, vehicles, tanks, and other objectives; it carpet bombed; it even engaged in a substantial amount of strategic bombardment.^{16*}

In other respects the air war was quite unlike that of 1942-1945. Most of the air missions were flown against little or no enemy fighter opposition except along a narrow strip adjacent to the Manchurian frontier. The Communists used neither a bomber force nor fighter-bombers, which permitted the Allies to engage in such unorthodox activities as naval vessels sitting inshore and shelling installations and helicopters picking up wounded on the field of battle. Enemy anti-aircraft artillery was never a serious threat. Because of the ground situation and other factors a disproportionate part of the Allied air operations were tactical, either immediate and direct in close support of ground troops or general in interdiction of lines of communication and in isolation of the battlefield.¹⁷

In its handling of tactical operations the USAF did a top-flight job—in spite of inadequate equipment, shortage of personnel, lack of aircraft, poor communications, too few good airfields, and a highly fluid battleline. The records of the Korean War as well as the statements of Allied Army and Naval commanders and of enemy prisoners of war prove repeatedly the high quality of those operations. Too, they proved, again, the validity of the principles established in Field Manual 100-20. Nevertheless during the early stages of the Korean conflict there developed in certain non-USAF quarters a movement toward returning tactical air operations to the pre-1943 system of Army control and of parceling out air power to individual ground units.¹⁸ The most notable examples of this movement occurred during the Inchon and Wonsan operations.

In setting up the amphibious operations at Inchon it was provided that General Almond's X Corps would have assigned to it a Marine air brigadier general for specific duty as X Corps Tactical Air Commander; that operational control of the air would pass to General Almond when he assumed over-all command ashore; that the Tactical Air Commander of X Corps

*Of course, it also engaged in many, and vital, non-combat activities, such as air supply, evacuation, reconnaissance.

would have exclusive control of all aircraft operating in the objective area until the area was disestablished; and that he alone would have authority to grant permission for aircraft to enter the objective area.

After elements of X Corps went ashore on 15 September 1950 at Inchon, the 1st Marine Air Wing, which was wholly attached to the Corps, established itself at Kimpo Airfield and set up its own close-support network, including nine tactical air control parties, a tactical air direction center, and ground control intercept warning installations. This meant that in the 1st Marine Air Wing, X Corps had what was in effect its own small tactical air force, with a headquarters, control apparatus, air warning, and tactical units. Moreover by orders from General Headquarters a sizeable air zone around Seoul and Inchon was reserved to X Corps, the planes of Fifth Air Force not being allowed to operate there.¹⁹

The net result of these arrangements was to place an air command, and the operational control of it, under a corps commander to be employed as he saw fit. Stated simply, this meant that a substantial part of the air war in Korea appeared about to revert to the long-discarded pattern which had featured the early days in Tunisia.

Not until 4 October was Far East Air Forces able to regain operational control of the land-based Marine squadrons, and even then the units were to continue to work in support of X Corps.²⁰ Hence when Almond's command set up an amphibious landing at Wonsan, it included the Marine air units in its troop lists and provided for its own tactical air command, together with a tactical air control center and a tactical air direction center to be echeloned at Wonsan. Moreover upon assumption of command ashore by the Commanding General, X Corps, control of aircraft in the objective area would pass to him. Thereafter all air operations in the area would be controlled by Maj. Gen. Field Harris, USMC, Tactical Air Commander ashore, under Almond. There is no escaping the conclusion that Almond now had his own tactical aviation and was fully enabled to dictate its employment.²¹

In the event, X Corps was delayed in landing at Wonsan by enemy mine fields until 26 October, by which time R.O.K. troops had long since seized Wonsan, while planes of Fifth Air Force and of the Marine wing had been operating from its airfield for about a week. When Almond did come ashore, his air objective area had been disestablished; nevertheless he informed Mac-

Arthur that he planned to direct the Marine wing to furnish all close-support missions inside the bomb line and all reconnaissance found necessary. MacArthur replied that the Fifth Air Force controlled all land-based air in Korea and that Almond must coordinate all requests for air support through the established procedure of the Joint Operations Center.²²

This effort to establish a tactical air arm under a corps commander received support from a number of newspaper correspondents and columnists. One news item declared that what was needed in Korea was "a couple of old-fashioned Marine Divisions with their integrated Air Force." A columnist announced that "a lot of GI's" wanted "a big 'umbrella' like the one 'issued' the Marines." The *Chicago Tribune*, in a particularly inaccurate report, believed that the airplane should be an extension of the infantry's weapons. This, the correspondent wrote, will assure that "fighter-bombers remain in the air over the troops throughout the daylight hours." The *New York Journal American* noted that "some of the brightest and most imaginative leaders on tactical air power argue that Korea demonstrates that ground forces can best control the application of air power." When USAF planes mistakenly attacked British ground troops, several newspapers suggested that such unfortunate accidents might be reduced by giving the Army its own tactical air units. The *Washington Times-Herald* suggested that the Air Force be returned to the Army. The *Atlanta Constitution* stated that the Korean conflict had proved the Marines and Navy to be right in their policy of "organic aviation."²³

In the long run these and similar comments accomplished little except further to disturb the already worried American people, and as the war continued, they were more than balanced by a sound understanding and appreciation of the success of the Air Force's tactical operations in Korea. This result was fortunate, for to have eliminated the modern system of tactical air command and of air coordination with ground forces and to have reverted to the system which would give each ground division commander his own air units to be used when, where, and how he wished could only have resulted in proving again the validity of Field Marshal Montgomery's statement that "nothing could be more fatal to successful results than to dissipate the air resources into small packets placed under the command of army formation commanders, with each packet working on its own plan."²⁴ The "small

packet," "air umbrella" doctrine would have turned back the clock to a system disproved and discarded in 1943, destroying the three most useful characteristics of the air weapon: concentration, flexibility, and economy of force.

USAF Historical Division

NOTES

¹Report to CG AAF by Brig. Gen. L. S. Kuter, Organization of American Air Forces, 12 May 1943 (cited hereinafter as Kuter Report). See also, Evolution of Air Command in the Mediterranean; German Air Historical Branch, a Tactical Appreciation of the Air War in Tunisia, 31 Oct. 1944 (British Air Ministry, Air Historical Branch, Translation VII/6, 21 Oct. 1946); CM-IN-2957 (7 Dec. 1942), Algiers to War [Department] 1312, 6 Dec. 1942.

²Kuter Report; Eisenhower's Dispatch on North African Campaign, p. 32; 12th AF Daily Intel. Rpts. Nos. 70, 72, 73 of 19, 21, 22 Jan. 1943; II Corps Report; cable, Algiers to Air Ministry, 22 Jan. 1943.

³Msg., Hq. Allied AF to Allied Air Support Command, 25, 26, 29 Jan. 1932 and to CON, 25 Jan. 1943; Administrative History, 12th AF; msg., AASC, Beaver to Allied AF, 7 Feb. 1943, and to AFHQ, 8 Feb. 1943; Hq. Mediterranean Allied Strategic AF, Weekly Intelligence Summary, No. 1; ltr., Kuter to Arnold, 12 May 1943; ltr., Robinett to Marshall, 8 Dec. 1942; Hq. 12th AF, Air Intelligence Report Nos. 16, 23 of 24 Nov., 3 Dec. 1942, and Air Weekly Intelligence Summary, 12 Dec. 1942; Interview with Maj. Gen. L. E. Oliver, 5 Feb. 1943; Interview with Lt. Gen. L. S. Kuter by Albert F. Simpson, 30 Aug. 1951.

⁴Kuter Report; draft history of 12th AF, Part I.

⁵For the story of what happened at the Casablanca Conference and for the details of the reorganization of the Allied Air Arm in the Mediterranean, see Craven and Cate (ed.), *The Army Air Forces in World War II*, Vol. II, pp. 113-115, 161-163.

⁶12th AF Daily Intel. Rpts. Nos. 84, 85 of 2, 3 Feb. 1943; XII Air Support Command Rpt.; msg., Doolittle to CO Moroccan Composite Wing, 20 Jan. 1943, to CGs XII ASC and XII Bomber Command, 5 Feb. 1943 and to CG 1st Air Defense Wing, 7 Feb. 1943; msg., FAIRFIELD to Allied AF, 1 Feb. 1943; Report of Col. J. H. McCormick.

⁷Brereton Rpt., Direct Air Support in the Western Desert; RAF Middle East Review No. 1; Clifford, *The Conquest of North Africa*.

⁸Eisenhower's Dispatch; II Corps Report; msg., AASC, 18th Army Gp. to 12th AF, 18 Feb. 1943; msg., Air Hq., 18th Army Gp. to XII BC, 19 Feb. 1943.

⁹Talk by Coningham to British and American generals and senior officers, Tripoli, 16 Feb. 1943.

¹⁰Hq., North African Tactical Air Force, Tunisian Campaign, Appendix C.

¹¹Ltr., Spaatz to Arnold, 7 Mar. 1943.

¹²"12 ASC in the Tunisian Campaign," p. 11; draft history, 12th AF, Part I; XII ASC Report.

¹³Hq. NATAF, Cable to II Corps et al., Ref. Spec. 40, 2 Apr. 1943; memo, 2 Corps and Air Support, 1/4 and 2/4 [no date given, but obviously 1 and 2 April 1943; no signature]; Interview with Lt. Gen. L. S. Kuter by Albert F. Simpson, 30 Aug. 1951.

¹⁴Hq. XII ASC, Daily Intel. Summary, 3 Apr. 1943; NATAF, Tunisian Campaign, p. 22; msg. NATAF to Advance Air Hq., Western Desert, 29 Mar. 1943; draft history, 12th AF, Pt. 1; German Air Hist. Branch, Development of the German Ground Attack, etc., 1 Dec. 1944, (Brit. Air Min., Hist. Branch Translation VII/14, 20 Dec. 1946).

¹⁵The last few weeks of the Tunisian Campaign are summarized in *The Army Air Forces in World War II*, Vol. II, pp. 182-205. For the increase in Allied sorties, victories, and claims see XII ASC Report on Operations, Tunisia, and XII ASC in the Tunisian Campaign.

¹⁶The details of USAF's operations in the first phases of the Korean War are in "USAF Operations in the Korean Conflict, 25 June—1 November 1950," prepared by the USAF Historical Division, Air University, Maxwell AFB, Ala. The story of the USAF's role since 1 November 1950 is presently being written by the Division. For a summary of some of the operations in the first phase, see *Air University Quarterly Review*, etc.

¹⁷See n. 16 above.

¹⁸Col. James Ferguson, Outline of Korean Operations, Special Aspects of Korean Campaign, pp. 19-22.

¹⁹Ferguson, Outline of Korean Operations, p. 11; msg., CG, FEAF to CG, Fifth AF, et al. (A-1131-BO), 18 Sept. 1950.

²⁰Msg., CG, FEAF to Commander in Chief Far East (AX-1666-B), 29 Sept. 1950; msg., CG, FEAF to CG, Fifth AF in Korea, VC-0318, 4 Oct. 1950, and A-1922 B, 5 Oct. 1950.

²¹X Corps, Operations Order No. 4, Annex 5; Air Support, 9 Oct. 1950. See also, msg., CG, FEAF to CG, FAFIK (BC-0318), 4 Oct. 1950.

²²FEAF, Weekly Roundup, 22-28 Oct. 1950; msg. CINCFE to FEAF and Commander of the Navy in the Far East (951-IR-50), 16 Oct. 1950; msg., CG, X Corps to CINCFE (AS-107), 21 Oct. 1950; msg., CINCFE to X Corps (CK-671720), 22 Oct. 1950. For other details of General Almond's interest in controlling tactical air power, see msg., CG, X Corps to FEAF (X-11645), 27 Oct. 1950; msg., CG, X Corps to CINCFE (X-11892), 2 Nov. 1950; msg., CG, FEAF to CG, X Corps (AX-3012 B), 3 Nov. 1950; Ferguson, Outline of Korean Operations, Special Aspects of Korean Campaign, pp. 19-22.

²³Air Force, March 1951, pp. 20, 21; Wayne Thomis in *Chicago Tribune*, 19 Aug. 1950; *New York Journal American*, 3 Oct. 1950; Dept. of Defense, OPI, News Digest Service, 6 Oct. 1950 quoting *Atlanta Constitution* and *Indianapolis Star*; *Washington Times-Herald*, 20 Sept. 1950; *Atlanta Constitution*, 11 Sept. 1950.

²⁴Air Ministry, *Air Power in the Land Battle*, May 1943.

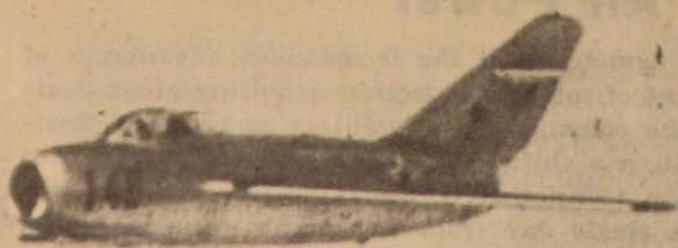
One Air Power

The Korean war has once more demonstrated the tremendous advantages of the use of air forces for attainment of military objectives requiring great flexibility in the concentration and the commitment of military power. The flexibility of air power entails more than a shift in direction, weight, and type of attack from one geographic region to another. Properly employed, air power can be shifted theater-wide in a single day from one major requirement to another—from air superiority to interdiction, from interdiction to close support. Its basic flexibility can be multiplied by diversifying the roles of fighter and bombardment aircraft. Improved crew training, more versatile aircraft, more precise instruments, a constantly expanding range of aerial weapons, and constant adaptation of tactics are increasing every day the overlap in the capability of all types of combat aircraft to attack various kinds of targets. In turn, this wide overlap affords new means of concentration, such as round-the-clock, all-weather bombing of a designated target system; it means that when one type aircraft is assigned a mission of greater priority, another can be shifted to handle the second priority assignment and thus maintain the unremitting pressure for immobilization of the enemy. The greater the capabilities in flexibility and concentration of mass, the more the need for centralized Air command of theater air forces to obtain the most effective and economical application of air forces to all the objectives and commitments of the theater commander, whatever they may be. Evidence has long mounted to support this doctrine—proved valid in World War II—to the point that informed consideration of the command and employment of air forces holds it axiomatic. The following pictures show something of the diversity of the three categories of combat aircraft in Korea: fighter (and fighter-bomber), light bomber, and medium bomber.

The Fighter

Fighter aircraft must have two faces in modern combat. The F-86's lined up for takeoff here are going about their most essential task—achieving and maintaining air superiority. But in Korea the early attainment of this goal and the relatively small subsequent attempts to challenge superiority gave the fighters early opportunity to turn to their secondary assignments of interdiction and close support. Some radical adjustments were necessary to adapt aircraft to their dual role. The F-80, backbone of the U.N. fighter force in Korea, had been designed as neither fighter nor interceptor, but merely as a production-model jet. Extra-large wing tanks were added to give it sufficient range to operate near the Yalu River from South Korea. Soon it was carrying eight rockets



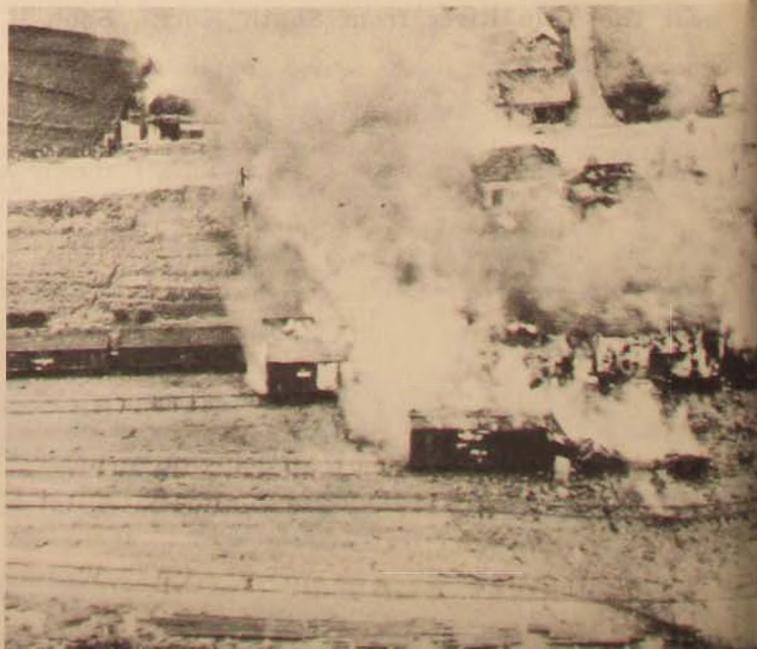


The MIG-15, seen here through the lens of a gun sight-aiming-point camera, is the principal target of FFAF fighter aircraft. Along with its sister ship, the MIG-9, it comprises four-fifths of the 1000-aircraft enemy air force across the Yalu. Its entry into the Korean conflict in November 1950 resurrected the problem of air superiority. The Russian-built jet, described by a veteran American pilot

“second only to the Sabrejet,” had a decided edge in speed over the F-80's. American pilots more than held their own by virtue of superior skill and training, and with the arrival in combat of the Sabrejet (F-86) on 18 December 1950, the MIG-15 had met its match. Through September the F-86's had destroyed 55 MIG's, probably destroyed 8, and damaged 82, against U.N. losses of 5 Sabrejets lost to enemy air action and 9 to other causes.

instead of four, then four rockets and two 500-pound bombs or four rockets and two 110-gallon napalm tanks. In another few months it was hitting special targets with two 1000-pound blockbusters. This case history of the F-80 jet fighter is the rule rather than the exception. The F-84 has also undergone radical transformation and has performed well in support. Only the F-86's have been retained purely in the capacity of interceptors, since their low-altitude characteristics make them less suitable for interdiction and close-support work than other fighters. Piecemealed air power could not make this deployment.

In the periods when air superiority was virtually unchallenged, the fighter assumed its second role—its most active in the peculiar Korean war—of fighter-bomber. First emphasis was placed on interdiction. Armed with rockets, bombs, and napalm tanks in addition to the usual complement of machine guns, U.N. fighter-bombers streaked over the North Korean countryside, searching for enemy troop concentrations, convoys, trains, tanks, and accumulations of supplies. Targets such as bridges and large marshalling yards were usually left to the shattering attentions of the B-26's or B-29's. These burning boxcars shown in the marshalling yard near Suwon, just south of Seoul, were rocketed and gunned by F-80's on 15 July 1950. In the first year of hostilities such strikes by FFAF aircraft cost the enemy 893 locomotives and 14,200 railroad cars destroyed or damaged.

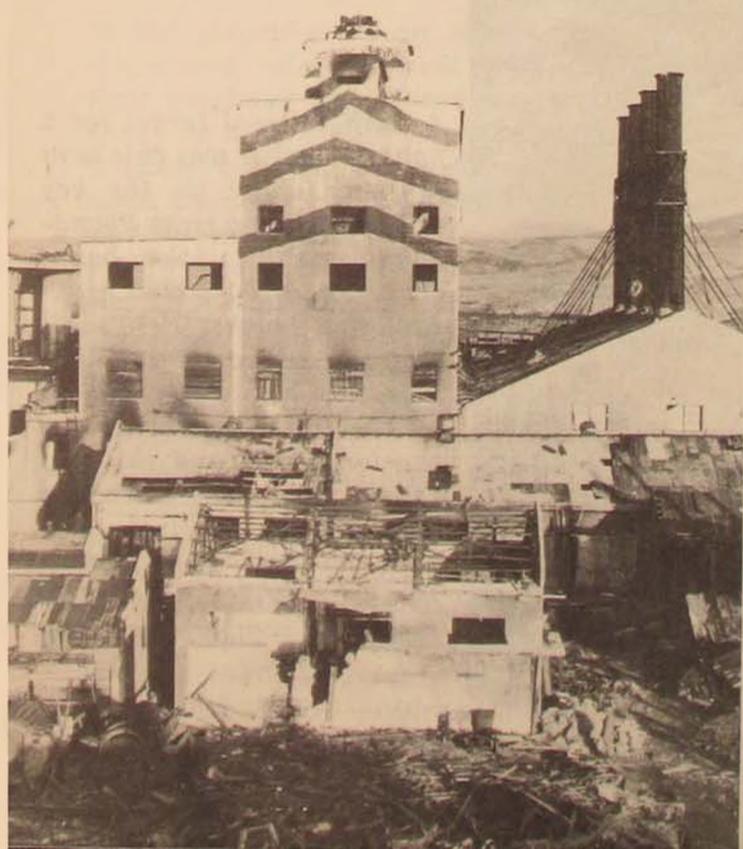


Another part of the fighter-bomber interdiction campaign was attack of troop concentrations and storage areas wherever they could be found. Here a Sabrejet returning from a bomber-escort mission has sighted a Communist supply dump and barracks and is peeling off for a strafing run. A few seconds after this picture was taken, one storehouse burst into flames as the Sabre's bullets ripped into ammunition that never reached the front, because of an aircraft intended for interception.



A more unusual target for a fighter-bomber was this twin railroad tunnel on the key railroad leading from Pyongyang south to the battle zone. Using 500-pound high-explosive bombs, F-80's effectively sealed off the tunnels. Two bombs were placed on the track at each end of the far tunnel and the near tunnel roof was caved in with a bomb hit just above the entrance. This fighter-bomber strike saved the medium bombers a trip.

In the fall of 1950 the pellmell retreat of the North Korean forces and the following intervention of the Chinese Communists turned the main fighter-bomber effort to close support. Guided to their targets by forward air controllers on the ground and by Mosquito spotter aircraft, the fighter-bombers often teamed with light bombers to eliminate enemy strong points, smash troop and tank concentrations, and generally soften enemy resistance. Here against a background of smoke from previous strikes, an F-80 banks sharply for another pass at Communist strong points. Early doubts as to the effectiveness of the speedy jets in such operations soon disappeared in the face of their overwhelming results. Particularly efficient was the command system in which the Joint Operations Center swiftly coordinated requests for air support from all sources, yet retained the great benefits of over-all Air Force command of air power.



Even the North Korean civilians were impressed at this display of fighter-bomber striking power. Inhabitants of Kilchu made quite a point of the fact that "small birds" had wrecked this large paper pulp plant, not the "big birds" which had demolished the marshalling yard across town. The crude attempt at camouflage (seen on the wall of the center building) failed as fighter-bombers poured rocket fire into the plant, tearing gaping holes in the reinforced-concrete walls and gutting the interior of the buildings with raging fire. The maze of twisted wreckage in the foreground shows the condition of the plant equipment when it was cleared out after the raid. This is another example of the wide range of targets opened up to the potent fighter-bombers by merging speed and flexibility with more powerful weapons.



The impressive array of destructive weapons pictured here is the normal load for a B-26 on a combat mission: 28 100-pound bombs, four 110-gallon napalm tanks, and about 6000 rounds of .50 caliber ammunition to feed the 14 forward-firing and two turret machine guns. Other size bombs can be substituted to fit the requirements of the target, and rockets can be added.

The Light Bomber

The light bomber has been a most versatile air weapon in Korea, operating far into the normal provinces of the smaller fighter-bombers and the hefty medium bombers. Its complex of weapons, plus the speed and maneuverability of the aircraft, enable the light bomber to stop short only of fighter interception on the one hand and of large-area bombing on the other. Its newest success has been night interdiction and support against an enemy already unable to move by day.

This enemy marshalling yard at Masan-ni is shown midway in receipt of the full treatment by B-26's on 13 May 1951. The cars on their sides testify to the accuracy of bombs already dropped. The smoke blanketing the center of the picture comes from the rocket attack now under way. After this attack, the light bombers chewed up the area with numerous strafing passes, and then fired the remains of their target with napalm bombs. The B-26's were equally effective in night flaredrop attacks, with B-29's and, later, C-47's overhead dropping parachute flares to illuminate interdiction and close-support targets for the hedge-hopping light bombers. These joint operations, involving aircraft based hundreds of miles apart, derive their great precision from centralized command over all aircraft in the theater.



Small bridges have been particularly susceptible to B-26 attack. Using high explosive bombs and parabombs, some of them with variable-time fuses, the light bombers quickly became proficient in destroying the innumerable small spans bridging the



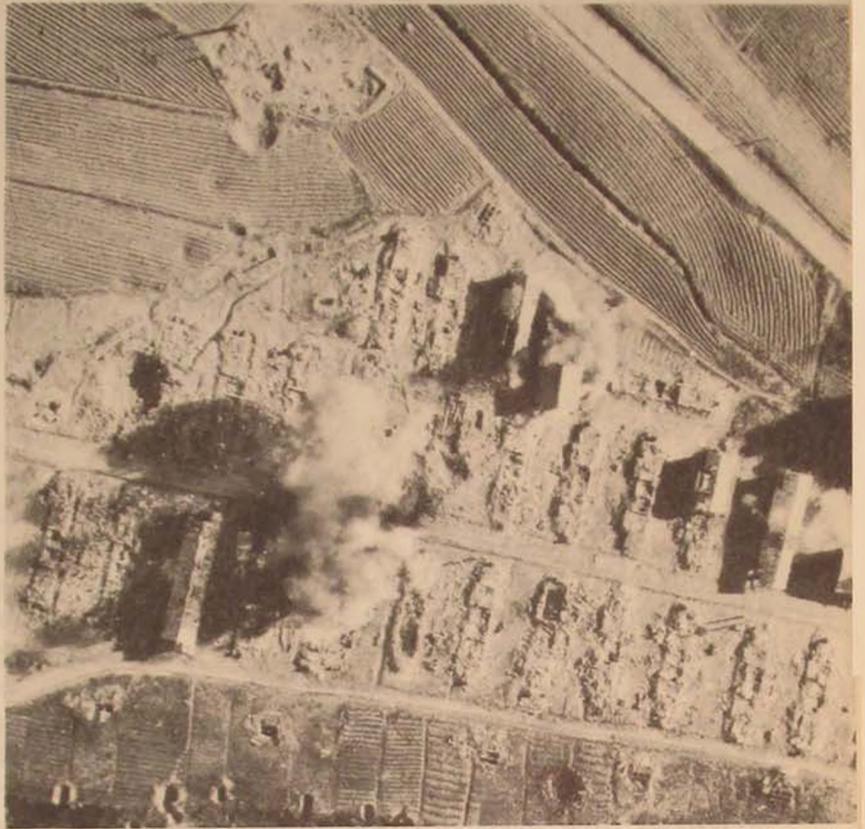
streams and valleys of the rugged Korean landscape. This remarkable photograph, taken in June 1951 by an aerial gunner in a B-26, shows a North Korean train plunging through a bridge which has just been bombed. By 20 June the interdiction campaign had been such a success that the North Koreans were moving almost entirely at night, so the B-26's were converted to night operations to continue the good work. Light-bomber attacks on this type target were frequently supplemented and coordinated with those of the fighter-bombers.

Napalm has given the B-26 a more effective weapon than the fire bomb for use against closely-packed buildings. A napalm bomb will cover an area 275 feet long and 80 feet



wide and burns at 1500 degrees. In March the torch was applied to a large barracks area near Wonsan. When the flames died down, half of the buildings were gone. In addition to casualties inflicted in the attack, the systematic attrition of shelter has created a serious housing shortage for the enemy and has intensified for him the difficult problems of reinforcement and redeployment of his troops.

Four burning buildings and one burned-out hulk are all that remain of this thirty-building storage area near Sukchon after attacks by Fifth Air Force B-26's. The attack on 1 May with incendiary and fragmentation bombs finished the job. This phase of the interdiction campaign was a carefully-mapped corollary to the strikes on bridges, convoys, railroads, and industrial targets, all with the same ultimate purpose—to keep enemy supplies and troops from reaching the front. Interdiction campaigns were organized by priority areas, each zone to be thoroughly demolished by attacks from all types of aircraft before a zone of lesser priority was taken up. Concerted, sustained attack by every available aircraft on an integrated target system within a delimited area is the surest means of choking the enemy resupply effort.



Frequently teaming with fighter-bombers, the B-26 has been much used for close support on both day and night missions. Here an enemy-held ridge is seared and smoking after a combined fighter-bomber and light-bomber attack. These troops too well entrenched to be vulnerable to rocket and machine gun fire were burned out of their positions by napalm. It is conservatively estimated that this aerial smashing of enemy troops from the Yalu to the front lines has killed a minimum of 120,000 enemy troops, with no attempt to estimate the number of wounded or desertions in consequence of air attacks.





Over the eroded hill-mountains of North Korea, B-29 mediums level off on 4 December 1950 to drop 32 tons of fire bombs on the North Korean supply and communications center of Anju.

The Medium Bomber

The B-29 completes the Air Force combat team in Korea. No corner of enemy territory is so remote as to be safe from the relentless pounding of its nine-and-ten-ton bomb loads. The long-range destruction of North Korean industrial potential, the original requirement for the medium bomber in Korea, was begun on 13 July and completed by 15 September 1950. During those two months the B-29's flew 4600 sorties and dropped 30,000 tons of bombs, with a loss of four aircraft, and only two of those to enemy action. Even during this period the medium bombers were participating in the interdiction program, and after the bulk of North Korean war-supporting industry had been neutralized, they turned the full weight of their massive power to interdiction. The Yalu River bridges, the Han River bridge complex at Seoul, and key marshalling yards and supply centers were high on the list of targets. New radar equipment and new techniques combined to make the B-29 a precision bomber in a way its predecessor, the B-17, had never been and paid dividends in limited-area bombing and in close support. Weather stalemates such as the one which grounded the Eighth Air Force B-17's and B-24's during the early part of the Battle of the Bulge now belong largely to the past, thanks to new radar devices. Bombing through overcast and enemy smoke screens with the precision of daylight attacks is now a normal capability.



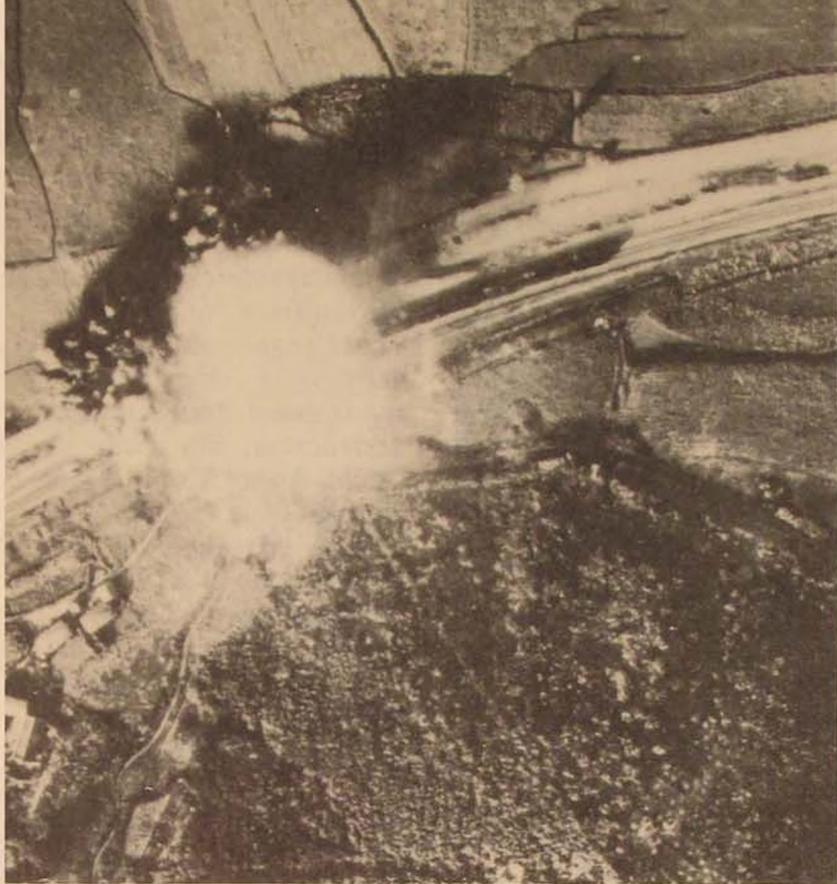
A routine mission for the B-29 is this March raid on a straggling barracks area in snow-covered mountains near Tokchon. Crossing the target in waves, the bombers first dropped high explosive patterns, then finished off the wreckage with fire bombs and incendiary clusters. All types of combat aircraft were used against barracks and supply centers in strikes tailored for economy of force.



All seven spans of this concrete-and-steel bridge across the Han River are down as the result of repeated B-29 strikes. Experience showed that the indefatigable enemy, with his swarms of workers, would soon repair a bridge with only one or two spans down. But complete destruction meant he would have to build an entirely new bridge. The shore approaches upstream from the main bridge indicate that a bypass bridge was at least begun, but it too has disappeared. Similar attacks on the Yalu bridges were made possible only by fighter escort, delicately timed joint operations requiring precision control by central air command.

On 16 August 1950 FEAF Bomber Command launched its most spectacular close-support operation of the Korean war. At the request of the Army, then hard-pressed within the Pusan perimeter, 98 B-29's dropped more than 850 tons of bombs in a saturation attack near Waegwan. There, in approximately three and a half by seven and a half miles of hills and valleys, an enemy build-up of 40,000 men had been reported. Dividing the area into one-mile squares with a central aiming point in each square, the bomb groups plastered the rugged terrain. Even in a mass operation over such a large target area, the bombs were carefully placed. Notice in the picture how the main weight of these bomb bursts is at the head of the little valley and comes down the trough into the fields. Paralleling the main course is a stick of bombs down the backbone of each flanking ridge. B-29's were later used in precision close support, particularly at night in conjunction with B-26's. A system of detonating 500-pound fragmentation bombs over the heads of enemy troops has been particularly effective. Night operations of this nature have been conducted as close as 400 yards from our own lines.





The effectiveness of B-29's as precision bombers is dramatically portrayed, as Superfort bombs strike a North Korean ammunition train on the line between Sinanju and Pyongyang, 20 September 1950. The brilliant flash is the secondary explosion as the loaded boxcars begin to explode like a string of firecrackers. Although this type of target is normally reserved for the versatile, low-flying fighter-bombers and light bombers, everything of military value is considered as a target of opportunity.

A further example of the pinpoint accuracy of B-29 bombing is revealed in this smash at the vital highway junction at Pyongtaek on the Seoul-Taejon highway. The bombs began hitting on the hillside and bracketed the road junction, the last bomb exploding some fifty feet beyond the road. The blinding secondary explosion at the point of the road intersection was produced by stored ammunition or gasoline. Although such strikes can cause only temporary delays, the immobilization of a critical highway even for a few days can disrupt an enemy's timetable, particularly in a country like Korea, where the scarcity of first-class roads makes alternate routing seriously difficult. Large high-explosive bombs are required to obliterate such a target, and the B-29 medium bomber was the logical aircraft to carry the big load. Continued expansion of overlap in capability among various types of combat aircraft means that no enemy target will be unmolested and that air commanders will have more varied, more efficient, and many times more powerful air weapons to pound the enemy.



Human Factors in Jet Bomber Operation

D. C. HEIMBURGER

RESearch in the the Aero Medical Field has solved or made large steps toward solution of many aircrew problems which arose during and since the last war. Its contributions have encouraged advancement of the aeronautical sciences by forcing recognition and solution of aircrew problems in high-performance aircraft.

The advent of turbojet power, while it has not introduced many entirely new human problems, has intensified some of the old ones—particularly those dealing with speed and altitude. The best range and efficiency of jet airplanes are obtained at high altitudes and high speeds. Hence normal operation is becoming commonplace at altitudes of 35,000 feet or higher and at true speeds in excess of 500 miles per hour.

Jets offer marked advantages to the aircrew. Among the most impressive are the almost complete lack of vibration and greatly diminished cabin noise, both of which are important in reducing crew fatigue. The basic simplicity and increasing reliability of jet engines permit less-cluttered cockpit arrangements and definitely reduce, in comparison with reciprocating engines, the time, effort, and diverse knowledge required to monitor and operate them. The present difficulties of interception of jet bombers may lessen the number and duration of actual combat encounters, particularly when the bomber's speed is taken advantage of in night, adverse weather, or feinting types of surprise attack.

Aircrew problems peculiar to, or intensified by, the jet bomber tend to offset some of its advantages. Its smaller crew is the result of the jet's simplicity and of automatic or semi-automatic equipment. For example, the B-29 Superfortress carries a crew of eleven or more, the B-47 Stratojet, which is of similar size, three. This reduction indicates not only a wider field of specialization in the B-47 crew member with less overlapping of duties but even closer teamwork, since each man carries a work load shared by almost 4 men on the B-29 crew. The problems associated with accurate navigation, bombing, and pro-

tective armament at high altitudes and high speeds demand extremely complicated electronic and mechanical equipment. As the success of the mission is largely dependent upon the proper functioning and operation of this equipment, each crew member must have the inherent technical ability and the training necessary to operate his share of it. This points toward a possible Air Force problem of accurate selection of men who combine adequate native technical ability with the temperament, experience, and other factors necessary to the good jet-bomber crew member.

High-speed flight requires a greater degree of concentration, since many operations are accelerated. More planning ahead of the airplane is necessary, and in cases of malfunction or emergency more rapid reaction and thinking are essential. The "anxiety factor" increases with speed because of this increased metal tension and the fact that chances of successful escape are greatly reduced with high speed and altitude. The rate of jet fuel consumption also contributes pressure on the crew. Range must be achieved by cutting fuel reserves on return well below the standard set for reciprocating engine aircraft. Much of the fuel safety margin is removed.

Because of the rapid fuel consumption and high speed the duration of jet flights has normally been regarded as relatively short. Improved engine efficiency, the advent of larger jet aircraft, and the development of in-flight refueling techniques have made possible flights approaching or bettering in length the longest missions being flown toward the end of World War II. Since little space is available to carry a relief crew—at least in the B-47—the fatigue problem will undoubtedly be acute. Fatigue will be intensified by the nervous strain of the "anxiety factor," the higher degree of concentration, and the discomfort of present flight gear worn for protection, high-altitude and high-speed escape, and survival after bail-out. Fatigue will be lessened by lack of vibration, the low noise level, and the general simplicity of jet engine and airplane operation.

The escape problem is one of the most acute in jet aircraft today and is an increasing restraint on development of advanced high-speed, inhabited aircraft. The skill and experience needed by a jet bomber crewman call for mature individuals, men who will in turn undoubtedly be concerned with satisfactory escape provisions. Since a crew's confidence in an aircraft is strongly influenced by relative ease of escape, and since this

confidence affects the success of missions, escape provisions bear directly on the aircraft's effectiveness.

Most types of high-speed, subsonic aircraft in use today rely on the ejection seat to clear the aircraft. This device has the decided advantage of permitting escape without the crewman having to unfasten harness and leave his seat to get to an exit, which he might find impossible if he is subject to acceleration or "g" loads in a gyrating aircraft or if time is short in a sudden catastrophe. The ejection seat has been used successfully at quite high speeds but probably will be limited to speeds under the sonic range. It has the mechanical questionability of any such device, and in some installations it requires several steps preparatory to actual ejection of the seat.

Escape hatches with a large airflow spoiler to allow a man to clear the hatch before being struck by the full force of the air stream, are also being applied to jet aircraft. They have the advantage of providing for the escape of a greater number of crewmen at a smaller weight penalty. Location of the hatch to insure escape clearance of airplane structure is difficult in some aircraft, and the upper speed limit on their use may be lower than for the ejection seat.

One problem that is intensified in jet airplanes, especially on jet bombers with their larger cockpits and multiple crew stations, is the inrush of air when the canopy or escape hatches are jettisoned for evacuation. The circulation of air is apparently influenced by the shape of the cockpit and its resonant volume, as well as by the size of the opening left by removal of the canopy or escape hatch, and of course it varies with air-speed. The exact effects vary widely with different airplane structures, but it can prove to be a serious limitation to the speed at which the airplane can be flown with reasonable assurance of escape.

There are several possible detrimental effects of cockpit air circulation on crewmen, the most critical and disabling conditions varying among crew stations at different airplane configurations and air speeds. The physical force of the airflow can restrict or prevent body movement or prevent the crewman from assuming the erect seated posture necessary with the ejection seat. Rather precise positioning of the arms, legs, and torso is necessary for clearance through the openings provided in most ejection-seat installations.* Fluctuations of air pressure, which feel like vibration or a heavy sound, plus the sheer

*But see "Escape," in this issue, p. 37.

volume of airstream noise, approach unendurability at higher air speeds. The effect on the crewman varies from mild annoyance or discomfort to such extremes at higher speeds as dizziness, a "peculiar" feeling in the chest, a temporary impairment of vision, mental instability or inability to continue rational thinking, or nausea. The nausea has persisted for some time after the experience, the slight dizziness and the "peculiar" feeling sometimes up to two or three days. A milder effect is local skin heating by the air blast and high-frequency air pressure fluctuation, which causes clothing, particularly fur-trimmed collars, to feel "hot" at higher speeds.

Another escape problem made more acute by jet aircraft is imposed by high altitude. Without special devices not commonly used today, escape from altitudes above 35,000 feet would be hazardous, even under the best of conditions. The problem is composed of the two separate yet interrelated factors of extreme cold and low air pressures. Normal solution to date has attempted to equip a free-falling man with sufficient protective clothing, independent oxygen supply, and other equipment to sustain his life momentarily at high altitude. The compromise on equipment is difficult between what is sufficient to sustain life at high altitude but still will not hinder movement or prove too uncomfortable in a warm, cramped cockpit. Although many advances have been made, there is much room for improvement. At the higher altitudes already attained in the operation of aircraft today, a successful bail-out without some sort of protective capsule container for the crewman is problematical.

The severity of the escape problem at very high altitudes and high speeds with present-day escape provisions may be appreciated if one considers the series of crises which must be overcome by a crewman attempting an escape. First he has gone through an extreme emergency which prompted the decision to abandon the airplane. He then must complete a prescribed list of procedures to prepare his equipment for ejection or bailout, missing any one of which may make his escape a failure. Jettisoning his canopy or escape hatch will be accompanied by nearly explosive decompression, and with it gone he will be subjected to the sudden and severe combined effects of air blast, cockpit air circulation, and extreme cold, any one of which may easily incapacitate him. After ejecting himself or bailing out, he must be conscious long enough to unfasten the ejection seat, deploy his parachute, and finally make a parachute landing. Some devices, such as automatic parachute de-

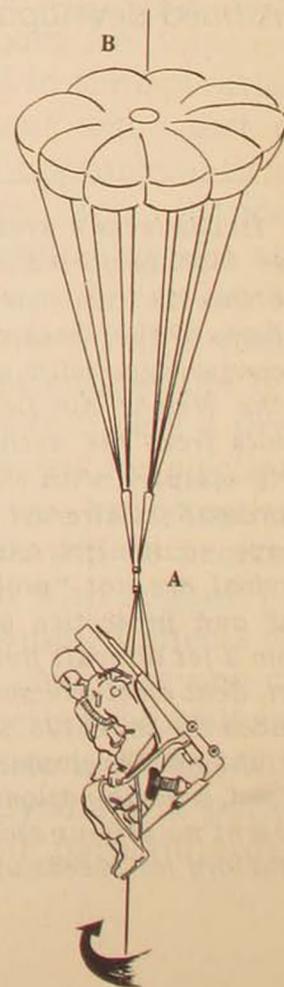
ployment, have been developed to alleviate portions of the problem and are definitely a step in the right direction. Consider, however, the probability recently set forth by Harold Luskin, a Douglas Aerodynamics Research Engineer, in his paper, "Predictions of Supersonic Airplane Performance," that if aircraft performance continues to advance according to past and present trends, the normal probable operating conditions with air-breathing engines in 1960 will be over 1400 miles per hour and above 80,000 feet in altitude. In such a light it appears that basic thinking on the escape problem, as well as on some others, should be revised and that development of escape provisions without the limitations in speed and altitude of those now in use should be strongly emphasized.

Solution of the human problems associated with flight at high speeds and altitudes must precede or, at the very least, parallel the design of advanced inhabited aircraft in order that necessary provisions to accommodate them may be added in the early design stages of the aircraft. This becomes doubly important when it appears that the equipment, particularly that for escape, may be a more integral part of the aircraft than ever before. Aero-medical research and accomplishment must proceed hand in hand with engineering advances to permit continued development in the aeronautical sciences.

—Boeing Airplane Company

MR. HEIMBURGER'S presentation and evaluation of the problems of escape from high-performance aircraft and the psychological effects of such problems on crew members cannot be questioned for its accuracy and realism. While recognizing the existence of these problems, the Editors, in concurrence with qualified personnel of the Aero Medical Laboratory of the Wright Air Development Center, feel that the article's pessimism results from the author's primary concern either with aircraft not properly equipped with the latest escape devices or with aircraft of the future. If present jet aircraft and their crews are provided with the most modern escape equipment and protective body gear, the chances of successful survival are not "problematical" as Heimburger maintains. The ejection seat and protective gear have permitted successful experimental escape from a jet aircraft flying at a true air speed of 555 miles per hour at 10,000 feet. Seat ejections and freefalls have been successfully accomplished at altitudes up to 42,176 feet. In the opinion of Major Vincent Mazza of the Wright Air Development Center, who holds the altitude and airspeed jump record, a combination of 555 miles per hour and 42,176 feet altitude would present no serious escape hazard. He believes present equipment to be satisfactory for speeds up to 600 miles per hour and altitudes up to 50,000 feet.

provided exit from the aircraft is available. Present equipment, he thinks, undoubtedly is adequate for higher speeds and altitudes, but the above mentioned figures are safe limits. Thus any jet aircraft currently used by the U.S. Air Force (other than experimental types) will permit successful escape, if equipped with escape devices. The conditions and factors which would affect escape at speeds well beyond the sonic barrier and at altitudes far above 50,000 feet are unknown. Before equipment can be designed to withstand speeds of 1400 miles per hour and altitudes up to 80,000 feet, in future, the limitations of the human body must be established. Experiments are now underway to determine the maximum which human physiology and mental faculties can endure. Once these limitations, if they do exist, are established, development can progress along definite lines. Experiments now being conducted in the capsule method for individual or crew escape have produced a number of successful preliminary tests. Should physiological limitations preclude the use of the seat-ejection method beyond certain established limits, the capsule may be the answer.—**Editor.**

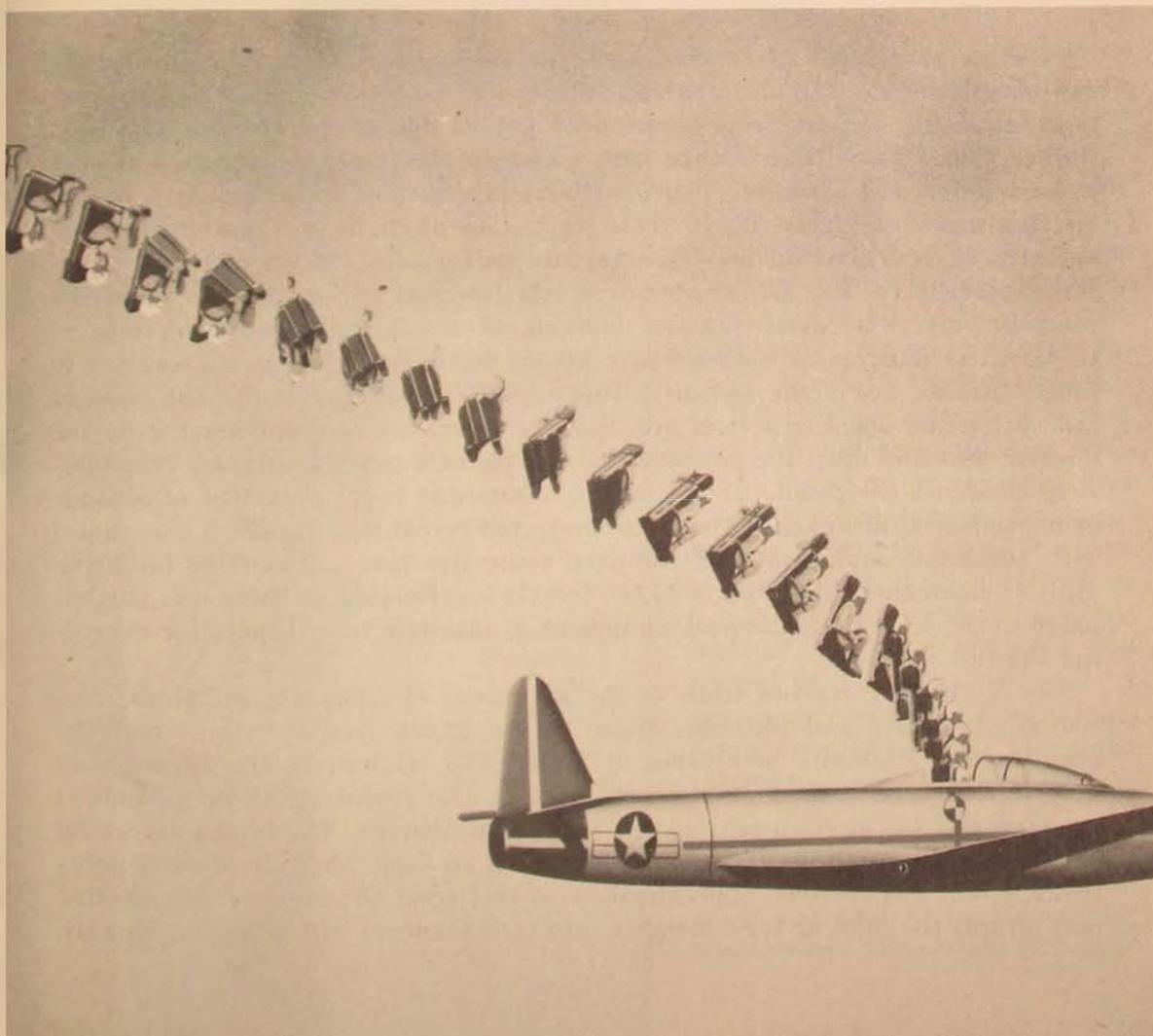


Line-drawing of an ejection-seat descent. The angular position of the chair and an automatic safety belt that opens at a pre-set altitude ensure release of the crew member from the seat. A static line from the seat automatically pulls the ripcord of his personal parachute. The remainder of his drop is then completed by free fall. By means of these precautionary devices unconsciousness or other physical disability will not prevent successful bail out. The swivel "A" between the chair and the shroud lines of the forty-inch stabilization parachute "B" reduces the rapid spinning about the axis of suspension and the resulting nausea previously experienced in ejection seat escapes from the cockpit.

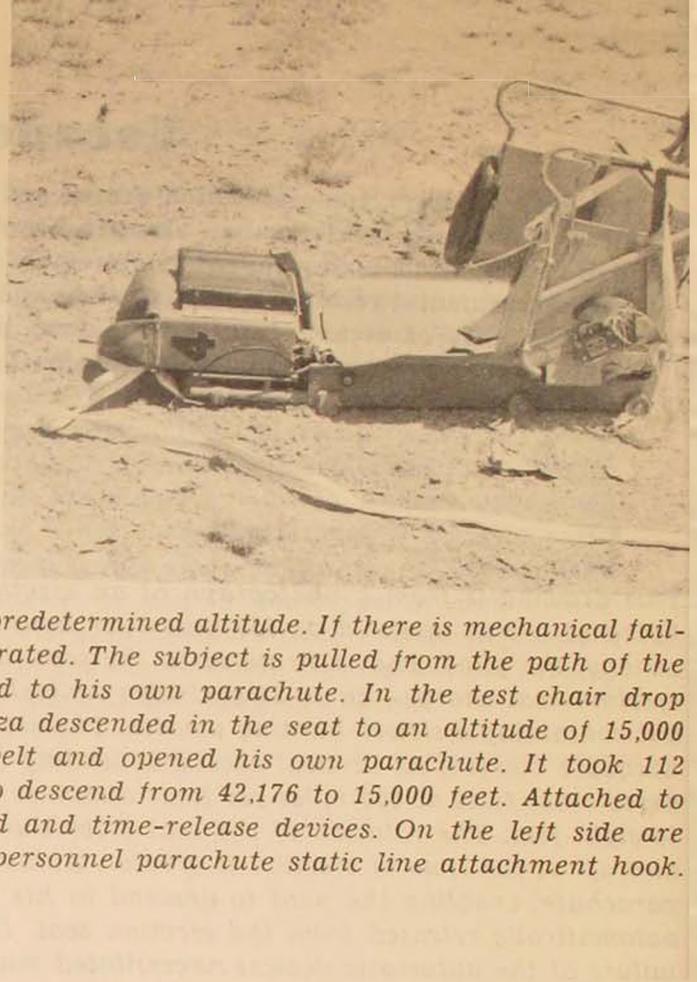
Escape

The many factors, some of which are as yet unknown, which affect successful escape from high-performance aircraft have led to the belief that escape at high altitude and high airspeed is extremely hazardous, if not improbable. Recent experimental results of high-altitude and high-speed bail-outs have proved the feasibility of escape, insofar as human physiology is concerned, and have demonstrated the practicability of automatic equipment for ejection-seat and free-bail-out methods of escape.

This drawing is from a photograph of an ejection-seat escape. The jet aircraft was flying at a true airspeed of 555 miles per hour at 10,000 feet. After jettisoning the canopy, the pilot, who is strapped to the seat, is shot from the cockpit by a special ejection-seat charge—an M-28 cartridge equivalent in charge to a 35-millimeter shell but containing a slower-burning powder. The seat clears all parts of the aircraft with adequate margin, its vertical ascent depending on the size of the powder charge. In three other tests at 600 miles per hour dummies cleared the tail of the aircraft by six to eight feet. The rotation of the seat after the discharge is less as the speed of the aircraft at the time of ejection is greater. Automatic devices release the ejection-seat parachute, enabling the pilot to descend in his seat to a set altitude at which he is automatically released from the ejection seat. In the test pictured here, mechanical failure of the automatic devices necessitated manual control of the entire jump, and proved the possibility of manual escape at high speeds even under adverse conditions.



Technically known as a high-altitude drop vehicle, the apparatus pictured here is the standard high-altitude ejection seat. The compartment behind the head rest houses the stabilization parachute, which automatically opens after the seat is discharged from the aircraft. A swivel between the shroud lines and the static line eliminates the terrific spin the chair previously underwent. Strapped in the seat by a shoulder harness and safety belt, the subject is released from the chair by an automatic device set to operate at a predetermined altitude. If there is mechanical failure, the release can be manually operated. The subject is pulled from the path of the seat by the pilot parachute attached to his own parachute. In the test chair drop from 42,176 feet Major Vincent Mazza descended in the seat to an altitude of 15,000 feet before he released the safety belt and opened his own parachute. It took 112 seconds for the seat and occupant to descend from 42,176 to 15,000 feet. Attached to the back of the seat are the aneroid and time-release devices. On the left side are the controllable drag plate and the personnel parachute static line attachment hook.



Telemetered records of fourteen experimental human tests in high-altitude bail-outs, both free fall and ejection seat, reveal no adverse physiological reactions, although some subjects experienced nausea during the descent. The tests showed that high-altitude escape with standard, developed equipment not only is feasible but can be accomplished without injury. The highest escape was an ejection-seat drop from 42,176 feet. No major physiological disabilities were experienced which would prevent adequate performance of normal and emergency procedures. The minor abnormal physiological effects which caused the most difficulty were disorientation, blurring of vision, and excitement. One of the greatest dangers in high-altitude escape is the inability of the subject to judge distance above the terrain, either visually or by estimating the time of fall. Automatic opening devices are designed to release the individual from the ejection seat and open the personnel parachute at a pre-set altitude. These devices eliminate the possibility of manual failure due to misjudgment of altitude or physiological incapacity. The tests conducted reveal that standard parachutes with automatic equipment and standard protective gear are suitable for high-altitude emergency escape up to 43,000 feet. It is estimated by those who participated in the tests that standard equipment is adequate for altitudes far exceeding the test altitudes.

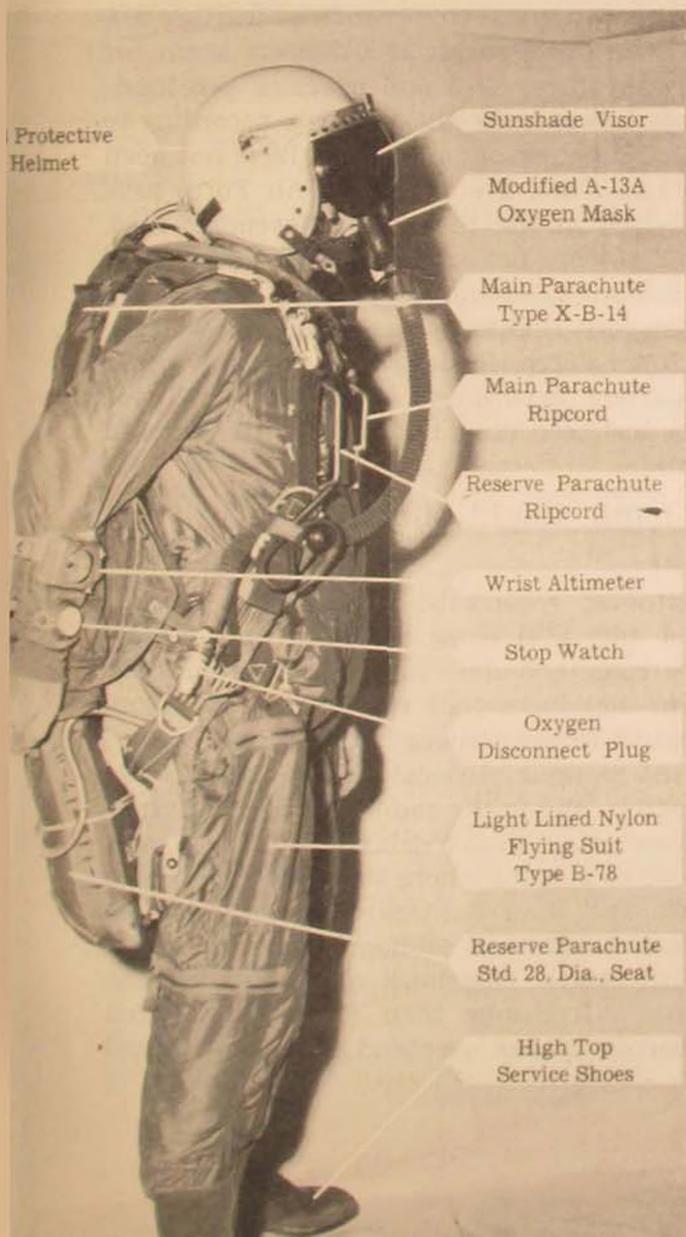
The results of forty-two trials of the automatic ejection seat at speeds from 150 to 555 knots and altitudes from 700 to 38,000 feet likewise reveal the physiological feasibility of escapes at high speed, as well as the adequacy of the ejection-seat method of exit. These tests also reveal that low altitude is more critical for ejection-seat escape than high altitude. The lowest successful jet bail-out on record occurred at 800 feet from an F-86. The full effect of parachute action was received approximately 30 feet from the ground. The ejection seat affords the pilot or crew member safe instantaneous exit from the aircraft.

regardless of adequate preparation or position in the seat. The immobilizing effect of high G-pressure is not peculiar to high-performance aircraft alone. The impossibility of escape from a disabled aircraft in an extreme emergency under high G-pressure is common to the most simple heavier-than-air craft. It is not unlikely that when emergency exit conditions prevail, the aircraft can be maneuvered to a position for proper exit.

Present escape equipment is adequate for current jet operational limits, provided that the aircraft is designed for and is equipped with the proper devices for exit. Development of equipment for escape at speeds exceeding Mach 1 and altitudes approaching 100,000 feet depends upon human limitations. Experiments are now underway to establish those limitations, if they do exist, and successful preliminary tests of devices for escape at supersonic speeds have been made.

Tests by Major Vincent Mazza and other qualified personnel of the Aero-Medical Laboratory have proved that the equipment pictured here, with the addition of gloves, is adequate for safe escape at speeds up to 600 miles per hour and altitudes up to 50,000 feet and that it also would very likely suffice for higher speed and altitude limits. Oxygen is vitally necessary, and as long as the escaping crew member has oxygen, altitude is not a critical factor in his escape. Since a pilot can survive a jump

from 30,000 feet without oxygen and an H-2 oxygen bottle is adequate for ten minutes of fall, a bottle of oxygen is ample for any present or near-future operational altitudes. A reserve oxygen bottle is stowed in the cushion on the seatpack parachute. For altitudes well above 50,000 feet heavier protective clothing may be necessary to prevent freezing; Major Mazza felt no sensation of cold during his drop from 42,176 feet. To provide for adequate breathing at extremely high altitudes where barometric pressure is sharply reduced, currently designed partial- or full-pressure suits may become an additional necessity. The critical factor as far as escape at high speeds is concerned, rests in keeping the gear intact. The P-3 protective helmet, if snugly fitted on the head, has passed multiple tests at 600 miles per hour and several at 775 miles per hour. A new type of oxygen hose is now being developed to withstand speeds in excess of 775 miles per hour. With gear kept intact and exit available from the aircraft, there are to date no limitations on speed and altitude maximums for practicable successful bail-outs.



Protective
Helmet

Sunshade Visor

Modified A-13A
Oxygen Mask

Main Parachute
Type X-B-14

Main Parachute
Ripcord

Reserve Parachute
Ripcord

Wrist Altimeter

Stop Watch

Oxygen
Disconnect Plug

Light Lined Nylon
Flying Suit
Type B-78

Reserve Parachute
Std. 28. Dia. Seat

High Top
Service Shoes

Air Force Psychological Warfare in Korea

W. PHILLIPS DAVISON

IF a foreign power were to send two agents to investigate Air Force psychological warfare in Korea and if these agents worked completely separately, it is quite possible that they would submit very different reports.

Agent A, for example, might report as follows:

The U.S. Air Force in the Far East has contributed very little to psychological warfare in the Korean war. Indeed until November 1950 only one Air Force officer was engaged in psychological warfare activities in the theater. Policy and operations of this branch of warfare are in the hands of the Army. The Air Force serves as a delivery agent for dropping leaflets prepared by the Army G-2 and operates two loud-speaker aircraft. These aircraft, however, fly missions only according to Army instructions and the Air Force personnel in them have not been trained in psychological warfare. When five additional Air Force psychological warfare officers arrived in the theater in November 1950, two were assigned to work with Army headquarters. The other three remained in the Far East Air Force Headquarters but at such a low level that their influence was very slight. No psychological warfare officer could be found at Fifth Air Force Headquarters or at any other Air Force operational headquarters. Accordingly it must be concluded that little work of importance has been done by the U.S. Air Force in this field of activity.

Agent B, on the other hand, might submit a report along the following lines:

The U.S. Air Force has achieved remarkable successes in psychological warfare in Korea. The fact that these successes were largely unexpected by the Air Force command does not detract from their significance or from the harm they have done the Communist cause. Air attacks on Chinese and North Korean troops have had psychological effects almost as important as their physical effects. Planes have caused Communist units to scatter, and in the course of dispersal many of the men have deserted. These attacks have delayed, terrorized, and disorganized units on the move to a point where their schedules have been seriously interfered with and their fighting qualities impaired. After air attacks many Chinese and Korean soldiers have surrendered rather than face another such attack. One must also note that the resolve of the South Koreans to continue their struggle has been stiffened by the sight of friendly planes overhead and that United

Nations troop morale has benefited greatly from the air support the ground forces have received. Indeed it would probably not be too much to say that if it had not been for the psychological effects of air activity in Korea the United Nations troops would have long since been pushed into the ocean.

The important thing about these two hypothetical reports is that both are substantially correct. If one considers that psychological warfare is only a matter of dropping leaflets, making radio broadcasts, and operating loudspeakers, then the Air Force contribution in Korea has been very modest. If, however, one includes as part of psychological warfare the use of weapons to achieve beneficial psychological results—and it is the contention of the writer that one should—then the contribution of the Air Force has been very large. Contributions under both definitions could have been greatly increased by more advance planning, additional technological development, and more adequate organizational arrangements.

During most of the war in Korea conventional PW (psychological warfare) operations were directed by the PW branch of G-2, Far East Command. At Eighth Army and X Corps, PW staff officers were the link between the operational forces and higher headquarters. In February of 1951 a special psychological warfare staff section at Eighth Army headquarters was established, and the number of PW officers at Corps and Division headquarters was increased. Finally, in June 1951, PW was raised to a special staff section at GHQ in Tokyo as well.

Principal energies of PW personnel in the Far East have been devoted to the dissemination of psychological warfare leaflets, the broadcast of radio programs to Korea, and the operation of both airborne and ground front-line loudspeakers.* Preparation of strategic leaflets has been handled chiefly by Army headquarters in Tokyo. The usual procedure has been as follows: PW officers in the field decide that a leaflet drop in a given sector would be advantageous. They telephone the psychological warfare office in Tokyo, stating in general the content they think would be desirable and the area in which the leaflets should be dropped. PW personnel in Tokyo either take the leaflets out of existing stocks or have them printed to fit the occasion. From the printing plant they are taken to airbases and loaded into aircraft which either drop them as directed or transship them to Korea to be dropped by Korea-based aircraft. As the war has gone on, more and more of the tactical leaflets have been prepared at Eighth Army headquar-

*For a preliminary account of Army psychological warfare operations in Korea see "Psychological Warfare in Korea—An Interim Report," *Public Opinion Quarterly*, Spring, 1951.

ters in Korea. All told, one half billion had been disseminated by the end of June 1951, or nearly twenty for every man, woman, and child in Korea. Both loudspeaker aircraft and mobile ground loudspeaker units perform missions at the request of PW officers at army, corps, and division headquarters. Radio, on the other hand, has been directed by psychological warfare headquarters in Tokyo.

All psychological warfare media have achieved results, some more substantial than others. Interrogation of enemy prisoners has shown that approximately one out of three has been in some degree influenced to surrender by PW leaflets. Interrogation of civilians in North Korea and those parts of South Korea which had been occupied by Communist forces has shown that the radio programs also reached a considerable audience and served to fan civilian opposition to the Communist regime. Surrenders in response to loudspeaker appeals have been fewer but sometimes extremely dramatic. In one case a group of four trucks and several hundred enemy soldiers obeyed the instructions of a loudspeaker aircraft to reverse their direction and proceed down a road to a point where they were taken into custody by advancing United Nations troops.

The primary contributions of the Air Force to conventional psychological warfare in Korea have been the provision of aircraft for dropping leaflets and the operation of two loudspeaker aircraft. Because of the shortage of aircraft at the outset of the Korean war only two or three leaflet missions per week could be flown, but this number has increased, so that by the spring of 1951 missions were scheduled for almost every day of the week. At first C-47's were ordinarily used to distribute leaflets over territory held by the United Nations, while B-29's dropped them over enemy-held territory. Later, C-47's assigned to Fifth Air Force in Korea did the bulk of the job over enemy-held territory as well. The two loudspeaker aircraft were assigned to the Far East Air Materiel Command but were also operated by the Fifth Air Force.

The Far East Air Forces made some less formal contributions to psychological warfare. In November 1950 three Air Force officers were made available to the G-2 PW Branch, and from that time on they played an important part in the operations of the Branch. The PW officers who remained at Headquarters, Far East Air Forces, contributed a considerable number of ideas, although their low organizational position made implementation difficult.

More important were a number of spontaneous attempts at

psychological warfare made by Air Force operational personnel, since these may foreshadow future developments. Unfortunately most of these attempts have not been recorded, but a few examples may be given. On 1 October, for example, a Mosquito pilot noted a group of about two hundred persons ten miles northeast of Kunsan. Some of these were in uniform and some in civilian clothes. The pilot dropped a message to them in an improvised container, saying that if they wished to surrender they should go to the top of a nearby hill and wait until United Nations troops arrived. A second message was then dropped, instructing the men to throw away their arms and wave flags if they accepted these terms. Soon after this message was picked up, several flags were seen waving on the hill. The Mosquito pilot notified the ground controller in the area that troops should be asked to go forward to take the prisoners. This was done.

On another occasion no messages were used. The aircraft succeeded in demonstrating by a succession of passes what action was desired. A Mosquito flushed an enemy T-34 tank by a very low pass and forced it out on an open road. Then, with the assistance of a flight of four F-51's, the Mosquito forced the tank to back up to United Nations lines, where it was captured intact with its crew.

Other Mosquito pilots experimented with various types of noisemakers on their planes to terrify enemy troops, but these attempts had to be given up because of the lack of technical research and development facilities.

RECENT investigations in Korea have shown that even without intending them the Air Force has achieved very impressive psychological effects. Some of these may be described briefly.

When the mechanized North Korean Army plunged southward in June 1950 and the weak South Korean forces, without heavy equipment, reeled back, South Korean leaders were deeply discouraged. They had no thought of giving up, but they felt that the best they could hope for would be immediate withdrawal to a small enclave toward the tip of the peninsula, there to attempt a holding operation. American military advisers, on the other hand, felt that time to bring up sufficient military forces could be gained only if the South Koreans delayed the enemy by a fighting withdrawal. While this decision was in the balance, American aircraft appeared and dealt several heavy blows to North Korean armor near Seoul. Encour-

aged, and realizing that they were not helpless in the face of the superior North Korean ground forces, the South Korean leaders decided to hold the Han River line as long as possible. One diplomatic observer on the spot said that in his opinion the United Nations would not have been able to stay in Korea at all if it had not been for the activities of the Air Force in the early days of the war.

The South Korean masses were similarly encouraged. The appearance of friendly aircraft gave them hope of ultimate victory. Many of them waged underground resistance against the Communists, avoided Communist military service, or went into hiding because of the activity of United Nations planes. Many South Koreans in territory occupied by the Communists said later that they waited impatiently for the planes to appear each day. If the planes did not appear, then the local people feared that the war might be going against the United Nations. Civilians were also aware that the Air Force sought to avoid attacking purely civilian installations. A number of precision attacks on factories and military equipment in which surrounding civilian houses were not damaged impressed them greatly, and, together with the U.N. radio and U.N. leaflets warning Koreans to stay away from military targets, convinced them of the good will, as well as the striking power, of the Air Force.

Air activity likewise exerted powerful psychological effects on enemy troops. It is difficult to disentangle the psychological effects completely from physical effects, since the two go hand in hand. Nevertheless a few of the outstanding may be mentioned. Air attacks on enemy units greatly frightened the soldier. In turn his fright contributed to disorganization of his unit and to wide dispersal of troops seeking cover. Disorganization and dispersal, in turn, led to ease of desertion. Of two hundred North Korean prisoners who were questioned, forty-three per cent said that desertions occurred in their units during air attacks. Some units lost more men through such desertions than by casualties from air ordnance. United Nations air activity also induced a feeling of powerlessness in many enemy soldiers, so that they were unwilling or unable to continue their activities when aircraft were overhead. It was found that air activity frequently inhibited the fire of enemy ground troops and thus took the pressure off hard-pressed United Nations ground forces.

Finally air support contributed greatly to the morale of United Nations troops, even when no actual physical assistance

was given. Several highly-placed officers commented on the benefit of the Waegwan carpet bombings to the morale of the friendly ground forces who saw the action. Other instances have been reported of ground units who did not feel able to advance in the absence of air support and which went ahead without difficulty as soon as friendly aircraft were overhead. A large proportion of United Nations soldiers who were questioned about the effects of air support made such statements as, "It helps you get going," or "It lets you get started."

THE chief reasons why the Air Force did not play a more active role in conventional psychological warfare in Korea are twofold: first, the organizational conditions for a major Air Force contribution did not exist; second, there were extensive shortages in materials, equipment, and personnel.

The principal organizational difficulty was beyond the control of the Air Force itself. In the Far East Command no joint staff existed. Consequently psychological warfare activities could not be executed on a truly joint basis at the highest level. Furthermore, until the spring of 1951, official channels between psychological warfare officers in FEAF and their opposite numbers in the Army were difficult and time consuming because of the relatively low positions of PW sections on either staff. As a result, communication between the two groups of specialists was frequently very informal and tenuous. Furthermore during the first nine months of the war the Air Force personnel were assigned to Intelligence, when in fact their principal concern was more closely allied to operations. In the spring of 1951 the organizational conditions for Air Force psychological warfare were considerably improved with the assignment of the small group of PW officers in FEAF to the Directorate of Operations. In the opinion of the writer the ideal organizational position for psychological warfare in a theater is that of a staff section in a joint headquarters, with direct technical channels authorized to PW officers in all services at lower echelons.

The effects of shortages in equipment and personnel were apparent. At the outset of the Korean war there were only two officers with psychological warfare training in FEAF. One of these was assigned to other duties. Additional personnel did not arrive until November 1950. As of July 1951 no psychological warfare personnel had become active at Fifth Air Force headquarters or at lower Air Force echelons.

Technical improvement was also needed. The leaflet bombs used for dissemination proved extremely unreliable. Over one-

third failed to open. The supply was inadequate and actually ran out at various times. Leaflet coverage was consequently far less thorough than it might have been. When leaflets were disseminated from C-47 aircraft, they had to be thrown in bundles through the hatch and the action of the slip-stream relied upon to remove the outer wrapping and scatter them. Besides being inaccurate, this procedure was wasteful and dangerous. A great many leaflets blew back into the aircraft, almost blinding the men who were trying to throw them out. A chute for the dissemination of leaflets from cargo aircraft was developed by FEAF PW officers, but as far as the writer knows it was never put into operation.

The Air Force had also failed to develop loudspeaker aircraft before the Korean war. The two which were finally put into service were C-47 aircraft which had the loudspeakers mounted to project slightly from the doors. They pointed at a forty-five degree angle toward the earth when the plane flew straight and level. This arrangement proved to be unsatisfactory. To point the speakers directly at the ground, the planes had to circle at low level—an extremely dangerous procedure. In January 1951 PW officers at FEAF attempted a remedy by mounting the speakers on the bottom of the planes but were unable to secure the necessary priorities to have the job done. In May the speakers were moved to the bottom of the planes, with considerable increase in efficiency.

Provision also might have been made for tactical aircraft to play a large part in psychological warfare. Examples of successful PW by Mosquito pilots have already been given. If such efforts had been systematically planned, it is likely that the results would have been multiplied many times over. On several occasions bodies of troops decided to surrender after being exposed to one air strike and threatened with another. Here again the systematic use of the threat of air attack might have led to an increased bag of prisoners. Just as loudspeaker appeals combined with the threat of artillery bombardment were found useful in undermining enemy morale and bringing about surrenders in World War II, appeals by leaflet or loudspeaker aircraft combined with the threat of air strikes can produce valuable psychological results. By April 1951 PW personnel in the field were attempting to make greater use of tactical aircraft in PW, and additional efforts were being made to coordinate leaflet drops, loudspeaker missions, and tactical air missions.

The writer feels that psychological warfare is not only an operations function but also a staff function. In addition to

conducting leaflet, loudspeaker, and radio operations the PW officer should be able to advise those in charge of other military operations about the probable psychological effects their operations will achieve. He should also be able to suggest ways to increase desirable psychological effects and to minimize undesirable effects. The psychological effects of weapons and tactics are particularly important in air operations. Those who have seen the motion picture *Odette* will recall the strong emotions revealed by the faces of the French guerrillas as an Allied plane came overhead. Similar emotions in unposed situations were seen in Korea. Aircraft and aerial weapons often have the power to arouse more hope in friends and more fear in enemies than the written or spoken word.

One of the most interesting aspects of the psychological effects of air activity in the Korean war is that they were for the most part unplanned and unanticipated. Individual officers and men were aware of them, but very few systematic attempts were made to maximize beneficial psychological effects. As has already been mentioned, the Air Force had no machinery available for doing this. If systematic advantage is to be taken of the psychological effects of air activity, at least three organizational prerequisites are desirable: (1) Machinery should be set up to gather intelligence on psychological effects as they occur. Since these effects will vary with the character of the enemy forces, all necessary intelligence cannot be gathered in advance. There must be continuous review of intelligence during actual operations. (2) Staff officers trained to review this intelligence and make recommendations regarding the conduct of operations should be placed at a sufficiently high level. (3) A procedure should be established for briefing pilots and command personnel at all echelons on how to achieve desirable psychological effects.

AIR activity in Korea has indicated a number of principles regarding psychological effects which will probably hold true in other situations. A few of these may be stated as follows:

1. Visibility of aircraft is very important for favorable psychological effects on friendly leaders, friendly civilians, and allied troops. When aircraft on missions are routed at altitudes or over areas where they are not seen or are seen only at a very great distance, most of the encouraging effect is lost. Some of the early missions which attacked targets north of Seoul were not seen from the South Korean capital. U.S. officials there

recommended that future missions be routed over the city to assure the South Koreans of powerful U.N. assistance.

2. In friendly occupied areas little resentment will be felt against an air force or that nation that employs it if the inhabitants are convinced of the military necessity of the attacks and the basic humanitarianism of the air force. Particularly important, a good reputation must be established early in the war. This can be done especially by precision attacks on military installations, by dropping leaflets or giving the inhabitants other warnings to stay clear of possible targets, and by sparing noncombatant civilians whenever possible.

3. Time in the air over the front lines is encouraging to friendly troops. When operational requirements do not make aircraft visible to them, the troops should be informed where the planes are and how they are assisting in the conduct of the war.

4. Even when the physical effects of air attacks on enemy troops are slight, the psychological effects may make the attacks worthwhile, by fostering disorganization, desertion, and delay—especially when the attacks take place at night.

The Korean experience has shown that much work is needed before the Air Force is prepared to play its full role in conventional psychological warfare. The development of a doctrine to provide for the coordination of air strikes with leaflet and loudspeaker missions and with psychological warfare in general would pay handsome dividends. Certain technological developments also are required. Loudspeaker aircraft, the usefulness of which has been demonstrated in an operation of the type in Korea, can certainly be brought more nearly to perfection. Better leaflet bombs are needed. The whole range of psychological "gadgets" for use in conjunction with aircraft remains to be explored systematically.

Even more, the Korean war has underlined the very special role of the Air Force in psychological warfare. With the Army and the Navy it shares an interest in conventional PW—leaflets, radios, and loudspeakers. But it also possesses in the airplane the weapon best fitted to fulfill the broadest intentions of psychological warfare—the bolstering of friendly morale and the destruction of enemy morale. As the Air Force learns, first, to value these potentialities, and second, to harness and channel the effects, its unique contribution to psychological warfare will increase proportionately.

*The RAND Corporation**

*The opinions expressed in this article are those of the author only and not those of the Rand Corporation.

The World Geographic Reference System

WILLIAM E. JOHNSON

A NEW worldwide geographic referencing system, called the "Georef" for short, has recently been adopted by the United States Air Force and is now effective for Air Force use throughout the world. It was developed by the Air War College, Air University, and is described in AF Regulation 96-5 of 19 January 1951.

In dealing with references to location on the surface of the earth, man has always been annoyed by the spherical shape of the globe. A spherical surface complicates the determination of distances and directions. Spherical terms such as degrees, minutes, and seconds are annoying because they do not coincide with normal surface units of measure. Communications and references in latitude and longitude have always been awkward and confusing for several reasons:

- (1) the north, south, east, and west directions involved;
- (2) the dual numeration of latitude N and S from the Equator and of longitude E and W from the Greenwich Meridian;
- (3) the division of the earth into four quadrants, resulting in four different sequences for reading and writing latitude and longitude: first, reading up and right north of the Equator and east of Greenwich; second, reading down and right south of the Equator and east of Greenwich; third, reading up and left north of the Equator and west of Greenwich; fourth, reading down and left south of the Equator and west of Greenwich (see Figure 1).

Related to this is probably the most confusing aspect of referencing by latitude and longitude. From childhood we have developed the habit of reading from left to right. Latitude and longitude referencing, which requires reading latitude first, either up or down, violates this lifelong practice. This interference with habit causes mental confusion, at times affecting even experienced Air Force officers. Still another serious handicap resulting from latitude and longitude referencing is to communications. Here the numerous figures, terms, and directions involved increase the chance of error and misunderstanding, especially under stress of combat.

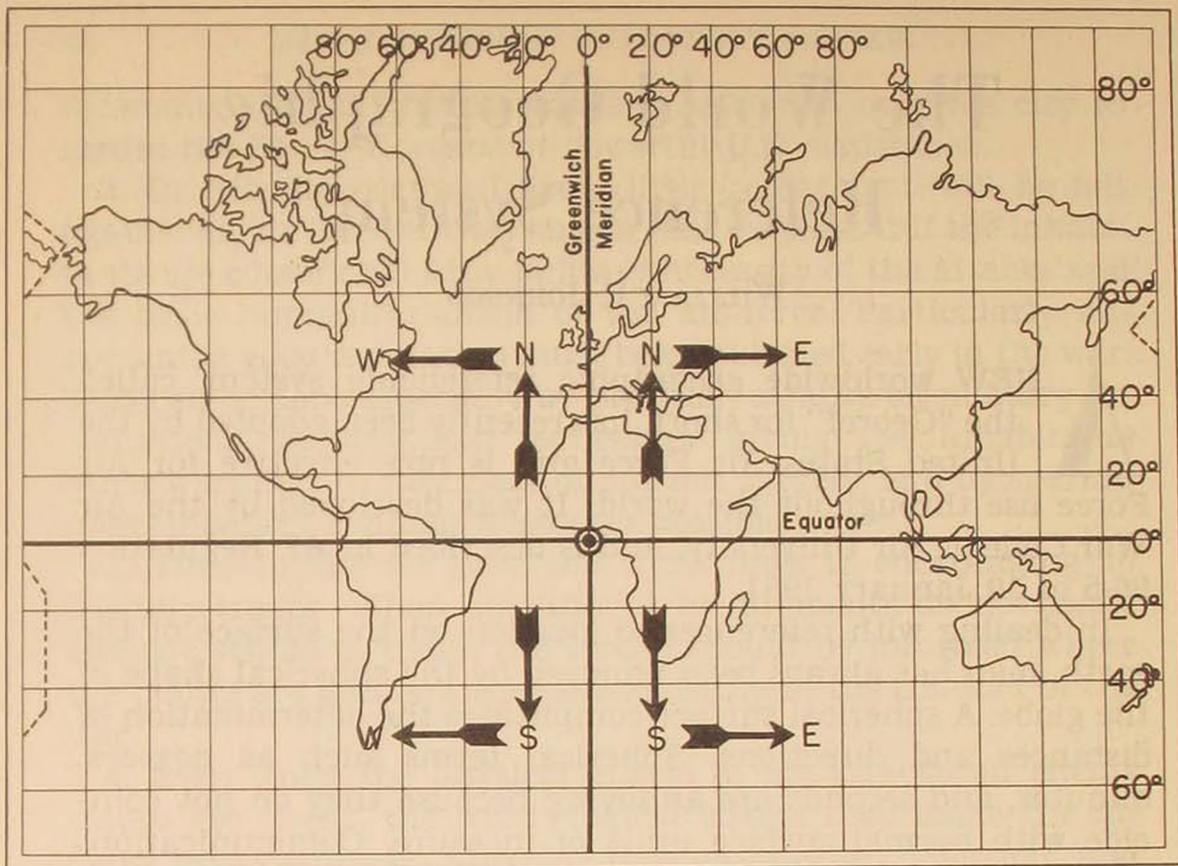


Figure 1: The four sequences of latitude and longitude.—The conventional system of latitude and longitude has characteristics that make it complex, confusing, and cumbersome for military use. It divides the earth into four quadrants, each requiring a different sequence in reading and plotting location, that is, N and E, S and E, N and W, and S and W. This division requires dual numeration of latitude N and S of the Equator and dual numeration of longitude E and W of Greenwich. These characteristics make latitude and longitude especially conducive to errors when military operations fall across the zero base lines and when all the quadrants are involved as occurred in World War II. Another source of confusion is our normal habit of reading from left to right, whether we read text, scales, or instrument dials. This habit makes us want to read latitude, the first factor given, to the right. Thus it may be confused with longitude.

Such considerations as these led the French to develop a rectangular grid system during World War I for the control and direction of artillery fire and for general use of their military forces. This was the perfect solution of the World War I problem of distance and direction referencing within the relatively limited area of France. It was ideally adapted to World War I conditions of a war of position over a fairly limited and highly surveyed area. A homogeneous grid of regular squares with constant distance values and constant directions, it presented coordinates that were always read first to the right and then up. With this simple survey grid based on plane coordinates, the guns of a battery could be located from nearby sur-

vey bench marks, coordinated, and trained on a known enemy position to deliver effective fire without necessity of seeing the enemy.

After World War I practically all nations followed the example of the French and adopted rectangular grids for the use of their military forces. All were thinking in terms of surface action with artillery as the farthest reaching weapon. The result was the development of many different military grids, each for a special limited national or military area and environs.

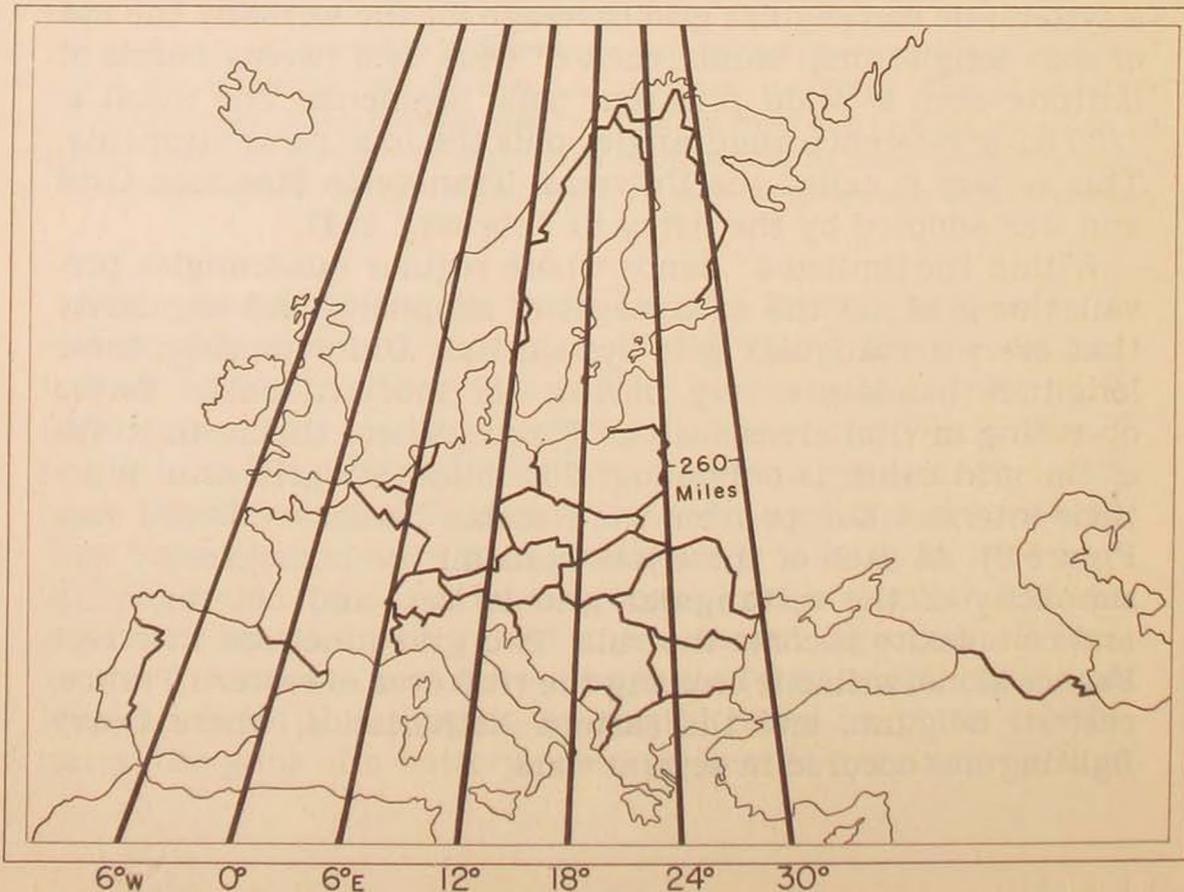
The difficulty with the rectangular grid system is that it can be used only over areas small enough to be considered as flat surfaces. If this relatively small area is exceeded, the simple rectangular grid breaks down. Beyond its limits a new grid must be used, and the overlap or junction areas between grids introduce complexities, irregularities, and changes in grid directions. These are confusing and destroy the simplicity and regularity for which the rectangular grid was conceived. In World War II battle lines were so extended that they overlapped these awkward grid zone junctions. The mobility of modern surface forces also vitiated the techniques of a war of position which had largely inspired the original development of the military grid.

In an effort to eliminate the hodgepodge of rectangular grids that were used during World War II, the U.S. Army developed a systematic rectangular grid coverage for the world by the use of sixty longitudinal bands, each 6° wide, and twenty bands of latitude, each 8° wide, plus four polar segments. The result is 1200 basic reference quadrangles plus the four polar segments. This system is called the Universal Transverse Mercator Grid and was adopted by the Army in February 1947.

Within the limited 6° bands where regular quadrangles prevail, this grid has the advantages of simplicity and regularity that every rectangular grid system has. Unfortunately these longitude bands are very narrow for modern mobile forces operating in vital areas such as Europe, where the mean width of the grid bands is only about 260 miles. Six grid zone junctions intersect Europe from the Russian border westward (see Figure 2). At each of these junctions all the homogeneity and simplicity of the rectangular grid is lost, and heterogeneity and complexity become the rule. Two grid junctions intersect France alone, with one crossing the vital area of eastern France, eastern Belgium, and the eastern Netherlands, where heavy fighting has occurred in several wars.

In 1948 the Joint Intelligence Committee of the Joint Chiefs of Staff recognized the need for a standard worldwide referencing system for use by the armed forces, individually and collectively. Proposals were requested to satisfy these requirements. The Army, with the concurrence of the Navy, submitted its U.T.M. Rectangular Grid. Global operations were visualized as a series of local surface engagements requiring only local operational control.

Figure 2: The Universal Transverse Military Grid is an outgrowth of the rectangular military grid developed by the French during World War I. That war was essentially a war of position, fought in a limited, highly surveyed area of Western Europe. Under such conditions the rectangular grid system provided an ideal solution to the military problems of distance and direction determination and location referencing. However the simplicity and regularity of the rectangular grid can be enjoyed only over areas that are small enough to be treated as flat surfaces. As soon as such a limited area is exceeded, the spherical shape of the earth must be recognized, and a new rectangular grid must be introduced. The narrowness of the U.T.M. Grid north-south bands in Europe exemplifies this limitation. In military operations the transition from one rectangular grid to another adjacent to it introduces complexities and adjustments that violate the principle of simplicity and regularity upon which the rectangular grid is based. These difficulties were experienced in Western Europe during World War II, and from the depth of bitter experience it has been said that "battles are always fought at grid junctions." Note on the map above the frequency of U.T.M. Grid junctions that traverse the vital areas of Central and Western Europe.



The Air Force held that the U.T.M. Grid does not meet Air Force requirements for global operations and therefore does not meet joint armed force requirements for several reasons:

1. A joint referencing system for the control of forces engaged in global operations must meet the requirements of the farthest reaching arm and must not be limited by local tactical considerations alone.

2. The range of Air Force operations makes it impossible for the Air Force to ignore the spherical shape of the earth and the spherical coordinates of latitude and longitude in its navigational requirements, as the Army can ignore them in local surface engagements.

3. Any joint referencing system for use in controlling forces engaged in global operations must appear on all maps and charts used by the three armed services in order to be effectively used by them. An over-print of the U.T.M. Grid on all Air Force charts would obscure navigational data and seriously interfere with their normal operational use.

THE Chief of Staff, USAF, directed the Air University to study the problems of military referencing systems, especially the suitability of the U.T.M. Grid for the proposed purpose, and submit recommendations.* The Geographic Referencing System worked out by the Air War College eliminated all reference to north, south, east, or west, eliminated dual numeration in latitude and longitude, eliminated the four different sequences required to express latitude and longitude, and used only one sequence, which was read to the right first in accord with established reading habits. This simplification was accomplished by using the 180th meridian and the South Pole as the point of origin (see Figure 3).

The next step was to find a basis for codification as a means to brevity. The world was divided into twenty-four one-hour bands of longitude, each 15° wide. These bands were assigned code letters from *A* to *Z* (omitting *I* and *O*) east from the 180th meridian. A similar sequence of 15°-bands of latitude beginning at the South Pole and lettered from *A* to *M* northward (omitting *I*) divided the earth into twelve latitude bands. This combination divides the earth into 288 basic 15° quadrangles each identified by two letters (Figure 3).

*The conclusions of the Air University in reference to the U.T.M. Grid were essentially those set forth above. A system suitable for Air Force use in both local and global operations and equally suitable for joint military use was developed and submitted.

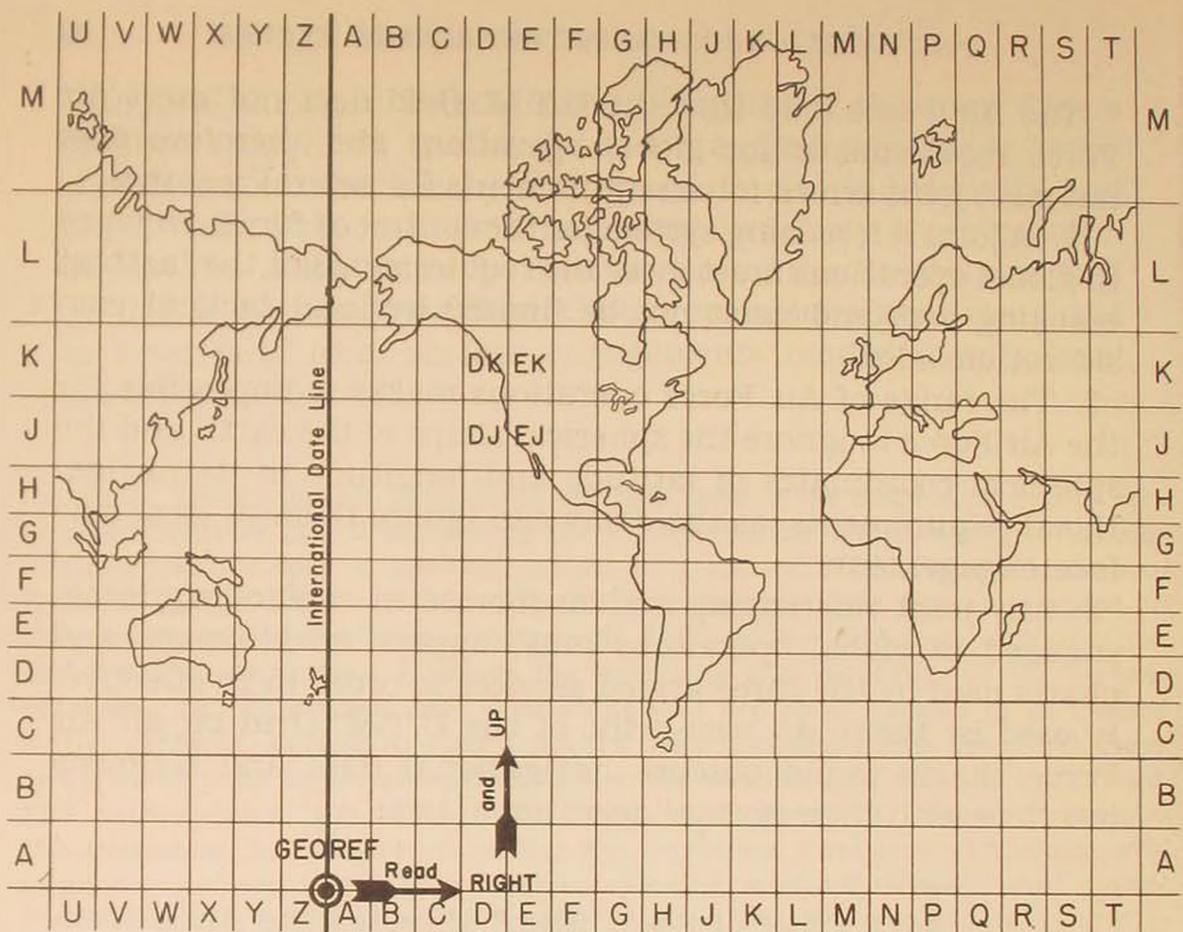
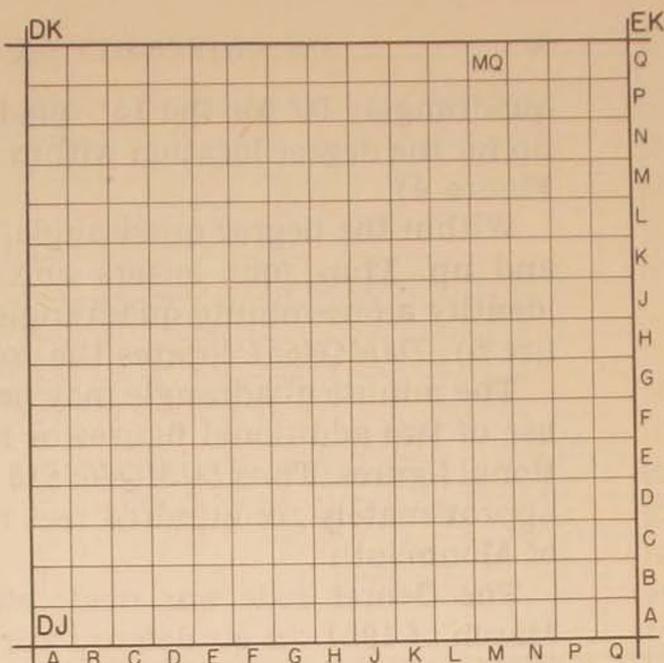


Figure 3: The Georef world breakdown into 15° quadrangles.—The World Geographic Reference System was designed to eliminate the complexities of latitude and longitude and at the same time to embody as much of the simplicity of the rectangular grid system as possible. The range of modern aircraft makes it impossible to ignore spherical values or the spherical shape of the earth. The first requirement of simplicity and regularity was achieved by using the South Pole at the 180th meridian as the point of origin and the use of one sequence throughout the world. This sequence reads to the right first (following the initial normal reading impulse) and then up. The second requirement, for brevity, is accomplished through the use of code letters for referencing. Through the device of making the first two letters represent an area 15° square, these two letters may be dropped for further brevity in local operations. Thus in the "Georef" system the first letter of a code reference identifies a 15° interval to the right or east of the 180° meridian and the second letter identifies a 15° interval north of the South Pole. The third code letter in a reference identifies a degree to the right within the 15° quadrangle and the fourth letter identifies a degree to the north within this same quadrangle (see Figure 4). Minutes are read to the right and up within the degree quadrangle (see Figure 5).

Thus two letters will locate and identify a 15° quadrangle any place on earth, reading right and up from the 180th meridian and the South Pole. For example, *DJ* locates a 15° quadrangle in the northwest United States, *D* to the right of the 180th meridian and *J* up from the South Pole. On Air Force charts these letters are shown in the lower left-hand corner of the 15°

Figure 4. The Georef 15° quadrangle breaks down to 1° quadrangles identified by the third and fourth letters of the Georef code reference: DJMQ. The code is read on the chart, first right to the M interval and then up to the Q interval, to locate the 1°-quadrangle MQ in 15°-quadrangle DJ.



quadrangle or at the corners of the chart, as is required. The method segregates the first two letters of the code in order that they may be dropped to abbreviate code designations for local operations confined approximately within a 15° quadrangle.

Within each 15° quadrangle the individual degrees are lettered to the right from A to Q and up from A to Q (omitting I and O). Thus four letters will locate and identify a 1° quadrangle any place on earth. There are no duplications, and no designation of cardinal directions are required. DJMQ locates a 1°

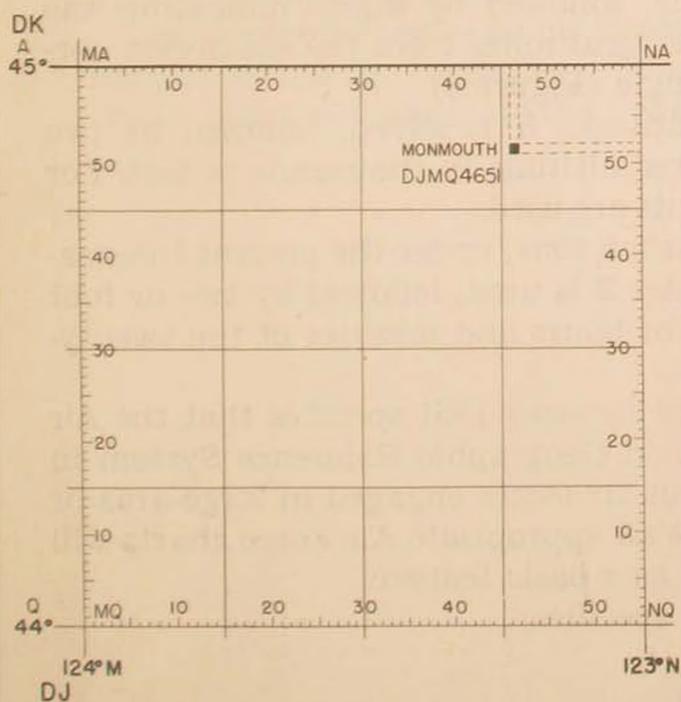


Figure 5. The Georef 1° quadrangle breaks down to one-minute quadrangles identified by four digits added to the code letters identifying the 1° quadrangle: DJMQ4651. This addition to the code is read on the chart, first to the right 46 minutes and then up 51 minutes, to locate the town of Monmouth within 1° quadrangle MQ.

quadrangle: *DJ* for the 15° quadrangle, *M* to the right, and *Q* up for the degree location within this basic 15° quadrangle (see Figure 4).

Within the degree quadrangle, minutes are read to the right and up. Thus four letters and four figures will locate and identify a one-minute quadrangle any place on earth (see Figure 5). *DJMQ4651* locates the town of Monmouth, Oregon.

The minute quadrangle may be subdivided into tenths by the use of two additional figures or into hundredths by four additional figures. Thus *DJMQ465515* will locate a small quadrangle approximately six hundred feet north and south in the center of Monmouth.

The Georef code was made effective for air defense use in March of 1951. In air defense work or any other localized activity the 15° quadrangle letters may be omitted for brevity, since a direction and distance is usually given with the grid reference. Only two letters and four figures are normally required for local-area operations.

Provision has been made for the use of several auxiliary factors at the end of Georef code designations:

(1) To designate a *special quadrangle*, the Georef code is used for the southwest corner of the area. This is followed with letter *S*, to denote *side*, followed by digits to represent the length in nautical miles of the lower side, then by *X* and the digits of the nautical miles for the length of the right side of the special quadrangle (see Figure 6).

(2) To designate a *circular area*, *R*, for *radius* of the circle, is added to the Georef Code, followed by digits indicating the length of the radius in nautical miles from the southwest corner of the Georef Quadrangle (Figure 6).

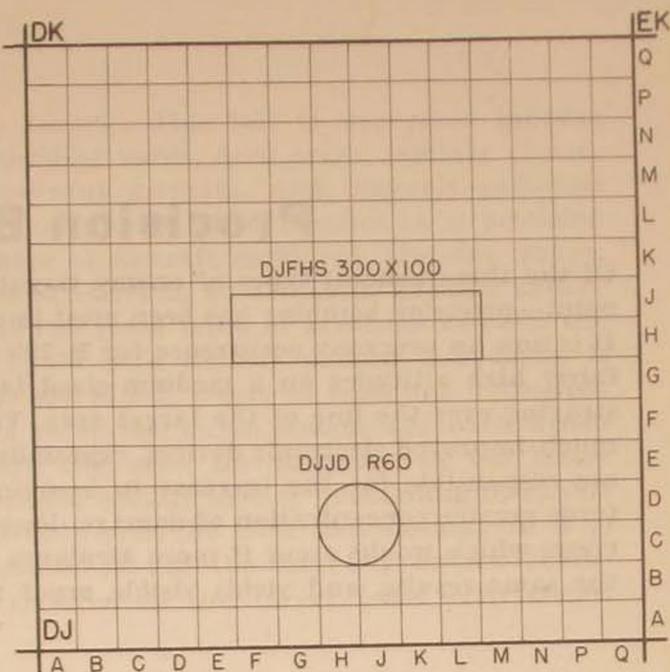
(3) To designate an altitude, *H* is added, followed by two digits indicating the desired altitude in thousands of feet. For hundreds of feet three digits are used.

(4) To designate *Greenwich time*, under the present International Time Code, the letter *Z* is used, followed by two or four digits representing hours or hours and minutes of the twenty-four hour clock.

AF Regulation 96-5 of 19 January 1951 specifies that the Air Force will employ the World Geographic Reference System in the control and direction of air forces engaged in large-area or global operations and that all appropriate Air Force charts will contain the WGR System as a basic feature.

This regulation further specifies:

Figure 6. To designate special quadrangles or circular areas, supplementary designations may be added to the Georef code reference identifying the quadrangle that includes them. Above, reading first to the right and then up, S300X100 denotes the base and altitude of a rectangle 300 nautical miles long extending from the southwest corner of 1°-quadrangle FH of 15°-quadrangle DJ. Likewise R60 denotes a circular area 60 nautical miles in radius centering upon the southwest corner of 1°-quadrangle JD of 15°-quadrangle DJ.



(1) that all elements of the Air Force will use Georef for position reporting, target designations, etc.,

(2) that Georef will be used in the control and direction of forces engaged in air defense,

(3) that Georef will be used in all other air operations, such as strategic operations, air-sea rescue, and tactical air operations *other than air support* of surface combat operations; for the latter the cooperating air forces will use the grid referencing system specified by the commander of the operations,

(4) that Georef will be employed in inter-Allied position reporting when so specified.

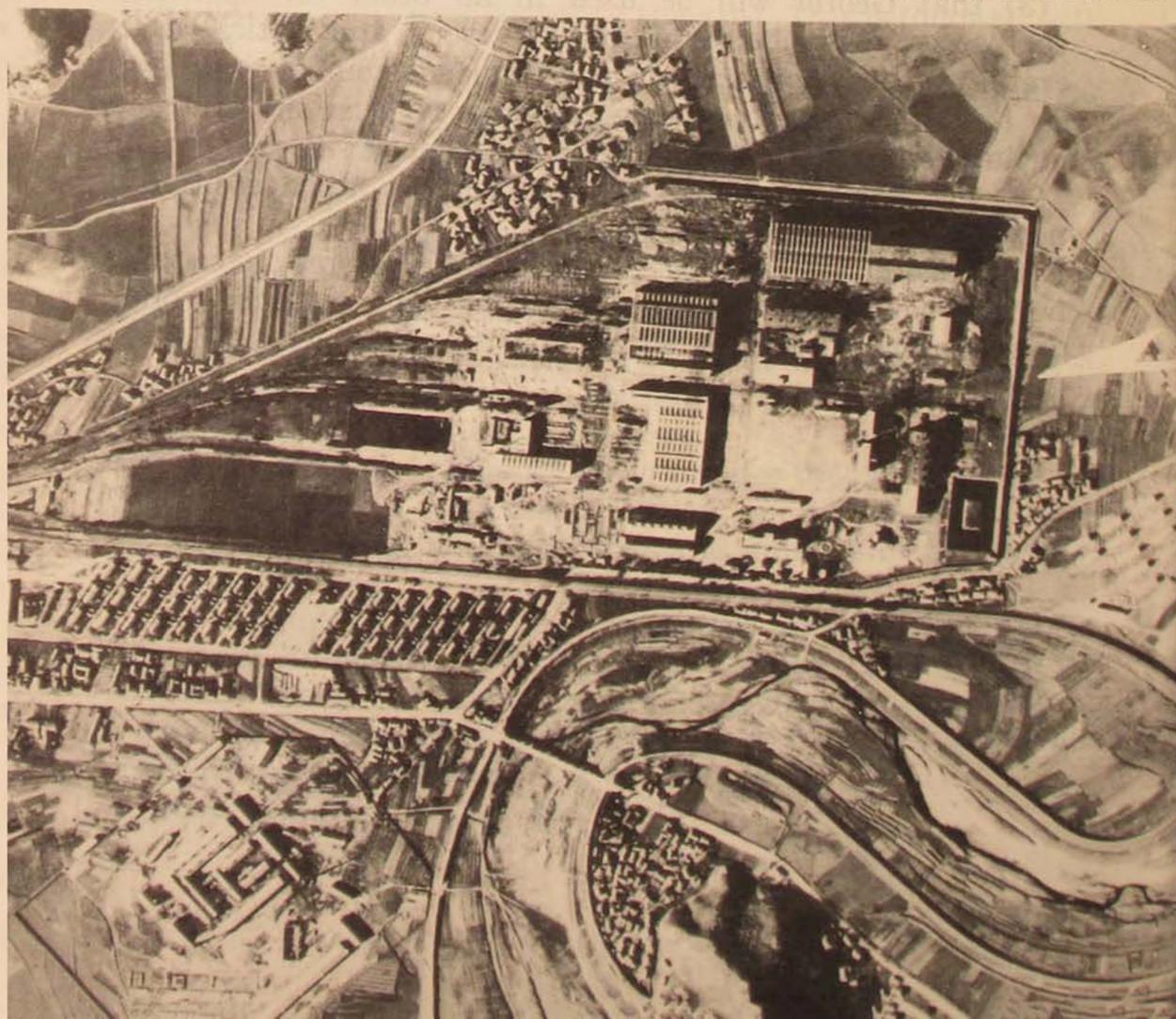
The Georef System is being printed on Air Force charts in the normal course of reprinting. Pending its availability on all charts, users will annotate their charts by hand with the Georef Code.

Air War College

Precision Bombing

Of the three general types of enemy target bombing—area, precision, and pinpoint—precision bombing has been most improved from World War II standards. It is now an everyday occurrence for B-29's to drop a heavy bomb tonnage from fairly high altitudes on a medium-sized target, with only an occasional bomb straying over the line of the target area. Veteran, trained-as-a-unit crews with much-improved electronic devices, especially radar for adverse-weather bombing, are responsible for the increase in bombing efficiency. Such improvement affords greater concentration of damage, lessens the wastage of airplanes and aircrews which would occur if more airplanes had to fly more missions to achieve the same results, and yields visible proof to the civilian population that U.N.

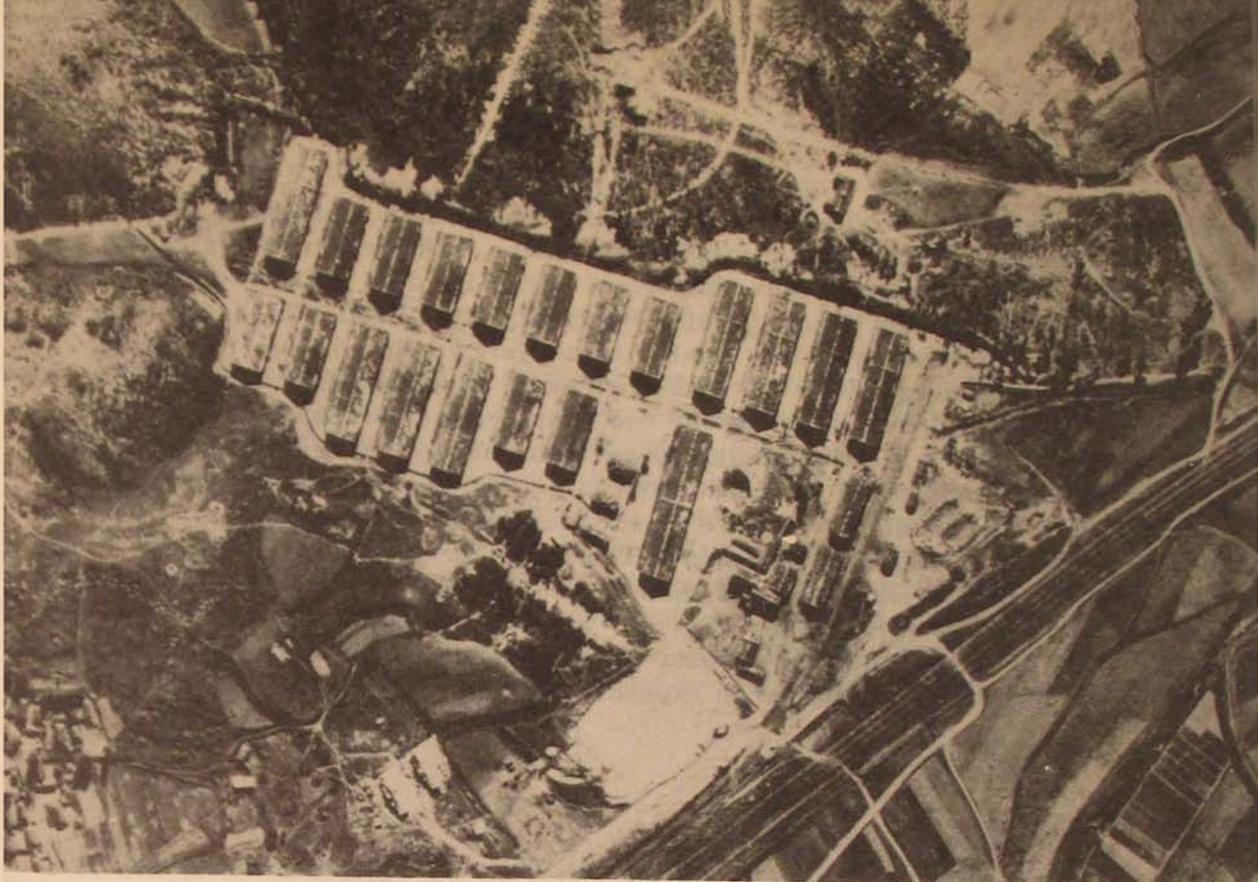
The Wonsan railroad locomotive and car repair shops, second largest in Korea, offered a fat target for precision area bombing. It was struck by about forty-five B-29's on 10 August 1950 in a heavy raid which divided 400 tons of bombs between it and the nearby Wonsan marshalling yard and oil refinery. Coming in from the south in a modified box formation, the bombers dropped a bomb pattern just within the fence,



bombing is confined to vital military targets. This last is important because precision bombing targets—large marshalling yards, dock areas, military camps, storage and ammunition depots, important airfields, and concrete-and-steel bridges—often nestle in the midst of towns and cities. Tactics in a precision bomb raid vary according to the number of aircraft employed, the size, shape, and nature of the target, and the desired effect to be achieved. Broadly speaking, the pictures which follow show the two main types of precision targets: the area target, where a relatively large space with sharply defined boundaries is blanketed with bombs; and the constricted target, where at least one dimension of the target is so small as to require a bomb-run on an oblique approach which will intersect the target at an angle. The need for precision in the latter type is obvious; but area bombing demands equally precise positioning to enable all bombers to drop their bombs so evenly over the area that nothing in it is missed, yet to keep within the boundaries set for the target. Precision bombing means maximum tonnages of explosive on the target from each strike.

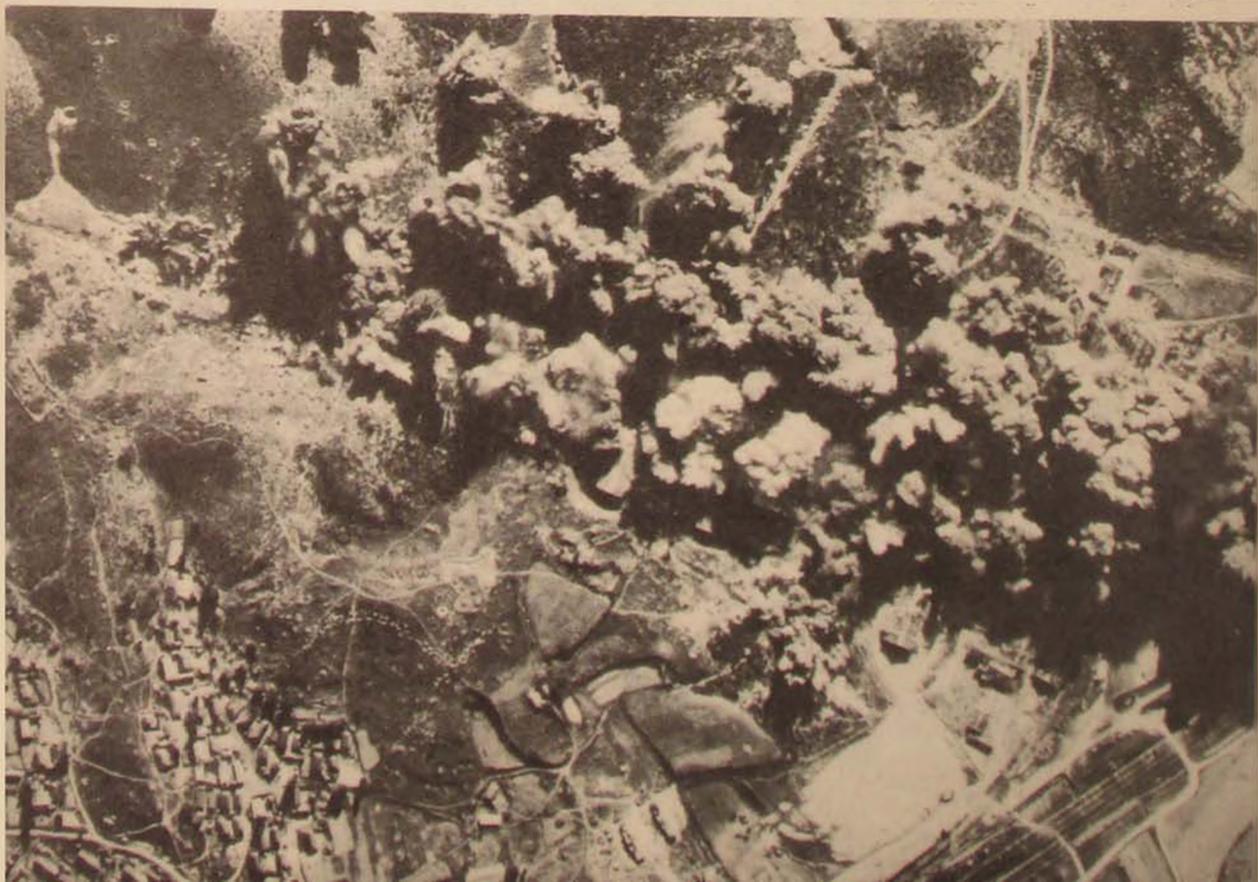
another pattern within the first, and walked bombs up the eastern fence to the yard entrance. Some two-thirds of the bombs were placed within the southern half of the target area. Here were congregated the large concrete buildings housing irreplaceable heavy forge equipment and machine shops. On the west where the bombs landed over the fence, they straddled the main north-south railroad from the key city Wonsan.





These orderly rows of military warehouses near Pyongyang were bombed by eight B-29's on 1 October 1950. Bunched together near the main line railroad, the area shows by the amount of track activity connecting various buildings that it was in full operation. Close scrutiny of the surrounding hills reveals numerous underground entrances, many of them connected by roads and paths whose light color evidences constant use.

The main weight of the strike began just above the spur railroad track and spilled through the cluster of buildings into the hills at the far end of the fenced-in area.

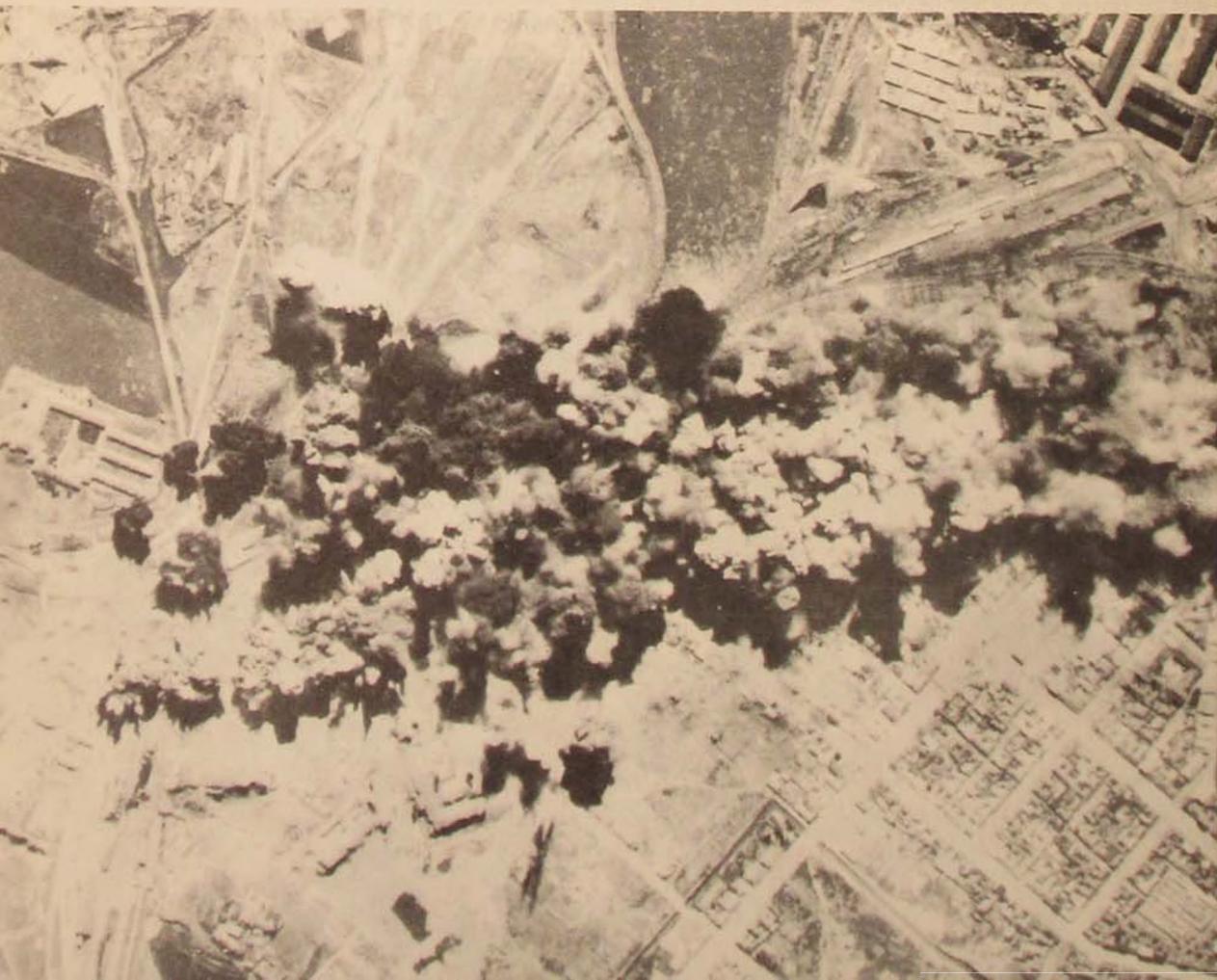




Of the twenty large buildings, twelve were totally destroyed and not one received less than sixty per cent damage, a bitter reminder to the Communists that eight B-29's pack the same load of explosives that it took 25 B-17's to carry during World War II.

The Chinnampo dock area was paid its second visit by B-29's on 8 July 1950 while smoke still rose from the debris of the 6 July raid on an adjacent target. Coming in over the water in box formation, the bombers made a looser pattern here than in the strike on the opposite page, because of the larger area involved. The bombs skirted the water on three sides and blanketed the dock facilities. Subsequent raids on 27 August and 31 August wiped out the remaining targets in Chinnampo, and in the dock area destroyed the enemy's arduous repair work of the preceding seven weeks.



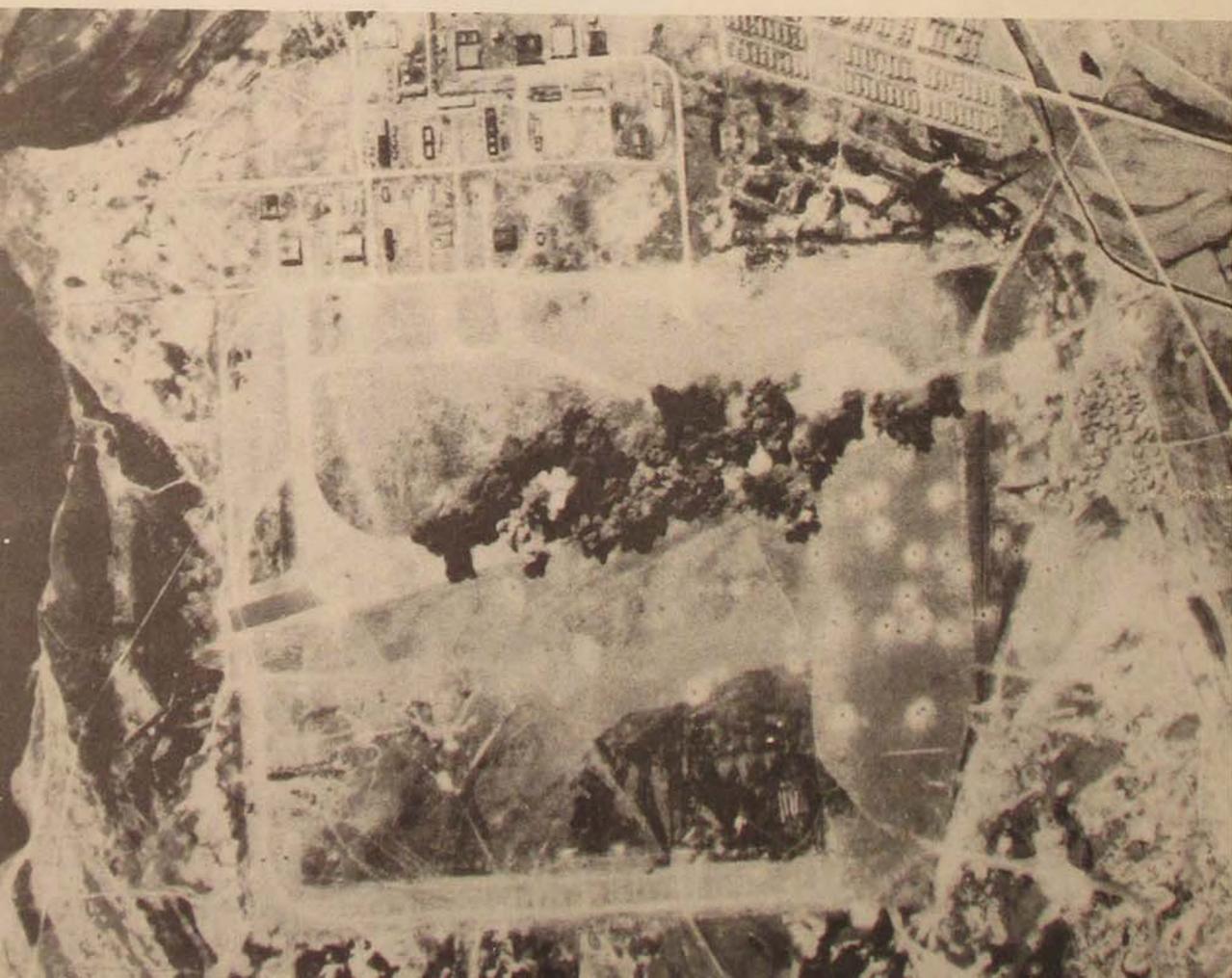
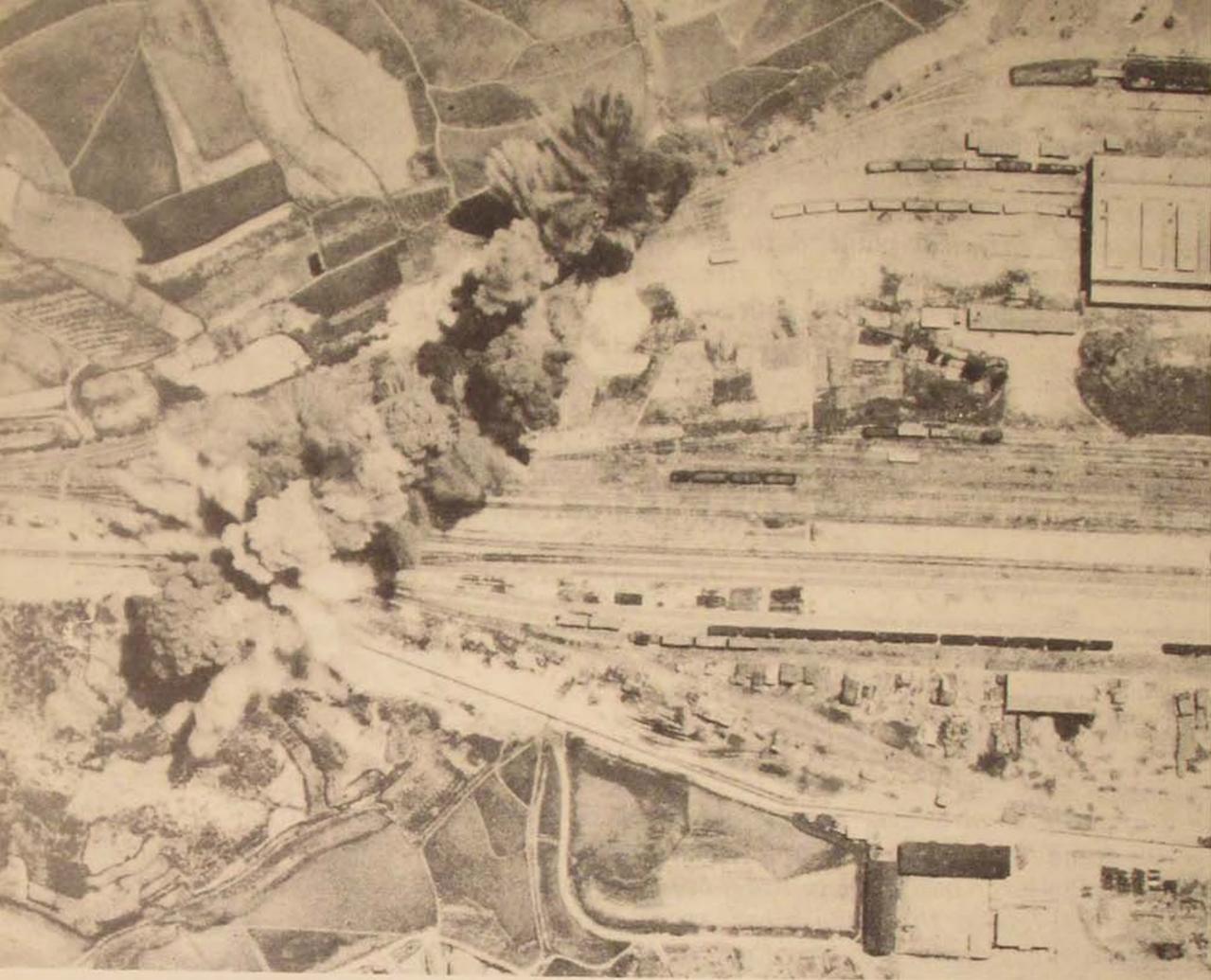


The military storage area beside this small marshalling yard at Chinnampo was a part of the target complex for a massive B-29 raid on 31 August 1950. Chinnampo, about twenty-five miles southwest of Pyongyang, was an important port, railroad, and industrial center. A chemical plant, a smelter, and a non-ferrous metals processing plant were other targets for this 600-ton attack. The storage area was a transshipping center, linking the big docks with railroad lines heading for the enemy fighting front.

The bombs began to drop on the bank of the canal and crossed the major highway intersection. The box pattern ran through the marshalling yard and blanketed the storage area. The last bombs landed directly athwart the railroad yard choke point.

The marshalling yard was completely blocked, with no through track undamaged. Over-all damage to the storage area was about sixty per cent, with seventy-five per cent damage to the large buildings in the more important half of the area. The camouflaged train station facing the wide clear space in the middle of the storage buildings was destroyed except for the tip of each wing. Chinnampo was thoroughly neutralized.





This precision interdiction attack on the Kaesong marshalling yard occurred on 23 August 1950. At that early stage of the Korean war there had not yet been time to pulverize medium-sized marshalling yards such as this one. As an interim measure B-29's dropped sticks of bombs at an angle across the one spot where they would do the most good. The bombs neatly bridged the three segments of the yard choke point and immobilized all tracks for vital days after the U.N. breakout from the Pusan perimeter.

When reconnaissance showed that Yonpo airfield, three miles southwest of Hungnam on the northeast coast of Korea, was nearing completion, B-29's struck with twenty-five tons of high explosives on 23 April 1951. Coming in from the sea, they loosed their bombs on the runway just beyond the large L-turn where the taxi strip joins the runway and potholed the surface for two-thirds of its length, intersecting both the smaller taxi strip and the turning end of the runway. Repairs were further delayed by the fact that some of the bombs were equipped with variable delay fuses and would explode intermittently for days. A cratered runway is as effective in stopping enemy air activity as is a smashed marshalling yard choke point in halting resupply by rail.

"Bridge 105" received a mortal blow on 4 October 1950, when B-29's deftly angled a decisive six tons of bombs across it in the last of a long series of aerial attacks on this stubborn target. This railroad bridge, crossing the Tongsong River at Hamhung, was 1500 feet long and had 26 spans of through truss construction. It was first bombed and rendered unserviceable in July 1950. Two weeks later it was in service again. The B-29's knocked out one span on 27 August, only to have reconnaissance report that by 6 September the bridge had been repaired and was again usable. Two days later six tons of bombs downed another span. On 22 September six more tons were dropped to keep the bridge out of commission, but reconnaissance on 24 September showed the bridge repaired and in use. On 3 October two B-29's inflicted minor damage, but the bridge remained usable. The six tons (shown in this picture) dropped on 4 October knocked out one span and damaged two others. The bridge was not bombed after that time because of the surge of U.N. ground troops into the Hamhung area. When the Chinese Communist invasion caused the U.N. withdrawal, the bridge was completely destroyed with demolition charges. This history of a single bridge shows the enemy's amazing recuperative power and the necessity of unremittent surveillance and attack.



In My Opinion . . .

THE MEDITERRANEAN BASIN AND SOVIET AIR POWER

CAPTAIN WILLIAM W. VICKERY

Two highly publicized events of recent months—Congressional approval of a huge money bill for construction of North African air bases and the late Admiral Sherman's visits to Spain and Italy—have emphasized that we are now committed to defend several of the Mediterranean nations from Soviet attack. Why this commitment? Why even assume Russia would have need for the Mediterranean Basin? The answer is that she would not have enough use for it to enter a shooting war unless she planned to move against the Allies in other parts of the world.

A glance at a map of the Mediterranean area shows that whether Russia moves against Western Europe or against the Middle East, or both, any advance to the west would rest a vulnerable flank on the Mediterranean. She must, therefore, move simultaneously against the Mediterranean powers and other military objectives in Europe or the Middle East if she is to avoid the horns of the same dilemma which crippled Hitler. Russia must either overrun the Mediterranean or neutralize it. The over-all objective, of course, is to deny North Africa to the Western nations for a gigantic staging area. In addition to ensuring protection to her European and Middle East flanks, Russia would gain the following with control of the Mediterranean:

1. Russian attacks in the Mediterranean would serve to isolate friendly Italy, Greece, Turkey, and Yugoslavia.

2. Control of North Africa would give Russia command of the Suez Canal, lifeline of the British Empire.

3. The Mediterranean coast would offer a tremendous projection of Russian air and sea bases toward the west, useful for a base of operations against Europe and for submarine bases for attack on Atlantic shipping.

4. Even if we denied Russia immediate use of Near East oil by destruction of the oil fields, she could hope for ultimate exploitation of that rich oil basin.

The question of the moment for us, now that we are committed, is what action can be taken to implement our commitment. The United States established military missions in

Greece and Turkey in 1947, which resulted in strengthening these nations both militarily and politically. The idea of a Mediterranean-United States alliance is, however, fairly recent, stemming from the failure to bring the Mediterranean nations into the Atlantic Pact.* Such an alliance offers a nucleus of unity of command in the Mediterranean.

Unity of strategy is not yet apparent. One idea supposedly gaining in favor with certain American military strategists is that the Mediterranean Basin can be defended along the natural defense line formed by the Pyrenees Mountains in the west, the Alps north of Italy, and the Carpathian Mountains north of Yugoslavia. An extension of this proposed defense line includes the Black Sea and the Caucasus mountain range. Behind the protection of this natural barrier, so proponents say, the Allies could build up land, sea, and air power capable of eventually turning a Russian offensive into defeat. Our logistics build-up could be undertaken in North Africa, into which we could pour men and materiel from our sea and air routes via the Gulf of Mexico, the Caribbean, the South American coastal areas, and the South Atlantic. These routes would require minimum air and sea defense forces to protect them.

The establishment of this defense line presupposes that any Russian offensive would move first against western Europe. Then the natural wall would give time to organize the purportedly powerful forces of Turkey, Greece, Italy, and Yugoslavia—plus those of other powers having Mediterranean interests.

No plan is offered to organize these several military forces into one force, except the creation of the Mediterranean Alliance, at present consisting of Greece, Turkey, and Italy, with Yugoslavia and Spain as likely additions. The military planner who refuses to be lulled into false security by the comforting word "alliance" will perceive that such a group of nations offers considerably less promise than its parent NATO organization, which is comprised of geographically united countries having modern transportation systems and large industrial facilities. It is difficult to see just how the Mediterranean Alliance would be held together. There is not in that area enough land, sea, or air transportation, either existent or potential to support an adequate communications and supply system.

The third bulwark in the proposed defense of the Mediterranean is considered to be the Strategic Air Command's

*Since this article was written, the Ottawa Conference of NATO Nations voted to admit Greece and Turkey into NATO.—Ed.

counteroffensive against the Soviet homeland. Stock reasoning here is that by the time any invasion could be well launched, our B-36 and B-50 bombers would have pulverized Russian industrial centers from American and British bases and other strategic points around the periphery of Russia. One principle of warfare is being overlooked by these optimists. This is the principle of mass or concentration, which carries with it, in its relationship to other principles of war, the requirement that the offensive must be sustained. This is especially true of air power. The principle of mass is increased in importance when we consider the losses which would be incurred in the initial attack against prepared air defense, when no reserves are held back, when control of the air depends on continuous employment of all available aircraft. We do not yet have the air forces sufficient even for the initial attack, much less enough to provide replacements. Also, strategic bombing is cumulative in impact, with the effect of the bombing of industry only gradually pinching off the pipeline to the fighting front. We cannot count on enough time lag in the Soviet offensive to permit this decimation of remote industrial plants to take its toll of reserve supplies and effectively weaken the enemy's fighting power on the battleline.

The major weakness in the plans to utilize the natural mountain barrier and the Mediterranean Alliance for defense is that they ignore the potentiality of Russian air power. The proponents of land and sea action have neglected the lessons of the Mediterranean air and sea campaigns of World War II. Marshal of the Royal Air Force Lord Tedder demonstrates the relationship of air and sea power in the Mediterranean in his book *Air Power in War*, showing that land-based aircraft in sustained attack from a large number of well-dispersed bases can make operations of naval forces, including carriers, either ineffective or prohibitively costly.

It would seem that the public has heard only of the one great weakness of the Russian air force—the lack of a strategic bomber equal to the B-36 or B-50, and the small number of such long range bombers as do exist—and has not been made aware of its categories of strength. In the fall of 1944 the Russians were mounting 3000 to 4000 sorties a day against the Germans on the East Prussian front alone. Most of these sorties were in close support of ground forces. This is the category of great Russian air power. Nor has the public heard of another category of Russian air strength—in airborne operations. Tak-

ing a cue from the German and Anglo-American airborne assaults of World War II, the Russians have developed strong forces for that type of warfare.

From the Russian standpoint both of these air capabilities are ideally suited to Mediterranean operations, simply because air power, the one military weapon which can ignore geographical barriers, must be countered by air power. And what air opposition can be offered to Russia in the Mediterranean?

A. Under the Atlantic Pact, we have undertaken the time-consuming task of building up, with geologic techniques, the over-all military strength of Western Europe, including its air power. Excluded from this plan is the one potentially strong logistical power on the Mediterranean—Italy.

B. Our allies, the Greeks and the Turks, as well as our recently adopted logistical responsibility, Yugoslavia, are woefully short on air power. We are too prone to give a nation's military capability in terms of numerical strength of surface forces. Even now, with the Korean air power epic in the limelight, we fail to give proper consideration to the historic reduction in time and space and the corresponding ability of air power in war to place sustained firepower against surface forces on offense or defense. We forget that an army of 200,000 well-armed ground troops without air forces to defend them is in an untenable situation. That army must wage war under disadvantageous terms of battle, or quit the battle and the war. Sustained air power, allowed the necessary time and space for its three-dimensional activity, can defeat a sustained surface effort. Turkey's land power of about 500,000 men has no effective counterpart in its air force of only 500 aircraft, poor in quality. Russian jets would experience a short time of hunting, against both Turkish air power and sea power. Greece, it appears, has about 100 aircraft to maintain command of the air and defend 125,000 troops. With such vulnerability in the air, how long would 125,000 troops remain effective? Italy is no better off. Envisage Italy's 400 aircraft pitted against MIG 15's. How long would it take to render the 200,000 Italian ground troops ineffective?

C. The American and British Mediterranean fleets would be at a serious disadvantage in attempting to operate carrier planes against overwhelming numbers of land-based aircraft flocking in on them from widely scattered bases in the satellite countries.

D. At present we have little in the way of land-based aircraft in North Africa to supplement carrier operations.

CRITICAL analysis of the time-space factor in the Mediterranean area demonstrates that Soviet air power, properly used, can control most of the Mediterranean area. Time and space is on the side of the Soviet now and in the foreseeable future. In addition, with the supplementary military force of land power in the form of air transportable infantry and its related resupply techniques, it is now within the scope of strategic-logistical solution for Russia to launch an offensive, not in France and Germany but in the Mediterranean area, across the geographical barriers of Yugoslavia and Greece, into Italy itself. From the Bulgarian-Greek border to Otranto, on the heel of Italy, is only 260 miles. From air bases in satellite countries the distance is only slightly more. In Russia's position a land offensive in Europe and a campaign in the Mediterranean built around air power seems the most feasible. Then there would be compelling logic in extending the offensive to neutralize British air power and its adjacent coastal responsibilities. There would be compelling logic to include the North African area capable of housing Allied logistical effort in support of an attempt at recovering lost Mediterranean land and sea areas. Immobilization of Allied air power in Germany and France would be no major task, with our present paucity of air forces there. Soviet attempts to gain and maintain command of the air, even against top Allied pilots, could not long be denied.

A Soviet offensive against the Mediterranean Basin, if built around air power, is not even a calculated risk. With command of the air assured, airborne and air transportable military forces could be used tactically and strategically. Tactical and strategic air operations, within a radius of only a thousand miles from bases in Romania, Bulgaria, and Hungary in support of airlift operations, could ensure marked success against key targets, both military and political. The only limitation on this type of combined operations would be the availability of trained personnel, sustained air resupply, and logistical support to sufficient ground forces to contain Yugoslavia.

The projection of this type of military force into northern Italy and southeastern France in conjunction with a land offensive against West Europe could bring quick and complete military and political control of the areas behind our own supposed defense line. We can expect that the military realists of the Soviet will attack in sufficient strength to succeed. At this time it is militarily impossible for the air forces of Yugoslavia, Italy, Greece, or Turkey to defeat attempts to gain command



The huge Mediterranean Basin is flanked on the north by massive mountains from the Spanish Pyrenees to the Russian Caucasus. On the south lie the arid reaches of North Africa, logical site for an Allied defensive build-up and scene of a vast American airbase construction program. To the southeast the rich oil fields of the Near East invite invasion, or perhaps isolation by hostile aircraft operating out of the Balkans.

of the air over their surface areas. When command of the air has been gained above the land and sea areas of the Mediterranean Basin and Russian air power can move unchallenged against the surface forces of the Allies, how long can these nations resist? It is not a matter of leadership and bravery. Air power applied under these conditions is far more effective than sea power and land power combined. Geographical mastery is political mastery—and it is inherent in dominant air power.

A military operation of the nature and magnitude we have considered calls for unprecedented commitments of the Soviet war potential to air power. Any Russian offensive capable of success in the Mediterranean basin must be built around the flexibility of air forces. If Russia's capability for airborne operations is in proportion to her known tactical air strength, and there is good reason for thinking that it is, then the picture is darker than many of us have thought.

IN BRIEF, Soviet air power is far ahead of Allied air efforts in the area of Germany, France, and England and in the Mediterranean area. Our own requirements for air forces in these critical regions, including those necessary for the air defense of our projected North African air bases, exceed the present U.S. allocation of national war potential to air power. And the attrition rate in combat would find us equally ill-prepared in reserve air strength.

Finally consideration must be given to unity of command in the Mediterranean area. Except for that engendered by the Atlantic Pact or under the United Nations, there the only union is that of the United States and individual Mediterranean nations. There is no pooling of resources, manpower, or strategy under one unified command.

For the sake of argument let us agree with the theorists and suppose that Russia does attack and overrun Europe and that we find ourselves fighting a defensive war from the natural defense line of the Mediterranean. What defense do we have against airborne and air-transportable military power in conjunction with Russian air superiority? Would there really exist a defense line if we should be denied control of the air? Air power, sufficient at least for a strong defense to gain time until large-scale reinforcements could arrive, is as necessary in this region as in the North Atlantic region.

The over-all requirement of 500 groups, as estimated by General Carl Spaatz, former Commanding General, USAF, seems too low to enable adequate qualitative and quantitative air offensive against the periphery and heartland of Russia. To meet the Russian threat in the Mediterranean calls then primarily for defensive air action. Plans should establish a ratio of Allied-to-Soviet aircraft, broken down into aircraft types. As with any action against prepared defenses, the losses of the attacker are considerably higher than those of the defenders. Therefore our air forces in the Mediterranean should be composed mainly of fighter groups, supplemented by light- and medium-bombardment groups, the total number of such groups to be at a ratio of about one Allied group to every three Russian groups. The danger of even this minimum ratio is apparent from the Battle of Britain, in which the Royal Air Force stood at a three-to-one disadvantage in bomber strength but only at a four-to-three disadvantage in fighter aircraft. We are considering defensive air, whose sole purpose is to inflict losses on the enemy in transport and fighter aircraft that make his air of-

fensive prohibitively costly. Light- and medium-bombardment aircraft could attack staging areas, enemy airfields, and supply dumps and support friendly land forces in action.

Without jumping too deeply into the present controversies about the "balanced force" concept of defense in the Mediterranean, we must recognize that we are establishing in the Mediterranean a *defensive* alliance, hoping to form a military force ultimately capable of inflicting such losses on an attacking force as would make the attack too costly to be feasible. Once this defensive force has been established, political unity, which usually follows military security, could be more firmly implemented. Under any foreseeable military defense of this land-locked sea, the necessary counterpunch, especially in the initial stages, must repose in air forces.

The announcement has been made that Strategic Bombardment units have already been committed to the Mediterranean, and we can expect that assignment of tactical and air-transport units will be announced in the near future. The basing of these units, plus action already taken to set up an alliance of the several powers there, would result in a solidifying of the entire defense scheme. Still to be reckoned with is the necessity for *enough* fighter aviation in the nations bordering on the Russian satellite powers. Just how much combat aviation should be committed to the Mediterranean is a consideration which should be determined by the necessary minimum to do the job against a first-rate enemy. The Communists have a mighty war machine, backed up with a rejuvenated air power and supported by sound air doctrine. Against such an enemy too little, too late, is suicide.



PRIZE EDITORIAL

THE JOB AHEAD

THE impact of technical advancement upon military strategy requires the professional soldier continually to adjust his thinking to a changing frame of reference. Indeed, in the last few years, the complexity and the speed of technological change have challenged the officer determined to keep abreast of his profession. Yet it is important that our preoccupation with technical matters does not blind us to the important social and economic issues involved in our present conflict. The problems of this conflict transcend by far the mere operation of a military campaign. The basic differences between Communism and democracy will not be resolved by blood alone. Unlike the war against Germany and Japan, what we face today is well-organized and wide-spread world revolution which capitalizes on social and economic inequality. In such a revolution the military operation will merely be the first battle of a much broader struggle. A prolonged global military campaign, with its inevitable heavy cost and destruction, may bring about the very conditions that are receptive to Communist ideology. We could very easily win the war yet not discredit or reduce the threat of Communism. The basic question, then, becomes: how do we wage war against an idea? It seems that this aspect of the present struggle should permeate our entire peacetime operation.

Although this problem is a specific responsibility of the State Department, it should also be a prime concern of military commanders. The objective of the U.S. Air Force should not be limited merely to the winning of military war. The Air Force personnel, whether they like it or not, are ambassadors of the United States in every foreign country they enter and in that capacity are front-line soldiers in the war of

ideas. To foreign people they become a living symbol of a way of life. What they do and how they conduct themselves can go a long way in either substantiating or disproving the Communist picture of American society.

But the problem goes far beyond the conduct of military personnel. Unless we are prepared to follow a shooting war with a program specifically designed to rehabilitate and educate the defeated people to the freedoms and responsibilities of a free society, we may well find that Communism is more wide spread and generally accepted after the war than before. We may find the struggle for education and rehabilitation much more complex, much more difficult, and much more susceptible to defeat than in a military war. And yet postwar education of a defeated people is just as important in the long run as is the shooting war. It involves a knowledge of languages and, above all, a respect for and understanding of things Americans have traditionally refused to take seriously.

The manner in which we handle the crisis following a shooting war would to a large extent determine the outcome of the present world conflict. The history of the world records the technical advancement of man in glorious detail, but it also records the consistent and tragic breakdown of his social order. If civilization as we know it is to advance, it must solve the extremely difficult matter of living together—and this matter is little related to technical advancement. It is time we broadened our horizon and looked beyond the technical problems of warfare to consider the social, economic, and political problems that face us at a war's conclusion. We must prepare at once to meet them.

*C. E. Fulbeck, Captain, USAF
USAF Institute of Technology*

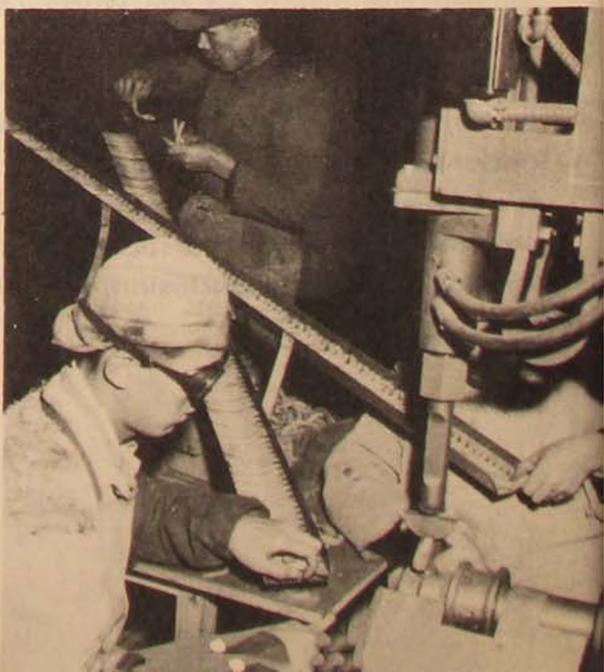
FEAMCOM

During the first year of the Korean conflict the emergency responsibilities of the Far East Air Materiel Command increased tremendously although the basic over-all mission, the logistical support of the Far East Air Forces, remained the same. Within days after the invasion of South Korea, FEAMCOM's mission was increased to include support of the R.O.K. Air Force with everything from parts and equipment to complete aircraft. A few weeks more brought the requirement to support other air forces of the United Nations. To meet its soaring logistical responsibility, FEAMCOM drew on all available supplies and manpower. Aircraft previously scheduled for reclamation were removed from storage and made combat ready. Aircraft formerly used by desk-bound pilots for proficiency flying were armed and made combat ready. As the war intensified and the Far East Air Forces went into full-scale operations in support of the forces of the United Nations, skilled manpower was drawn wherever available and loaned to FEAMCOM units to meet the accelerated demand for maintenance, supply, and erection of combat aircraft. Problems pertaining to logistical support became more and more numerous as all available aircraft were sent into action and FEAF bases multiplied to accommodate the many new aircraft arriving in the theater. Four phases of support services under combat conditions are briefly treated.

Modification and Engineering Development

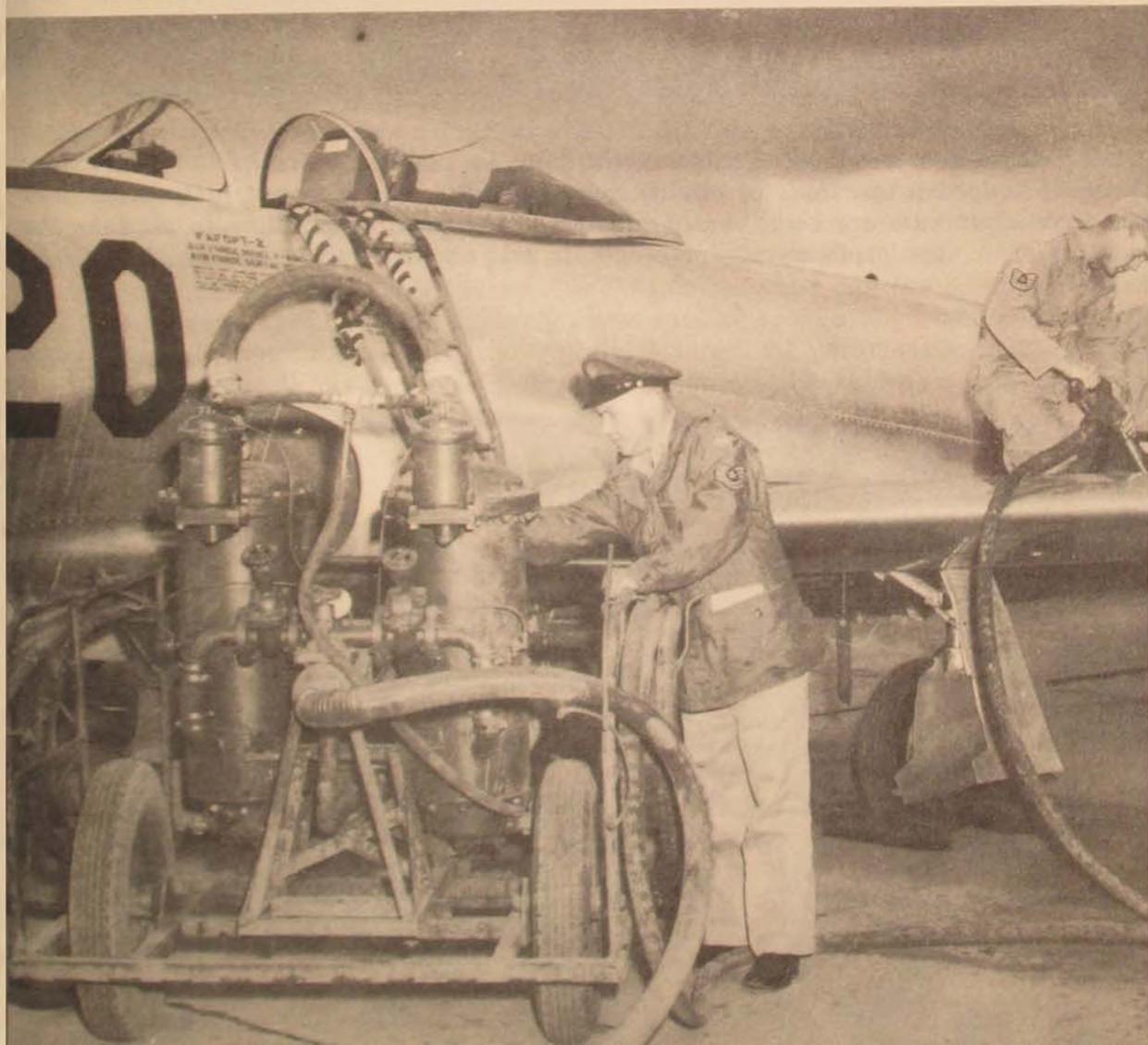
The Production Facilities and Drafting Branch of FEAMCOM has the mission of the designing and development of tools and equipment and aircraft modifications demanded by field requirements. At the outbreak of the Korean war the

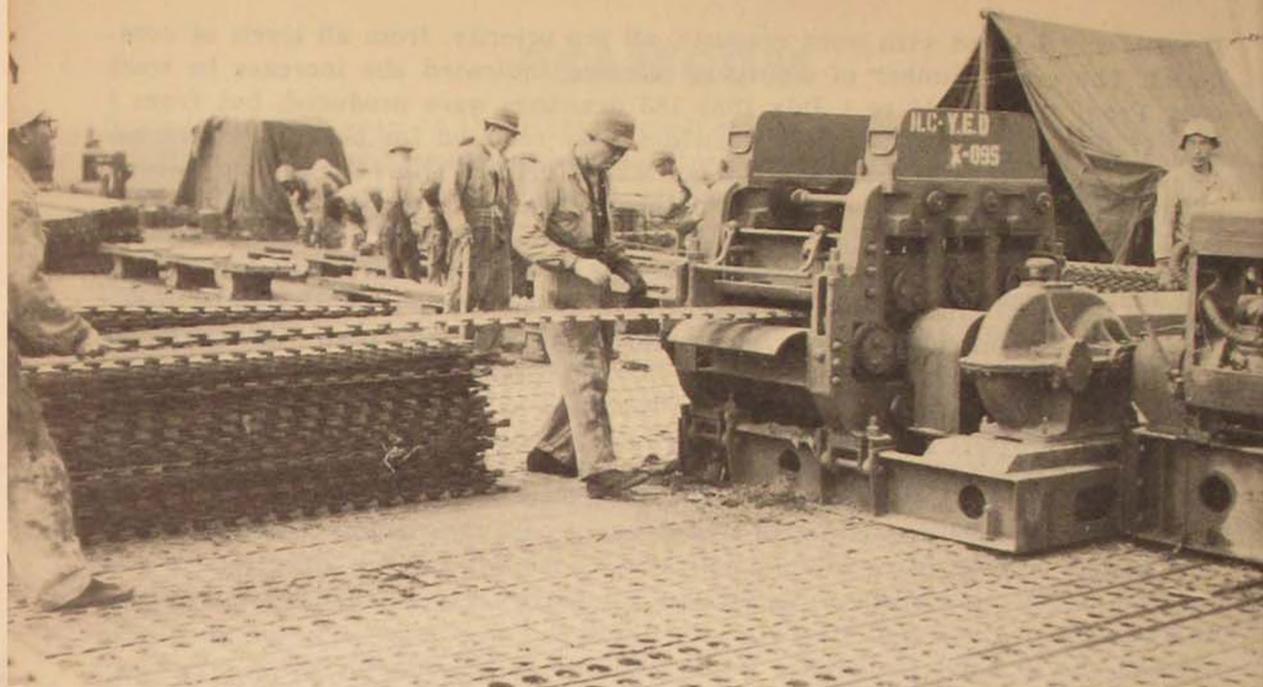
Many thousands of these tire-puncturing devices, sometimes called tetrahedrons, have been manufactured in FEAMCOM's shops and sent to Korea. Designed to land on any solid surface always with one sharp prong upward, the tetrahedron will flatten any tire. Even self-sealing tubes deflate because the hollow-tube construction of the tetrahedron affords the compressed air an escape channel. Tons of these "tacks" have been dropped on enemy roads, freezing convoys into sitting-ducks for U.N. fighters.



Branch was deluged with work requests, all top priority, from all levels of command. The great number of drawings released indicated the increase in work load. From 1 July 1949 to 1 July 1950 183 drawings were produced, but from 1 July 1950 to 15 March 1951 1180 drawings were released for production, an increase derived not only from the Korean war effort but from the urgency which precluded the usual practice of referring projects to Air Materiel Command. Projects have varied from design or drawings of simple shop or field tools, such as bomb fin wrenches, to major modifications of aircraft and aircraft components, such as the B-29 Chaff Dispenser. Every field of Air Force activity has been included—armament, photography, communications, and the many diversities of maintenance. Practically every type of aircraft found in the Far East theater or items of special equipment have been modified in some way. The majority of FEAMCOM projects have been initiated in response to field requirements. Well over a hundred products have been manufactured and are still in use.

A portable fueling, metering, and filtering unit manufactured in one of FEAMCOM's depots refuels an F-80. This serviceable device, representing the pooled experience of a number of experts, is especially useful at advanced air bases for speedy, assembly-line refueling. Frequent remodeling corrects the weaknesses found in field operation.





The use of forward airfields in Korea by FEAF's combat aircraft presented special problems to FEAMCOM. As the strips were hacked out of mud, rock, and sand, thousands of sections of pierced metal planking were used to reinforce the primitive runways for combat aircraft. Even so, the instability of the foundation fill and the impact of the speedy, heavily-loaded airplanes rapidly damaged the planks and constant replacement was necessary. A processing plant was set up, including, in addition to the straightening press shown here, an acid bath for removal of rust and a dip tank to apply paint. After this five-minute job, planks were bundled for reuse.

Mixing napalm is a laborious job usually done by combat units in the field. Here carefully-judged proportions of naphthenic acid, celic acid, coconut fatty acids, and powdered aluminum are being mixed to thicken the aviation gasoline to produce the liquid inferno, napalm. Equipment, ingredients, and tanks are furnished by FEAMCOM.

C-38





When the parachutes arrive at the Parachute Shop, they are dried and inspected. After the defects have been noted, the soiled parachutes are washed and again dried. Then they begin their trip through the repair shop. First to be repaired is damage to harness and shroud lines. Sometimes every shroud line is replaced and complete new harnesses are installed. Then the parachutes go to the canopy repair section. Here, as shown in the picture, trained airmen and Japanese cut away the damaged panels and tack in new ones, which are securely sewed into place on special machines. Working three eight-hour shifts each day, experts repaired 232 paratrooper chutes in one week. Since replacing a panel cost only four dollars, parachute repair pays for itself.

Parachute Repair

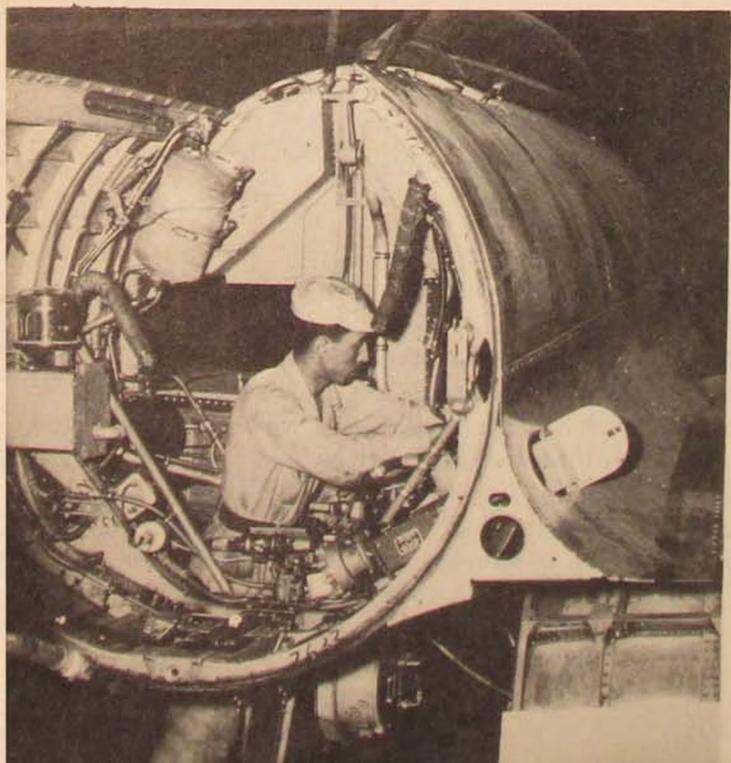
Though the Army uses most of the parachutes in the Far East, FEAMCOM has the enormous job of major repair and maintenance of all parachutes in the theater. Every type of parachute is repaired at FEAMCOM, from the big chutes used to drop aerial lifeboats to the smaller ones used by the paratroopers. Parachutes come to FEAMCOM with all varieties of damage from torn canopies to cut shroud lines. Most are returned to supply channels as good as new. Before parachutes are returned to duty, every inch of the canopies, lines, and harnesses is rigidly inspected. When the paperwork is completed, the parachutes are picked up on the supply records. If drop testing is needed, notation is made on the accompanying forms, and the field organization receiving the parachute performs this vital operation before the chute is used by personnel. If the parachutes require too much repair or if they are too old for safe use by airborne troops, they are converted to the job of dropping supplies and equipment to forces in Korea.

A combat-damaged B-26 is being sufficiently repaired by a FEAMCOM field unit in Korea to limp to Japan, where it will be rebuilt in the main FEAMCOM depot. This picture shows a nacelle being patched up enough to receive an engine for the trip. Getting aircraft like this back to rear areas for major repairs is economy not only in money, but, because it results in quality work, in lives and time.



Structural Repair

The repair of structurally damaged aircraft is an important responsibility of FEAMCOM. Aircraft so badly damaged that they cannot be repaired in the field are brought to Japan for repair. There it is determined if damaged stress members are repairable and repair is economical or if damage is so bad that the aircraft is fit only for salvage. Realizing the importance of structural repairs, FEAMCOM Maintenance Group created the job of "Structural Repair Officer." An officer with a degree in aeronautical engineering was assigned to the Aero Repair Branch and placed in Maintenance Group headquarters to work with the group commander. His job was to design all aircraft structural repairs, or to approve the design, and to conduct a class in structural repair work. This expert supervision and training has done much to raise efficiency of maintenance.



Many of the Japanese mechanics employed by FEAMCOM are veterans of the old Douglas Aircraft factory near Tokyo and are highly skilled in their trades. The vast repair facilities of FEAMCOM include foundries, sheet metal shops, machine shops, wood-working shops, instrument repair shops, plating shops, and testing labs, employing thousands of skilled and semi-skilled workers. Complete production-line repair is made on engines, fuselages, equipment, and instruments.

Supply

Behind the fighting Air Force in Korea is the longest supply line in the world, a 10,000-mile pipeline extending from the east coast of the United States to the 38th Parallel and beyond in Korea. A part of the eight-billion-dollar USAF supply and maintenance network described by the term logistics, the pipeline has its far terminal in FEAMCOM, theater supply and maintenance agency for the Far East Air Forces. When the Korean war immediately swelled the logistics activities of FEAMCOM, monthly supply demands rocketed from 58,000 line items in May 1950 to 257,000 a year later. The vastly expanded needs of support could be effectively met only by slashing the time for United States-to-FEAMCOM shipments. Stocks on hand in general categories could supply a war for as little as four months. No stocks were on hand for the support of new types of aircraft already enroute to the theater. Within Korea complicated transportation problems arose from the surge of the fighting forces up and down the peninsula. Fighter units based on advanced airfields frequently shifted locations under the fluid situation. Every realignment of forces put kinks in the supply pipeline. Improvisations, the order of the day, were supplemented by over-riding priorities, accelerated movement of supplies and equipment, expanded airlift allocations, mechanized requisitioning procedures, automatic shipment of tables of supply for new aircraft, and local purchase and manufacture in improvised shops.

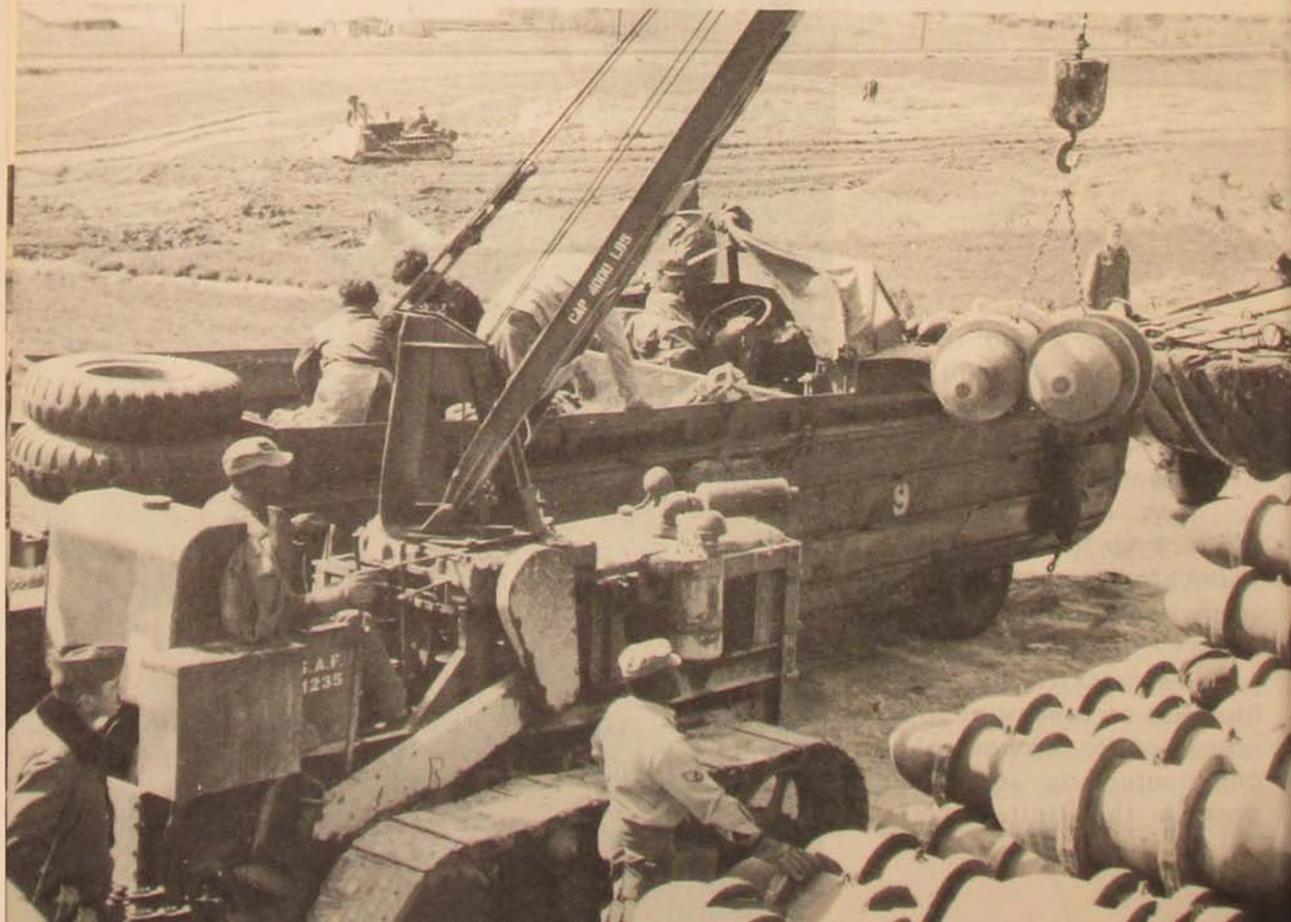
Here is water's end in the longest supply line in the world. At one of the ports in Korea, ocean-going freighters discharge their loads on the dock. FEAMCOM units will pick up the vehicles and distribute them to Air Force combat units. Not too many weeks before, these vehicles were represented by only a line item on a piece of paper, scheduled for mechanical requisitioning on supply depots in the United States.





FEAMCOM's ammunition supply squadron in Korea processes and ships all types of air ammunition to the combat units of the Far East Air Forces in Korea, using the most expeditious means of transportation available, from cargo aircraft to packmules.

Somewhere in Korea five-hundred pound bombs are taken off amphibious trucks and stacked in a FEAMCOM ammunition depot. They will be issued to combat units of the United Nations Air Forces for the final unloading over suitable Communist targets.



Air War in Korea: III

EYES, SPEED, AND ALTITUDE

LT. COL. GLENN T. EAGLESTON

LT. COL. BRUCE H. HINTON

4th Fighter-Interceptor Group

A COMMON STATEMENT among fighter pilots is the often quoted "I'll never get shot down by one I can see." While this statement is open to argument, the most important factor in air-to-air combat between fighter aircraft still is seeing the enemy. In an engagement between high-speed jet aircraft the techniques which were proved in reciprocating aircraft have again been found essentially sound. The exception is in changes imposed by the limitations of the fighter pilot's eyes.

Since the advent of the F-86A in the Korean air war, fighter-versus-fighter combat has been conducted at speeds and altitudes far greater than ever before. The inherent problems of jet fighter warfare were found to be the same as for all tactics in fighter aviation, and the devising of attack and defense methods centered on overcoming the difference made by the new conditions.

Speed, the salient characteristic of the modern fighter airplane, has imposed the stiffest challenge to both the security of the fighter force and the judgment of the pilot. Combat speed of 500 to 650 miles per hour has almost doubled the fighting speeds to which pilots were accustomed, and the high rate of closure of attacking aircraft approaching from abeam, around the front quarter to head-on, skyrocketed their difficulties.

Recognition of an attacker or of an enemy fighter force at the maximum range of the pilot's vision yet leaves, with the high closing speed, little or no time for decision and action. In head-on passes between the F-86 and the MIG-15 the enemy has frequently been lost from sight while a turn was being made to engage. On several occasions the formations of hostile airplanes have flown through each other before either had seen the other. At a closing speed near twelve miles a minute this is understandable, yet it indicates the extreme alertness required of the pilots.

The problem of recognizing the MIG-15 attacking from abeam has shown that the closing speed necessitates immediate action upon sighting. Usually a fast-flying MIG formation is already a threat before it is identified. In some cases enemy attacks have been pressed home despite the fact that the USAF formation leader saw the enemy attacking and broke into his attack. The high speeds of closing and of interception are deceptive and have caused many pilots to fall short on a turn into a MIG-15. Since the speed variation is generally between 500 to 650 knots, it is a safe assumption that the F-86 should be flying in that speed range. But frequent encounters where the MIG was flying at 400 knots or thereabouts proved that too much speed is as hazardous and profitless as too little speed.

Judging the speed of a jet is extremely difficult when it can vary between 400 and 650 miles per hour. The deceleration of an attacking F-86 is

equally difficult if the target is doing some 150 to 250 m.p.h. less. The actual judgment of the speed of a MIG-15 passing below or level has been a severe problem.

An F-86 closing on a MIG-15 with a 50 m.p.h. overtaking speed requires about seven or eight miles to close from 5000 feet to 2000 feet for firing, assuming the target speed is high. In dives or with a longer distance to close, this distance can stretch and has stretched to twenty miles. Thus speed has made it almost impossible to localize an air battle and to maintain concentration of force. Once a fight begins between two planes, there is seldom any one person who can report having seen all or even most of it. The battle generally occupies an area covering 30 miles, at all altitudes from the ground up to 35,000 feet or higher. Swirling dogfights, which usually start in one small area, quickly break up and separate into several fights, and often pilots who have been in the area of the many fights have reported not encountering anyone at all. With the speed and the high operating altitudes of these airplanes, the battles have been extended greatly in depth and the area covered has been more than doubled. Tactics have had to be adapted to meet these handicaps.

Another problem in jet fighter operations is sighting the enemy at high altitudes against the background of dark sky. Here the ranging of a pilot's eyes can be at fault. At high altitudes and except when the sun's rays are glancing directly off an airplane, the reflection of the deep blue sky serves as an effective camouflage. If eyes are not ranged exactly upon the aircraft distance, no sighting is made. Attacking aircraft can slip in without recognition until they are within dangerously close range.

All this enlargement of the sky area to be covered by the eyes of the jet fighter pilot has not enabled him to see any further. Consequently targets in the same piece of air but separated by 15,000 to 20,000 feet in any direction are likely to be missed, particularly since they are in the area very briefly.

F-86 pilots trying to cover the sky at all points of the clock at all levels, and at varying ranges have found how easily they can be surprised. The elements of speed, altitude, and eye ranging often combine to present a firing MIG-15 at five o'clock when the pilot has just finished clearing himself in that direction. It happens often enough to be considered a probability of jet air fighting.

It is recognized that these factors are not unusual and that even their more limited presence in air fighting during World War II was a threat. But their accentuation by greater speeds and higher altitudes has served to emphasize forcefully the limitations of the human eye.

THE BUILD-UP OF ENEMY AIR POTENTIAL

MAJOR PAUL J. STERNE, JR.

Office of the Director of Intelligence, FEAFF

IN 1914, somewhere over Northern France, two airplanes passed each other in flight. As they passed, one pilot fired a revolver at the other. According to combined fact and legend, air warfare had been born. By the end of the war, now numbered as World War "I", fighters in large formations—

large for that day at least—were daily engaging in aerial combat at speeds almost four times those of the early planes.

In the current Korean air war, dating really from November 1950, if we ignore the almost routine manner in which the North Korean Air Force was erased during the previous July, August and September—air combat was initiated by first-line jet fighters of the MIG-15 type, fighting at speeds approaching 600 miles per hour. In June 1951 a U.N. jet fighter on night patrol overran an enemy aircraft near Seoul and was fired on from the rear seat by a hand-held "burp gun." The enemy aircraft had a top speed of only one-sixth that of the jet.

It might seem from this incident that air warfare was advancing in retrograde, at least in the Far East. Lately it has seemed that the aircraft most relied upon by the enemy for offensive action against the U.N. forces in Korea is the PO-2, a biplane trainer aircraft with a top speed in level flight of approximately ninety miles per hour. Since early June 1951 it has been raiding ground positions near Seoul almost nightly in the role of a "very light" bomber. But to assume that enemy air activity should be characterized only in the slightly comic opera atmosphere of the PO-2 operations would be seriously fallacious.

Recent months have seen a steady increase in the numbers of aircraft of all types available to the combined alien air forces presently based in Manchuria, with a complementary improvement in the ability of the enemy pilots to fight these aircraft. Present bases have been expanded and improved, and new air facilities are being added. Reports of air raid practice alerts have been noted in the Chinese Communist press in increasing numbers in recent months, and other reports have alluded to additional air defense measures in the heavily populated areas on the Chinese mainland. Such activity evidences concern over an air defense system, but the principal interest until very recently has been in the formation of an effective air force. Within certain limitations—to be discussed later in some detail—the Chinese Communist efforts have been successful, and U.N. air forces presently in the Far East Theater of Operations face in Manchuria a formidable force. Although in late July this air power had not been committed to the Korean air war to any large degree, it remains a potential danger to U.N. troops and installations and a threat to the maintenance of air superiority over Korea by the U.N. air forces.

Until mid 1950, FEAF Intelligence estimates concerning the Chinese Communist Air Force indicated only an embryonic force armed with a conglomeration of former U.S., British, and Japanese planes and a few second-line Soviet models. This assemblage was manned by a few moderately trained Chinese Communist pilots, a few well-to-moderately trained former Nationalist pilots, and a considerable number of pilots whose training had been sketchy. Indigenous Chinese Communist air efforts begun in 1947 with the establishment of at least one and possibly two training schools in Northern Manchuria—at Chiamussu and Chang Chun—had created little more by 1949 than a training nucleus for an air force. This early training had been carried out almost entirely in Japanese aircraft of doubtful serviceability. Poor ground crew training had been reflected in bad maintenance. There had been almost complete absence of combat capability, and as a result, engagement with the Chinese Nationalists had been avoided whenever possible.

Early in 1950 the picture changed considerably. The signing of the Sino-Soviet Pact in February 1950 gave the Chinese Communists the status of a Soviet satellite, with all the concomitant military advantages. Shortly thereafter a Soviet military mission, accompanied by Soviet aircraft, arrived and systematic training began. Propaganda played up a recruitment program glamorized by the purported immediate allocation of Soviet aircraft to the CCAF. This period might be construed as the actual foundation of the present Chinese Communist Air Force.

By the latter part of May 1950 reports indicated that the CCAF had about 175 operational aircraft, including some 50 former U.S. and British aircraft still in good condition; 50 former Japanese fighters; and 75 newly received Soviet aircraft, mostly of the Lavochkin series—La-7's and La-9's—and some ground-attack planes of the Il-10 type. Spare parts and aviation gasoline, although still critical, were being supplied by the U.S.S.R. on a continuing basis. It was estimated that the CCAF probably could sustain operations of its entire force for about thirty days under combat conditions. Training had been concentrated at Chiamussu, to derive maximum advantage from the services of the Soviet instructors and the new Soviet training planes; but language differences and the limited formal education of the majority of the Chinese trainees had caused difficulty. It was estimated that the CCAF then possessed about three hundred trained pilots, and that possibly another six hundred would be sufficiently trained for assignment to operational units within six months.

Information on the establishment and training of the North Korean Air Force is notably scarce, but it is known that aircraft were provided by the Soviet while it occupied North Korea and that training and organization of an air division of two regiments was completed before the withdrawal of Soviet forces. At the start of the North Korean aggression in June 1950, estimates gave the North Korean Air Force 145 combat aircraft, about half fighters of the conventional YAK fighter type and the rest ground-attack models. Adequate air base facilities had been developed at several centers, principally at Pyongyang, Sinuiju, Wonsan, Yonpo, Pyonggang, and Sinmak, and events proved that maintenance, supplies, and fuel had been provided for at least several months' combat operations.

OPERATIONS of the Korean air war can be divided into two phases: a first phase, in which it is believed the North Korean Air Force fought alone, and a second phase, which has seen to date the commitment of modern jet fighters in addition to conventional types.

As previously stated, the NKAF possessed approximately 145 combat aircraft on 25 June 1950. Under sustained attack this force disintegrated, and on 30 September 1950, U.N. fighters claimed two enemy aircraft destroyed, ending the air-to-air combat of the first phase of the Korean operation and marking the reduction of the NKAF to five aircraft and its forced withdrawal to bases across the Yalu River. No further enemy activity was observed over North Korea until the appearance early in November of jet fighters. It is believed that a reconstituted NKAF is currently in the process of organization, and undoubtedly it will eventually be recommitted to action over Korea, much as the reconstituted North Korean Army was recommitted following its shattering defeat of October and early November. For the remainder of this discussion the NKAF will be treated not as an

entity but as a part of the so-called "combined alien" air forces in Manchuria.

Although it is believed that the CCAF—with associated Soviet air forces in China and Manchuria—did not intervene during the first phase of the Korean air war, efforts were intensified to organize the existing CCAF units into a combat-ready force. It is known that aircraft continued to arrive in Manchuria from the U.S.S.R. A number of first-line jet fighters of the MIG-15 type were observed over Shanghai and Canton during July and August, and Soviet Air Force personnel were seen in increasing numbers on the streets of the larger cities. Not until early in the fall of 1950 was it determined that organized combat units of the CCAF had been stationed on Manchurian bases. Before then it was assumed that a large portion of the flying observed during the summer and early fall was by Soviet aircraft. But by late October sufficient information on the growth of the CCAF had accumulated to support an increase in its estimated strength, even though it was increasingly difficult to distinguish between aircraft belonging to the indigenous CCAF and those specifically belonging to the Soviets but operating either as a part of or in conjunction with the Chinese Communists. Consequently the intelligence estimate made by FEAF in November 1950 credited the "combined" air forces with a total of approximately 500 aircraft, stating that "probably" 300 of these were organic to Chinese forces. This force was broken down into about 200 fighters of conventional types (F-51's, La-5's, La-7's, and La-9's, YAKs of several models, and some jets—although doubtful); 75 light bombers of the Tu-2 type, and about 25 transports of the C-47, C-46, and Li-2 types. It was believed that the rest of the aircraft included a considerable number of MIG-15 jets, probably half of the remainder.

SWEPT-WING jets of the MIG type had been seen during the summer in China proper and on a few occasions were reported over North Korea during the first months of combat. None were confirmed as taking active part in the air engagements, until the first week in November, when they began to appear in small numbers over the area immediately contiguous to the Yalu River. The second phase of the air war—that of the commitment of the combined alien air forces—can be dated, then, from 1 November, the first day enemy jets in any numbers were seen in combat. On that day six to nine jets attacked a flight of four F-51's, only to receive a beating and break off the attack with two damaged.

During the late fall of 1950 and the early part of 1951 reports showed a continued flow of combat aircraft into Manchuria. Training stations specifically established for the newly reborn North Korean Air Force were identified at two bases in Manchuria, and there were indications that some aircraft were being moved into a few North Korean airfields, particularly Sinuiju, Pyongyang, Sariwon, and Pyonggang. However U.N. counterairfield sweeps contained this incipient effort, and little actual operation was noted from any of these fields.

But even aerial surveillance supported by counteroperations could not entirely suppress enemy airfield construction. In fact the enemy's program has been one of the strangest phases of the entire Korean incident. All fall, even while the North Korean army was streaming northward, airstrips continued to be filled in and rolled flat, and revetments continued

to appear, though in some cases the airfields were almost within U.N. hands. This activity has continued throughout 1951. A few aircraft have operated from some of the airfields, but again U.N. air efforts have made the air facilities inoperative on any scale, forcing the enemy to retain the great majority of his operational air power on Manchurian bases, within the "sanctuary." The single exception to this rule has been the considerable installation at Sinuiju, where a small number of conventional fighters and ground-attack aircraft have been based. But at this extreme location, sweeps have struck the base whenever reconnaissance has revealed a sizable force of enemy aircraft, and the enemy has moved back across the river.

By December FEAF Intelligence estimated that there were available to the combined command—although not all were based in a manner to support Korean operations—a total of 650 combat aircraft, a probable 400 of which were specifically employed by the CCAF/NKAF and the remainder under exclusive control of the Russians. In February this figure was again raised, this time to 750, the additional 100 aircraft all reflecting an increase in the CCAF/NKAF. In May the total was further revised to 900 combat aircraft.

In the May estimate FEAF attempted for the first time to evaluate the success of the training program for flying personnel and credited the CCAF/NKAF with approximately one thousand trained, combat-ready pilots. It was believed that the additional aircraft were principally MIG-15 or MIG-9 jet fighters and a few Tu-2 light bombers, the majority of which were added to the formidable forces already present on Manchurian bases. It was accepted that organization of the CCAF and the reconstituted NKAF had progressed to the stage of nearly full-strength air regiments, with disposition probably coinciding with the Chinese Communist political organization of military and administrative districts. But the great weight of the air forces remained in the northeast district, that part of Communist China which contains Manchuria and borders on Korea.

Most recently, as announced by Headquarters, USAF, it is believed that the U.N. air forces in Korea face an enemy air force composed of three elements: units of the Soviet Air Force, which are committed to the combined command, Manchurian-based units of the CCAF, and all the North Korean Air Force. This "combined" air command, sometimes referred to as the "alien air forces in Manchuria," is equipped with a force of combat aircraft numbering slightly over a thousand planes. The largest portion is composed of fighter aircraft, many of which are first-line jet fighters. The force is complemented with light bombers, ground-attack aircraft, and a relatively small number of transports. There seems to be a sufficiently strong command organization to control the operations of this force, and the area in which these aircraft are based contains a considerable number of well-equipped and maintained air facilities.

One of the weakest points of the NKAF and the CCAF, as independent forces, is their almost complete dependence on the Soviet logistical system for supply and maintenance. It is probable that for some time neither of these air forces will have enough trained ground personnel to maintain effectively the combat aircraft, even under limited operational conditions. Should for any reason the U.S.S.R. withdraw its logistical support and advisory assistance, it is reasonable to assume that within a short time

the combat capability of both air forces would drop sharply. This is not to say that either force may be ignored, or that an ultimate development of independent maintenance and training services is impossible. It is simply that within the foreseeable period of the Korean incident it is most improbable.

With continued support by the Soviet both the CCAF and the NKAF will undoubtedly continue to expand and to improve in combat efficiency. But should these forces be committed to large-scale air operations in the near future, their planned, unhampered expansion would come to an abrupt halt, although they might wreak severe damage on U.N. forces and installations in both the battle and rear area. In the past their aircraft have exposed themselves to attack by U.N. air forces only in limited numbers and only when conditions favored a quick withdrawal. Under a near maximum commitment of these combined air forces to combat over or near U.N.-held Korea, these conditions could not hold, and considerable losses would certainly be inflicted upon them. In addition, although this must be considered only a possibility, retaliatory action could result against their formerly secure bases within the "sanctuary." All possibility of their achieving even potential air superiority within the near future would be eliminated and they would be exposed to a rate of attrition similar to that which earlier reduced the NKAF to the point of extinction.

It must be considered, however, that time is to the benefit of the enemy. Each additional month of delay in commitment of the CCAF/NKAF to aerial combat provides for further expansion of an offensive air capability, increases the probability of greater damage to U.N. efforts, and, finally, reduces proportionally the likelihood that an all-out effort by the enemy would cost him prohibitive losses.

INTERVENTION BY CHINESE COMMUNISTS

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WITH the intervention of the Chinese Communists during the month of November 1950 the United Nations advance in Korea was abruptly reversed.

On 1 November 1950 the U.N. ground forces stood within approximately twenty miles of the Manchurian border. Tactical air units had been deployed to place three conventional type [piston-engined] fighter groups, six jet fighter squadrons, one tactical air control squadron, and a detachment of an air rescue squadron in Korea along with Fifth Air Force's advance headquarters, then in Seoul. Light-bomber units were staging from Korean bases, a tactical control group was busily refining its communications facilities, and the Eighth Army-Fifth Air Force Joint Operations Center was functioning effectively. Several fighter squadrons operated from bases in North Korea, and enemy air activity had every appearance of having been well neutralized.

With the entry of the Chinese Communist forces into the Korean war,

there came a marked increase in enemy air activity. On 5 November 1950 the enemy air force was suddenly alive, shifting from sporadic sneak attacks to bolder tactics of intercepting U.N. fighters and bombers. Increasingly frequent sightings of enemy aircraft crossing the Yalu River, the sudden increase in enemy air activities after 1 November 1950, the appearance of enemy aircraft in numbers greater than the estimated strength of the NKAF, and the appearance of sweptback-wing jets, elliptical-wing jets, and B-29-type aircraft collectively revealed that elements of an air force other than the NKAF had entered the Korean war.

Throughout November and December the enemy took advantage of the Manchurian "sanctuary" by utilizing air facilities north of the Yalu River. His aircraft continued to enjoy their advantage of scooting across the border to escape from adverse situations. Some air attacks were made against U.N. forces as far south as Pyongyang but generally by small forces of conventional fighters or by individual slow-flying biplanes. MIG-15 aircraft, often encountered in the vicinity of Sinuiju, were consistently outmaneuvered by F-51's and F-80's; and upon the arrival of F-84's and F-86's on combat air patrol or escort missions in "MIG Alley," the MIG-15 losses mounted rapidly. The first F-86 kill of a MIG-15 was made near Sinuiju on 17 December 1950 by Lt. Col. Bruce H. Hinton during the first engagement of these jet fighters. After the loss of one F-86 on the morning of 22 December 1950, the F-86's returned to the Sinuiju area in the afternoon and destroyed six MIG-15's with no losses or damage to themselves.

Because of the U.N. forces' withdrawal to the south early in December, Fifth Air Force units north of the 38th parallel were redeployed to bases in South Korea. Other units were redeployed to Japan for conversion to jet aircraft, and an F-84 group was redeployed from Japan to Korea. By 10 December 1950, when U.N. forces in North Korea were split by Chinese Communist forces, those in the eastern sector held a defense perimeter around the Hungnam area until all friendly forces were evacuated later in the month. Fifth Air Force, Marine, and 77th RAAF conventional fighters based within this perimeter provided close support and air cover for the Hungnam evacuation and for the U.N. ground forces engaged in the bitter, fighting withdrawal from the Choshin Reservoir and flew reconnaissance of the northern and eastern sectors of North Korea. Fighters from the Hungnam perimeter were the last to operate from a North Korean base and were redeployed to South Korea on 17 December 1950.

On several occasions the rapid advance of Chinese Communist forces in North Korea isolated groups of U.N. ground personnel. The versatility of the Mosquito aircraft,* which seemed to reach no limit, was most evident in the assistance it afforded such groups. Among the Mosquito's accomplishments were deep reconnaissance to assist in removing road-blocks of enemy troops, night reconnaissance to check enemy movement over main supply routes or to spot artillery positions by their muzzle blasts, spotting enemy strongpoints in the vicinity of isolated

* [The familiar basic trainer aircraft [T-6] used in Korea for front-line reconnaissance required by ground troops, for marking targets in front-line areas, and for directing high-speed aircraft to such targets.]

groups and advising those isolated of a safe route around such strong-points, locating U.N. prisoners or downed airmen and coordinating their rescue by air or ground units, and marking enemy targets for attack by friendly aircraft.

Major General John H. Church, Commander of the 24th Infantry Division, stated on 12 December 1950 that the close support provided the division at the direction of a Mosquito aircraft was instrumental in saving approximately two hundred American lives during the withdrawal of elements south of Kunu-ri on 30 November. Once, while covering the withdrawal of those 24th Infantry Division elements, a Mosquito spotted an estimated 10,000 enemy troops deployed in a road-block directly ahead and in the path of a 24th Division convoy. The Mosquito warned the convoy it would soon come under attack, called in fighters, was cleared by the ground commander to mark targets for attack fifty yards beyond either side of the road, and remained in the area for a period of five hours to mark targets for friendly fighters. Twenty-eight flights of fighters and light bombers were worked by the Mosquito during this period, and the convoy was able to continue slowly southward. Another time the Mosquito spotted a Banzai charge by a large number of enemy troops down a hillside toward the center of the convoy. It fired a smoke rocket into the lead of the charge, and F-51's immediately swooped down and dropped their napalm, scoring direct hits which effectively stopped it. The retention of air superiority by Fifth Air Force had made possible such uses of the Mosquito, which were widely appreciated by U.N. ground forces. During December F-84 and F-86 aircraft were employed with Mosquitoes for the first time. The F-84 proved to be highly effective in close-support in conjunction with the Mosquito, but the characteristics of the F-86 at low level precluded its continued use in such operations.

Upon the withdrawal of U.N. forces to their re-established defense line just below the 38th parallel, Fifth Air Force initiated an intensive interdiction campaign. The advance of Chinese Communist forces to points below the parallel had lost its momentum as a result of extending supply routes, which were being hammered at a steadily increasing tempo by the Fifth Air Force. Rail lines and key rail bridges became top priority interdiction targets and were attacked periodically to disrupt any efforts at reconstruction revealed by photographic or visual reconnaissance. But adverse weather and the more pressing need for close-support operations temporarily limited the intensity of the interdiction program during the winter months.

Early in January 1951, when the Chinese Communists had captured Seoul and were pressing southward, Fifth Air Force Headquarters withdrew to Taegu, and only those elements considered essential to the operations of its units remained in Korea. The enemy had achieved his gains primarily by sheer numerical superiority of man power, but in so doing he had suffered 42,000 troop casualties inflicted by Fifth Air Force during December and January.

Tactical-fighter and light-bomber units based as far as 350 to 400 miles from the front lines now maintained proportionately high sortie rates by staging from more forward Korean bases. The interdiction campaign against enemy supply routes had begun to make the enemy wary of ex-

posed movements and concentrations of supplies. Movements of his convoys and trains became restricted to darkness, and skillful camouflage made targets more difficult to find. With improving weather emphasis was again given to night-intruder operations to counter his tactics. This forced the Chinese to move without lights most of the time, which impeded their progress but did create the problem of finding their traffic on dark nights. Flare-drop missions were then initiated by B-26 aircraft with considerable success. Subsequently the use of C-47's for flare drops proved more satisfactory and was extended to cover busy front-line areas. Flare-illuminated low-level intruder tactics became an important contribution to both interdiction and close-support operations. On occasions C-47 flare-drop aircraft also were used to illuminate battle areas throughout an entire night for ground force observation of the enemy.

As additional reconnaissance aircraft became available, battle areas and routes of supply were subdivided into geographical sectors, and each sector was reconnoitered daily. RF-51 aircraft were equipped with .50 caliber machine guns and assigned photo or visual reconnaissance missions in front-line areas. These aircraft also attacked enemy troops, vehicles, or other targets of opportunity and frequently assisted in directing fighter-bombers in strikes against lucrative targets they had located. RF-80's were employed in daylight photography of enemy airfields, supply, and communications lines, and RB-26's were used in providing night photographic coverage. This reconnaissance coverage deprived the enemy of effective use of airfields within Korea, as it resulted in almost daily fighter sweeps and bombing attacks upon them. It also provided ground and air commanders with continuous information on enemy movements and capabilities.

The losses suffered by the enemy from the intensive twenty-four-hour, all-weather campaign against his front-line dispositions and his supply routes was reflected in his meticulous camouflage techniques. Enemy troops wore reversible clothing with one side white for winter use and the other side green or brown. Bivouac areas and artillery batteries were cleverly dispersed in orchards or woods, and armored vehicles were concealed within or beside buildings and sharp defiles. Increased dispersion and caution in the selection of supply routes made it increasingly difficult to find and attack large groups of enemy vehicles.

One of the many "firsts" coming from the Korean war is the extensive use of radar-controlled night and all-weather bombing of close-support and interdiction targets. The systems used are refinements of those of World War II. Both radar-controlled B-26's and B-29's have been accredited with the destruction of enemy positions in front-line areas. These systems also have contributed to the effectiveness of the interdiction campaign in pinpoint bombing of targets like supply points, road junctions, and bridges. The following statement made by Major General Edward M. Almond to Lieutenant General Van Fleet on 16 April 1951 exemplifies the effect of combined radar-controlled and flare-drop operations:

"Of significant interest in last night's activities was the effective part played by night air attack and the exhibition of close cooperation between Fifth Air Force, Naval Air, and my ground troops. Commencing at 142100 hours, one B-26, bombing by radar, planted several 100-pounders on a group of enemy reportedly building up just ahead of

the 17th Infantry. Shortly thereafter, artillery placed star shells on the four corners of the same area; a C-47 then sewed strings of flares across the marked area, permitting Navy F4U's to strafe with their explosive 20 mm. This devastating performance was repeated periodically until 0330 this morning. The aftermath pleases me, as I am sure it will you—this afternoon ten North Koreans gave up, saying they just could not fight all day and stand bombing all night. The effectiveness of this bombardment was especially gratifying inasmuch as dense ground haze, coupled with smoke of burning grasslands, had severely restricted employment of close air support during the day."

OPERATION KILLER was launched by General Ridgway during March 1951 for the express purpose of decimating the ranks of the Chinese Communist and North Korean forces. The stated primary objective was the destruction of the enemy, with the secondary objective the acquisition of geographical gains that might result from the destruction of the enemy with minimum friendly losses. At that time the U.N. forces were along a line from the west coast along the south bank of the Han River to Yanpyong-Chipyong and thence generally to Kangnung on the east coast. During the period of "Killer," enemy activity was characterized by steadily increasing vehicular activity in the areas immediately behind his front-line positions. The area contained within a line connecting Chorwon-Kumwha-Pyongyang was observed to be the principal enemy assembly and supply stockpile area. Eventually it became known as the "Iron Triangle." Periods of poor visibility caused by brush fires and smudge pots ignited by the enemy to screen his movements were encountered in this area, and radar-controlled bombing was effectively used in sustaining attacks on targets.

As the U.N. ground forces wore forward in "Operation Killer," the capability of the aircraft as an antipersonnel weapon was further demonstrated. Fighters and light bombers exacted a tremendous toll of enemy troops, particularly when they were openly committed to an attack or a retreat. A Chinese prisoner of war stated that about 30 May his battalion was severely bombed, rocketed, and strafed by U.N. fighters. The battalion, which at that time consisted of 600 troops, was caught assembled in the open and suffered 200 killed and 230 wounded from that attack. A few days later its remnants were again attacked in a narrow valley, leaving less than 150 survivors in the unit. Napalm has been effective against troops in bunkers and other well dug-in positions where other weapons have failed. During March and April enemy troop casualties from air attack averaged over 10,500 per month, and an estimated 20,500 casualties were inflicted by Fifth Air Force aircraft in the month of May. These estimates are considered very conservative. On many occasions hills described as "crawling with enemy troops" were completely covered with napalm, and accurate estimates of casualties from such attacks are impossible.

While maximum support was being maintained for the U.N. ground forces during this period, close reconnaissance was also made of the work on enemy air bases in North Korea. On 9 May Sinuiju airfield was heavily attacked. Fifteen conventional fighters were destroyed and large stores of supplies, and the only appreciable attempt by the enemy to operate his aircraft from bases within Korea since early in the war was effectively eradicated.

From the early part of this year there has been a marked increase in the intensity of enemy anti-aircraft fire. Occasionally flak traps of temptingly exposed targets bordered by high terrain containing concealed anti-aircraft weapons were encountered. Increased losses of friendly aircraft from stronger concentrations of enemy ground fire developed a variety of fighter-bomber tactics. Armed reconnaissance missions were flown with higher power settings and resulting high speeds. Interdiction targets known to be heavily protected by automatic weapons and heavy anti-aircraft guns received special loads of rockets and bombs equipped with variable time [proximity] fuses. When attacking a target independently, the fighter-bomber sometimes fired VT rockets on its initial pass at the target area and released bombs or made strafing runs on subsequent passes.

In March MIG-15's were venturing as far south as a hundred miles from the Yalu River. The MIG pilots appeared to be more aggressive than they had been. F-80's and F-51's continued to hold their own in their encounters with MIG's, destroying and damaging several with relatively minor damage in return. Although the MIG's had a large advantage in speed over these aircraft, U.N. pilots had little difficulty in outclassing them. It has been the tendency of the MIG pilot to attempt to fight the F-80 on equal terms, and he has often made such errors as reversing direction of turn or trying to turn with the F-80.

The entry of F-84 and F-86 aircraft into the Korean war resulted in the MIG-15's being primarily employed defensively near the Yalu River. Through 24 June 1951, F-86's had destroyed 39 MIG's, probably destroyed 6, and damaged 70. The F-84 score for this period was 6 MIG's destroyed, 5 probably destroyed, and 24 damaged. On 7 April 1951 48 F-84's escorted 36 B-29's in an assault on the primary railroad bridge across the Yalu River from Antung to Sinuiju. An estimated 70 MIG-15's attacked the bombers on the bomb run, and in the battle that ensued the F-84's destroyed one MIG-15 and damaged two others and suffered minor damage to only one aircraft. A similar encounter occurred on 12 April when F-84's and F-86's were joined in escort for B-29's to the same target. An estimated 100 MIG-15's were committed by the enemy against this attack. Some damage was inflicted on the medium bombers, but the friendly fighters continued to maintain their advantage of superior pilotage and gunnery.

On 25 June 1951 total Fifth Air Force claims against MIG-15's were 61 destroyed, 18 probably destroyed, and 165 damaged. Total score against all type of enemy aircraft attacked both in the air and on the ground is 129 destroyed, 38 probably destroyed, and 232 damaged. This destruction was inflicted at a loss to Fifth Air Force of 4 F-86's, 1 F-84, and 3 F-80's in air-to-air encounters. One of the F-80's was lost and a MIG-15 destroyed when the two collided during a dog fight over Sinuiju. Captain James Jabara became the first jet-to-jet ace in history on 20 May 1951 when he ran his MIG-15 victories to a total of 6 destroyed, 1 probably destroyed, and 4 damaged.

Against ground targets Fifth Air Force claims on 25 June 1951 include 778 tanks destroyed and 671 damaged, 15,131 motor vehicles destroyed and 11,315 damaged, 385 locomotives destroyed and 410 damaged, 3372 railroad cars destroyed and 9000 damaged, 262 bridges destroyed and 931 damaged, 1670 guns destroyed and 969 damaged, and over 126,000 troop casualties.

At the start of the Kaesong cease-fire conferences, U.N. forces had

reached once again the 38th parallel and had advanced as far as forty miles north of the parallel on the east coast. Pending the results of the conferences, Fifth Air Force continued to conduct business as usual.

FEAF: MISSION AND COMMAND RELATIONSHIPS

COLONEL DON Z. ZIMMERMAN

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FAR EAST AIR FORCES (FEAF) is the air component of Far East Command, in which the coordinating authority, the Unified Commander, provides overall direction of the operations of the three separate Service components. FEAF had certain basic missions stemming from the basic functions of the United States Air Force. These included attaining and maintaining air superiority, detection and destruction of enemy forces, air defense, intra-theater air transport and troop carrier operations, aerial reconnaissance, and support of the operations of the two other major components of FEC.

The entry of the United States into the Korean conflict required an expansion of these missions to include air operations against the enemy forces and military potential in Korea. The responsibility for air action then required additional air forces, which were provided within the capabilities of the United States Air Force. To control and utilize these augmented forces properly, FEAF modified its command structure.

The assignment of several Strategic Air Command medium bombardment groups to FEAF precipitated the establishment of FEAF Bomber Command, Provisional (FEAF BOMCOM), a command directly subordinate to FEAF and exercising operational control of all medium bombardment groups in the theater, including a group previously assigned to a FEAF numbered Air Force. As the war progressed and the Fifth Air Force advanced its main base areas into Korea, the 314th Air Division was formed as a major command of FEAF to assume the responsibilities of the Fifth Air Force in Japan, including air defenses of Japan and joint operations with ground forces remaining in Japan. Similarly, with the expansion of the FEAF air transport capability by the addition on temporary duty of Military Air Transport Service and Tactical Air Command units, all troop carrier forces and operations were integrated into another FEAF major command, the 315th Air Division [Combat Cargo Command, Provisional]. FEAF BOMCOM and the 315th Air Division originally were both provided logistical and base support by the Fifth Air Force. Later this responsibility was assumed by the 314th Air Division. The 315th Air Division now provides its own support. The other major commands of FEAF and their responsibilities remained essentially unchanged.

Participation in the Korean war by air units of several of the members of the United Nations did not introduce any outstanding problems in command relations. Those air units performing USAF missions were attached for operational control to the appropriate FEAF commands and have operated as integral parts thereof. Other air units, performing U.S. Navy missions, such as the Royal Air Force patrol squadron, were placed under the operational control of Naval Forces, Far East (NAVFE).

Pursuant to the basic missions of the USAF, FEAF commands, controls, or coordinates all air operations in the air-ground campaign in Korea. Current doctrines in joint air-ground warfare have contributed greatly to the success of the air campaign. The command relations embodied in these doctrines are sound. Objective and searching consideration may well be given to the possibility of adopting similar principles of command relations in all levels of joint operations.

The Fifth Air Force, being the FEAF agency charged with tactical air operations in Korea, cooperates with the Eighth Army in planning and in operations, utilizing the Joint Operations Center (JOC) as the coordinating agency for operations. In addition to exercising operational control of Marine Corps land-based air units, the Fifth Air Force also coordinates through the JOC and the NAVFE water-based air effort whenever these Navy and Marine units are assisting in the performance of USAF missions. Through the JOC the Fifth Air Force also provides the tactical air direction of BOMCOM aircraft and NAVFE carrier-based aircraft when these aircraft are performing close-support missions. FEAF, largely through the Fifth Air Force, provides air bases and facilities, air base support units, and other necessary logistical support to Naval and Marine air units.

The cleavage of responsibility for the ground campaign in Korea, resulting from the activation of the X Corps as a separate command, concomitantly introduced an additional command other than the Eighth Army with which the Fifth Air Force cooperated in discharging its air-ground responsibilities. Assignment of the X Corps to the Eighth Army, subsequent to the Hungnam evacuation, eliminated this situation.

The Korean campaign has again demonstrated that command relations must be primarily based upon the responsibilities of the various commands. Interservice command relations cannot be defined categorically, being difficult in definition as a result of the overlapping of the primary and collateral functions of the services. However these command relations provide the basic structure for the cohesive coordination of effort. Successful and integrated multiservice operations depend not only on an axiomatic delineation of command relations but also on mutual respect and confidence and understanding of the basic functions and responsibilities of the various services.



Air Force REVIEW

The Expanding Air Force: 1 January to 1 August 1951

American Air Power is and has been undeniably one of the major factors in deterring further military aggression by the Communist world. To provide superior air power in all its phases and superior air forces in being, the United States Air Force is taking great strides in its long-range program of expansion. This expansion, gauged to the rapid progress of American technology demands an organization flexibly adaptable to new and constantly changing weapons, operational skills, strategy, and techniques. Listed below, by commands, are brief accounts of the upper-echelon Air Force organizations activated or reorganized during the seven months beginning 1 January 1951. Expansion during this one period alone provides two new major commands, six new air forces, eighteen more air divisions, and twelve auxiliary units—the latter falling into such categories as projects, forces, centers, or services. The sum indicates a part of the Air Force contribution to the growing strength of the free world.

Headquarters, United States Air Force

The *Air Force Finance Center* (AFFC), activated on 1 January 1951, is located at Denver, Colorado. Commanded by Brigadier General John R. Gilchrist, who also serves as the USAF Deputy Director of Finance, AFFC supervises the Air Force finance network. Among its major responsibilities is the expeditious issuance of Air Force personnel allotment checks. During the first eight months of operation AFFC concentrated on internal operating problems, including the integration of responsibilities transferred from the Directorate of Finance. It is now ready to unite all Air Force finance units for effective service. Organized as a separate agency under the technical supervision of the Directorate of Finance, the Center consists of seven operating divisions: Accounting, Allotment, Central Disbursing, Disbursing Advisory, Liaison, Military Pay, and Settlements. Its eighty officers and three thousand civilian employees are housed in eleven buildings covering thirty-seven acres. During the month of August 1951, its second full operational month, AFFC handled 551,000 allotment checks.

The *Air Pictorial Service* (APS) was activated in April 1951 to provide centralized supervision of USAF photographic functions and requirements, a responsibility which was formerly scattered among the major commands and within several offices of the Air Staff. Commanded by Colonel Brooke E. Allen, APS is located in Washington, D. C., with components situated throughout the United States and overseas. Its mission is to control all Air Force activities in photography and television, with the exception of reconnaissance photography. APS also organizes the units necessary to accomplish its mission and trains personnel in special photographic techniques when that training is not available elsewhere in the Air Force. Squadron detachments are deployed to secure photographic coverage in key areas.

Strategic Air Command

To improve operational control at bases where two or more wings are assigned, Strategic Air Command (SAC) has revived the air division. The command role of the air division as arbitrator, supervisor, and inspector, created by the Eighth Air Force in the United Kingdom during World War II, is intended to increase the effectiveness of the wing commanders and their staffs, to bring organizations in line with the specialized maintenance program which SAC has developed, to make the wing organization compatible with mobility plans, and to increase the general effectiveness of wing administrative procedures. Some of the recent divisional activations by SAC include 57th Air Division (Fifteenth Air Force), 47th Air Division (Eighth Air Force), 19th Air Division (Eighth Air Force), 42nd Air Division (Eighth Air Force), 6th Air Division (Second Air Force), 40th Air Division (Second Air Force), 7th Air Division (Hq. SAC), 4th Air Division (Second Air Force), 14th Air Division (Fifteenth Air Force), 5th Air Division (Hq. SAC), 12th Air Division (Fifteenth Air Force), and 21st Air Division (Hq. SAC).

Air Defense Command

Air Defense Command (ADC), formerly subordinate to Continental Air Command, became a separate major command on 1 January 1951. Charged with the responsibility of conducting the air defense of the United States, ADC is also prepared, through its subordinate units, to support the operations of SAC and Military Air Transport Service, to conduct antisubmarine warfare, and to administer, equip, train, and prepare for combat the crews attached or assigned to it.

Eastern Air Defense Force (EADF), originally activated on 1 September 1949 as a subordinate command of Continental Air Command, was transferred to Air Defense Command jurisdiction on 1 January 1951. From its headquarters at Stewart AFB, Newburg, New York, Major General Frederic H. Smith, Jr. directs the operational units of EADF's air defense system in nineteen states and the District of Columbia, an area containing more than half the population of the United States and the nation's most vital industrial installations. EADF's fighter wings and squadrons are equipped with F-86's, F-94's, and F-84's. Veteran fighter wings, tactically deployed throughout the command area, have been supplemented by recalled Air National Guard wings, many of which came on active duty with jet equipment. Transition to jet aircraft in all wings is being undertaken by an EADF training program. Navy fighters are integrated into the defense system for use in emergency. In performance of its mission—to deny to a potential enemy the air space over the nation's industrial heart—EADF works in close liaison with the Eastern Army Antiaircraft Artillery Command and the Navy's Eastern Sea Frontier.

Western Air Defense Force (WADF), originally activated on 1 September 1949 under the jurisdiction of Continental Air Command, became a subcommand of ADC on 1 January 1951. It is commanded by Major General Hugo P. Rush, with headquarters at Hamilton AFB, California. It maintains administrative, logistical, and operational control over its air defense divisions and all fighter wings assigned in the western area. Aircraft

control and warning groups are directly under the air divisions. To protect the western United States from enemy air attack, WADF units are equipped with F-94's, F-84's, F-86's, and the new F-89 Scorpions.

No information is available on the *29th Air Division (Defense)*, a recent activation under Western Air Defense Force.

The *34th Air Division (Defense)*, at Kirtland Air Force Base, New Mexico, is responsible for the air defense of an area comprising New Mexico, Arizona, part of Colorado, Utah, and Nevada. To defend this strategic region, where many atomic weapons projects are located, the 34th maintains a radar network, antiaircraft and fighter interceptor units, an air defense control center, a military-civil air raid warning system, and point-to-point and ground/air communications system. The majority of the 34th's officers and airmen are World War II veterans or Korean combat returnees—experienced in the various phases of air defense.

Central Air Defense Force (CADF) was created to fill the gap between the Eastern and Western air defense forces. It has taken over an area comprising twenty states—including the entire South and Southeast and a belt in the Midwest from the Texas Gulf Coast to the North Dakota-Canadian border. The full strength of Eastern Air Defense Force therefore can now be concentrated on the Great Lakes, the northeast and the east coastal areas of the United States. CADF is commanded by Major General George R. Acheson, and headquarters are in Kansas City, Missouri. On 20 May 1951 Eastern Air Defense Force transferred all operational and administrative control of units within the new area to CADF. CADF is also engaged in recruiting and training civilian volunteers for an expanded ground observer corps.

The *33rd Air Division (Defense)* was activated on 19 March 1951 under EADF and later transferred to CADF. Commanded by Colonel Victor H. Strahm, the 33rd is located at Tinker AFB, Oklahoma, and is presently undergoing a broad internal training program.

The *35th Air Division (Defense)*, the newest link in CADF's defensive chain, has recently been activated. Details of manning and equipment have not yet been announced.

Air Training Command

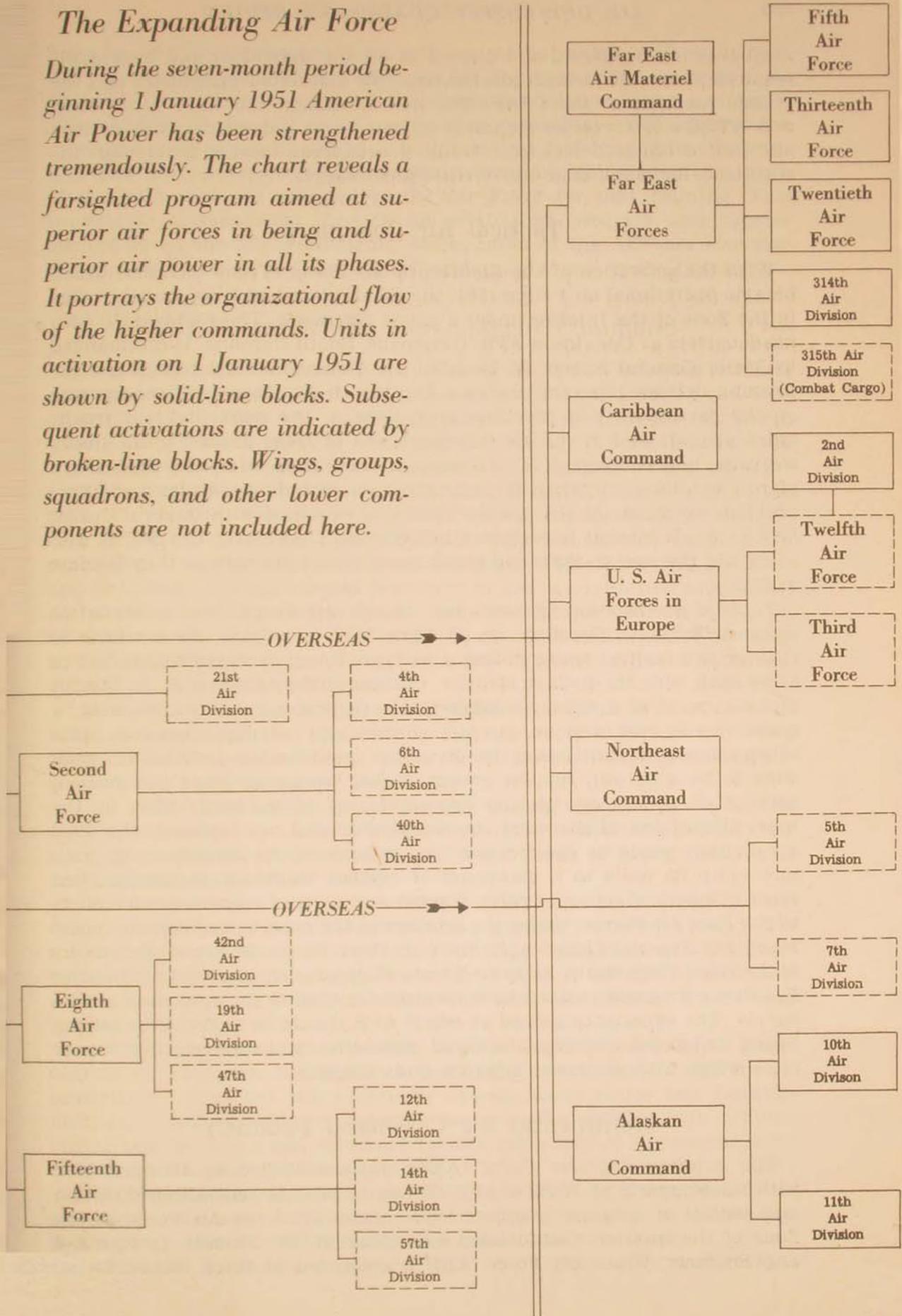
Any sizable expansion of the USAF necessarily includes expansion of Air Training Command (ATRC). Early this spring, at the recommendation of Lieutenant General Robert W. Harper, Commanding General of ATRC, the USAF approved establishment of two subordinate headquarters to ATRC, designated as the Flying Training Air Force (FTAF or FlyTAF) and the Technical Training Air Force (TTAF or TecTAF).

Flying Training Air Force was activated on 1 May 1951 at Waco, Texas, under the command of Major General Warren R. Carter. At the beginning of its operation on 15 May the new command assumed control and supervision of the flight training of pilots, navigators, bombardiers, radar observers, and combat crews. The twenty-seven bases (with four more proposed) falling under the jurisdiction of FlyTAF extend from coast to coast.

Technical Training Air Force, with headquarters to be established at the Gulf Coast Military Academy near Biloxi, Mississippi, is commanded by Major General C. C. Chauncey. TecTAF will control and supervise the tech-

The Expanding Air Force

During the seven-month period beginning 1 January 1951 American Air Power has been strengthened tremendously. The chart reveals a farsighted program aimed at superior air forces in being and superior air power in all its phases. It portrays the organizational flow of the higher commands. Units in activation on 1 January 1951 are shown by solid-line blocks. Subsequent activations are indicated by broken-line blocks. Wings, groups, squadrons, and other lower components are not included here.



nical training of officers and airmen in all the individual and crew skills required to operate aircraft mechanisms, the associated equipment, and the ground facilities of the USAF. The new command will have jurisdiction over ATRC's seven major technical schools, three indoctrinational centers, and half a hundred technical training squadrons located at civilian institutions, including state universities and colleges.

Tactical Air Command

With the activation of the *Eighteenth Air Force (Troop Carrier)*, which became operational on 1 June 1951, the USAF placed all troop carrier wings in the Zone of the Interior under a single command. The Eighteenth, with headquarters at Donaldson AFB, Greenville, South Carolina, is commanded by Major General Robert W. Douglas, Jr. Assigned a vital role in the expanding defense program, the new Eighteenth Air Force will concentrate on the development of precision operations in the mass flight of troop-laden aircraft and in the air transportation of large ground units, heavy weapons, and equipment. To accomplish these objectives, the Eighteenth plans a continuous internal training program, including joint land and amphibious exercises. At the present time it is equipped with C-119's, C-82's, and C-46's. It intends to replace all C-82's and C-46's with C-119's, as well as to add the new C-123's and other more recent aircraft as they become available.

Tactical Air Division (Provisional) (Ninth Air Force) was activated at Shaw AFB, South Carolina, on 25 April 1951, to enable one air base to quarter two tactical wings different in type, function, and mission, yet to allow each wing its distinct identity. Commanded by Colonel P. K. Morrill and composed of a fighter-bomber and a tactical reconnaissance wing, a crash rescue boat and an aircraft control and warning squadron, plus other common tenant units, the divisional organization provides for each wing to have its own support groups. Either wing may leave the division without disturbing the routine administration of the other wing or the base. Should one of the wings be transferred and not replaced, the TAC air division would be deactivated. The mission of the division is to train and equip its units to a maximum of combat readiness. It has supplied great numbers of combat fighter-bomber and tactical reconnaissance pilots to Far East Air Forces. Under the tutelage of the experienced division pilots many Air National Guard units have received jet transition, while officers and airmen from North Atlantic Treaty Organization and Mutual Defense Assistance Program nations have received training in jet maintenance and supply. The experience gained at Shaw AFB should be valuable in solving future command and organizational difficulties at bases housing two or more wings with divergent missions and equipment.

Continental Air Command (ConAC)

The *Aviation Engineer Force (AEF)* was established on 10 April 1951 with headquarters at Wolters AFB, Texas, to provide centralized direction and control of Aviation Engineer Units attached to the Air Force in the Zone of the Interior. Commanded by Colonel H. W. Ehr Gott, former A-4 and Engineer, Ninth Air Force, AEF is composed of three brigades. The

brigades, in turn, are broken down into groups, battalions, and companies. AEF units are tenants on Air Force bases. The base complement is composed of Air Force personnel, but the designated mission troops are Army. The function of the AEF is to construct or rehabilitate airfields and the necessary utilities, roads, and basic buildings and to defend their construction sites. Units received their basic and technical training from the Army, after which they are assigned to the Air Force for unit training. This training is accomplished through an established program and supplemented by on-the-job assignments. Major units of the AEF are also stationed at Orlando AFB, Eglin AFB, Florida, and Camp Beale, California.

Air Research and Development Command

The *Air Research and Development Command* (ARDC) assumed its place as a major independent Air Force command on 2 April 1951. At the time of its elevation ARDC was temporarily located at Wright-Patterson AFB, Ohio, where it was assigned to Air Materiel Command for organization and training. Now commanded by Lieutenant General Earle E. Partridge, it recently has moved headquarters to Baltimore, Maryland. This newest of the major independent commands is designed to keep the Air Force technologically proficient. With the mission of providing the best in aeronautical equipment, including aircraft, guided missiles, armament, and all scientific and technological requirements necessary to attain qualitative superiority, ARDC directs specific research, test, and development projects in its six field commands, designated as Centers. It also lets contracts for research projects at universities, private or non-profit research organizations, and industrial research corporations.

Wright Air Development Center (WADC), at Wright-Patterson AFB, conducts a major portion of ARDC development work in weapons systems, aeronautics, all-weather flying, flight test, materiel, research, weapons components, and engineering standards.

Air Force Flight Test Center (AFFTC), at Edwards AFB, California, on a barren area free of flight obstructions, is a primary test agency for nearsonic and supersonic aircraft and for all types of experimental and new production aircraft.

Air Force Missile Test Center (AFMTC) (formerly Long Range Proving Ground Division), at Patrick AFB, Florida, operates a proving ground with a 1000-mile range off the Florida coast for the development and testing of guided missiles and guidance systems. Also a part of AFMTC is Holloman AFB, Alamogordo, New Mexico, which tests high-altitude and short-range rockets and missiles.

Arnold Engineering Development Center (AEDC) (formerly Air Engineering Development Division), at Tullahoma, Tennessee, is still in the construction stage but will eventually operate three major test facilities making it the most advanced research center in the world: a high-altitude engine test facility, a gas dynamics facility (also termed hypersonic wind tunnel), and a propulsion wind tunnel.

Air Force Cambridge Research Center (AFCRC), at Cambridge, Massachusetts, conducts basic and applied research in radiophysics, geophysics, radiobiology, radiochemistry, and the related physical sciences.

Rome Air Development Center (RADC), at Griffiss AFB, New York, is

a major electronics center, conducting experiments in detection, control, navigation, automatic flight, and communications systems.

Air Materiel Command

Commanded by Lieutenant General Edwin W. Rawlings, *Air Materiel Command* (AMC) located at Wright-Patterson AFB, Ohio, is charged with buying, supplying, and maintaining Air Force ground and airborne equipment throughout the world. Through its Directorate of Procurement and Industrial Planning AMC ascertains that resources are available to produce equipment on schedule in national emergency and inspects equipment before delivery for conformance to Air Force standards. Its Directorate of Supply, Maintenance, and Services determines the type and quantity of purchases and provides for first-class maintenance of the equipment. Because of the scope of its activities and the necessity for regional procurement facilities, eight Air Materiel areas and six procurement districts have been established in appropriately located cities throughout the country. In a recent reorganization AMC transferred all research and development activities to the new Air Research and Development Command. The transfer did not require moving research facilities from Wright-Patterson. The various laboratories were placed under the administration of the Wright Air Development Center, a major component of ARDC.

Military Air Transport Service (MATS)

On 23 February 1951 the *Air Resupply and Communications Service* (ARCS) was organized to train Air Force units for psychological warfare. Commanded by Colonel John C. Young and located in Washington, D.C., the new Service operates on the same level as other MATS Services. Presently composed of two wings now in training at Mountain Home AFB, Idaho, ARCS plans more activations soon. The training of its wings, part of which is accomplished at Georgetown University, Washington, D.C., is to take from six months to a year. After training, the wings will be deployed throughout the world. During peacetime they will continue training and will also augment the normal air resupply and communications of their theater. In war they will prepare, reproduce, and disseminate psychological warfare materials as directed by the theater commander. Each wing will be capable of composing and reproducing four million five-by-seven-inch leaflets a day and packaging and distributing their materials at the rate of 1500 tons a month. Besides leaflets, radio and loudspeaker broadcasts will be prepared and transmitted through mobile stations and loudspeakers attached to low-flying helicopters. For its complete mission each wing will be assigned about twenty-four aircraft, including B-29's, C-119's, SA-16's, and helicopters.

Air Proving Ground Command

The *Armament Test Division* (ATD), at Eglin AFB, Florida, was activated in a rearrangement of command jurisdiction on 5 January 1951. At that time the Air Materiel Armament Test Center (AMATC), which had been organized on 14 December 1949, was transferred from AMC to the Air

Proving Ground Command (APG). Shortly thereafter a joint board of AMATC and APG officers issued the following statement: "The mission of the Armament Test Division is to program, direct, monitor and conduct field testing of armament in the research, development and engineering fields, to provide and operate facilities for testing in those fields, and to plan and organize these and other activities in coordination with the Air Force Armament Program." A present multimillion dollar building program calls for a three-story temperature-controlled Armament Engineering Building, a Heavy Systems Building, and a huge Armament Installations Building to be added to the existing facilities. ATD plans call for high altitude tracking ranges and rocket and firing ranges, which will utilize a part of the half-million acre reservation of the APG.

Armed Forces Special Weapons Project

The *Field Command, Armed Forces Special Weapons Project* (FCAFSWP), at Sandia AFB, New Mexico, is commanded by Brigadier General Leland S. Stranathan. It is the principal field installation of the Armed Forces Special Weapons Project (AFSWP), a joint Army, Navy, and Air Force organization to discharge military service functions relating to atomic energy.

United States Air Forces in Europe (USAFE)

On 1 May 1951 the 3rd Air Division was elevated to the status of the *Third Air Force*, commanded by Major General Leon Johnson. Formerly the 3rd Air Division was responsible for operational control and administrative and logistical support for the SAC rotational units training in England. After its reorganization as an air force the operational training was transferred to the newly activated 7th Air Division directly under SAC, while administrative and logistical support for the rotational program remained with the Third Air Force. The Third also maintains liaison with the Air Ministry and the Royal Air Force. The heart of the Third's logistical support system consists of two air depot wings, which supply the operating bases of the 7th Air Division. To expedite a vast construction program now underway in the British Isles, Third Air Force maintains a support party at bases included in the program. By providing billeting and messing facilities, transportation, security, and the many other functions essential to the operation of a base, the Third makes it possible for the engineering units to devote full effort to construction. Supporting the Third Air Force in England are the components of a U.S. Antiaircraft Artillery Brigade. This brigade, which is dispersed at airfields used by combat units, is gaining valuable experience by working with the RAF Fighter Command and British antiaircraft units.

The activation of the *Twelfth Air Force* on 21 January 1951 opened the current build-up of USAF strength in Europe. This build-up was deemed imperative by the NATO nations after international tensions mounted following the Communist attack on South Korea. To accomplish its primary mission of support within its area the Twelfth maintains a constant state of combat readiness. Its F-84 fighter-bomber wings engage in a continuous cycle of realistic training directed toward proficiency in gunnery, bombing,

instrument flying, and general mobility of the units. An important aspect of this training is joint maneuvers, in which Twelfth units furnish close support to units of the Seventh Army and ground forces of the NATO Nations. Recently reinforced by the arrival of C-119's of the 433rd Troop Carrier Wing (M), the Twelfth is prepared to expand the air transportability of NATO troops and supplies.

Far East Air Force (FEAF)

On 25 January 1951 Combat Cargo Command (Provisional) was redesignated the *315th Air Division (Combat Cargo)* and made a permanent part of FEAF. Commanded by Brigadier General John P. Henebry, the division is equipped with C-46, C-47, C-54, and C-119 aircraft. In addition to operating the Korean airlift, the 315th flies scheduled and non-scheduled airlift service to all parts of Japan, Okinawa, Formosa, the Philippines, Iwo Jima, and Guam. Major missions of the 315th include the mounting of paratroop attacks, ground resupply drops, air-land resupply in the entire theater, airlifting of personnel and complete units, air evacuation of wounded, and operation of its own air terminals in Japan and Korea. The 315th carries on continuous on-the-job training for both old and new crews and airborne operation training in conjunction with airborne troops.

The Air Force Language Program

The need of the Armed Forces for personnel trained in foreign languages became apparent during World War II. The events that followed, had they portended an era of peace, might have allowed the smugly erroneous attitude that foreign languages are negligible to our existence, or that it is easier for others to learn our language, or that Americans do not make good linguists anyhow. But America's new role in a world divided by conflicting ideologies has impressed forcefully on the Armed Services the absolute necessity of providing themselves with as many persons trained in foreign languages as possible and in as short a time as possible.

Until about a year ago the language training requirements of the services were met by the Army Language School, at the Presidio of Monterey, California, and the Navy Language School at Anacostia, Maryland. The Air Force, in its widening contact with other peoples and its multiple ramifications in technical research, intelligence, training, and operations, has become one of the major users of language specialists. Such persons not only are trained to speak, read, and write a language with facility but also are educated in language area subjects, such as history, geography, political structure, sociology, and psychology. Demands have exceeded the capacity of the Army Language School to train the required number of Air Force personnel. As a result the USAF Institute of Technology has recently expanded its Civilian Institutions program to include language training for officers and airmen.

Among the few universities that have had extensive experience in teaching uncommon languages are Cornell, Indiana, Pennsylvania, Syracuse, and Yale. The bulk of the training is being done on these campuses, although Army Language School facilities are still used whenever possible.

Two types of courses are being conducted: a pure *language* course, aimed

at fluency and academic proficiency, and a *language area* course, designed to provide a solid background of subjects related to a particular country or area. The intensified language courses run six or twelve months (according to language studied). Area training usually requires one additional year. Within that time, unless the student (officer or airman) is an outright "dud," he is molded into a language specialist. Six hours a day of instruction, plus two or three hours' home preparation, see to that. The courses, language or area, are highlighted by lectures, seminars, round-table discussions, movies, and recordings and are generally supplemented by extra-curricular activities.

Since each enrollment in a language school is based on a specific requirement submitted by an Air Force agency, the eventual assignment of a student is usually known at the time of his selection for training. The Military Aid Advisory Group at The Hague, for example, may require the assignment of a WAF First Lieutenant speaking Dutch fluently; the USAF mission to Ecuador may have requested an airman with a thorough knowledge of Spanish; the office of the U.S. Air Attache in Pakistan may ask for a field grade officer well versed in Hindustani. Thus language instruction places interesting career opportunities within the reach of practically every category of Air Force personnel.

Persons are needed who speak and translate Arabic, Russian, Chinese, Japanese, the mid-European languages, Tagalog, Norwegian, Annamese, and many tongues few people have heard of before. As certain small states have been thrown into sharp focus on the international scene, either because of their strategic location and value or because of their proximity to a "powder keg" area, use for a working knowledge of rare languages has increased.

Broader advantages also develop from language study by Air Force personnel: harmonious and fruitful relationships with nationals of friendly countries and better comprehension of potential or effectively hostile nations. The language program thus transcends its immediate military advantage. It will aid substantially in overcoming a past inadequacy in the American educational system by opening new careers, broadening cultural horizons, and contributing to the development of world-minded citizens.—*USAF Institute of Technology*

Air Command Communications Network

A new teletype-relay system, serving Air Force units throughout the United States, now sends and receives more messages faster, with fewer operators and at less expense, than any comparable network in the history of military communications.

This system is part of the modernized AIRCOMNET, worldwide web of Air Force command communications. Its high-capacity relay facilities are installed at five message-switching centers in the continental United States, linked by 128,000 miles of commercial leased-wire telegraph lines. Branching out from these centers are more leased circuits to 113 tributary stations at Air Force bases from coast to coast. The network currently handles some 25,000 individual messages per day, including some for the Army and Navy. About 64,000 transmissions are necessary to get these messages to their destinations.



The switching center in the Pentagon, a part of the United States Air Force's new nationwide, push-button, high-speed telegraphic network that links 118 stations in the United States into the Air Command Communications Network. The new system, which requires only five switching centers to replace the twenty-eight centers formerly in use saves four hundred operators and, eventually, more than one million dollars a year.

AIRCOMNET relay stations have been set up at McClellan Air Force Base, Sacramento, California; Carswell Air Force Base, Fort Worth, Texas; Wright-Patterson Air Force Base, Dayton, Ohio; Maxwell Air Force Base, Montgomery, Alabama; and the Pentagon, Washington, D.C. Each of these five centers is operated by a squadron of the 1060th USAF Communications Group, activated in January 1951 with headquarters in the Pentagon and under supervision of the USAF Director of Communications, Major General F. L. Ankenbrandt. Besides the AIRCOMNET switching centers, this group also mans the message center of Headquarters USAF in the Pentagon, other communications facilities in the Washington area, and terminal facilities for certain Air Force overseas circuits.

The unique performance of the new AIRCOMNET is achieved with semi-automatic "reperforator" teletype-relay equipment, custom built and leased to the Air Force by the Western Union Telegraph Company, which installed the equipment in the five switching centers and maintains it under contract. The new system, which went into operation on 17 February 1951, has enabled the Air Force (1) to reduce the number of major message-relay stations required for the AIRCOMNET in the U.S. from twenty-eight (needed when the standard "torn-tape" method of message relaying was used) to the present five switching centers; (2) to cut operat-

ing personnel employed in relaying messages from 1500 to 500 (of whom nearly 400 are now WAF's); (3) to lower operating costs for the Zone of Interior portion of the AIRCOMNET from \$5,500,000 formerly spent each year to an estimated \$2,500,000 for 1951 operations.

The high-speed message relay that is possible over the modernized AIRCOMNET is not due to an increase in rate of message transmission. The rate continues at sixty-five words per minute, which is currently standard for teletype operations by the armed forces. The new system is able to relay a larger number of messages per operator and per circuit because it eliminates much delay in message handling. As in standard torn-tape relay operations, messages received by the switching centers are simultaneously typed in readable characters and punched out in a coded pattern of small perforations on a narrow paper tape. In the torn-tape procedure the operator waits until a complete message is received, then tears off the length of tape bearing the message and puts it in a holding rack. Another operator picks up the message and feeds it into the proper transmitting machine to send it on its way. If the message has more than one addressee, the tape must be run through a sending machine for each addressee in turn, or additional message tapes must be cut in the relay station for simultaneous transmission of the message over several sending machines. In the AIRCOMNET's reperforator system the operator simply notes the addressee shown at the beginning of an incoming message and then presses a button (or as many buttons as there are addressees) which automatically puts the message on the proper circuits to reach its destination. Messages can be started on their way from the switching center even before the complete text has been received. The same message can be sent simultaneously to all tributary stations served by the center and to the other relay stations from the original tape on which it is received.

Relay equipment at each of the five switching centers consists of thirty double-decked, streamlined consoles containing Western Union "Plan 51" reperforator sending and receiving equipment. The consoles are arranged in two parallel rows facing a central aisle where the operators work. Each console, or cabinet, holds an upper and lower teletype position, one for each of the two circuits terminated in the cabinet. A total of sixty circuits is therefore available at each center.

Every receiving position (equipped with a machine called a "typing reperforator") has an associated "transmitter-distributor," which can be connected to any of the sending circuits in the switching center through a push-button panel on each console. Message tape flows directly and continuously from the typing reperforator to the transmitter-distributor, and then into a bin provided at each console, where it can be held temporarily for reference. When a completed message has been transmitted, a special signal sent at the end of the message automatically stops the transmitter-distributor until an operator selects the circuits for transmission of the next message being received on the tape.

Another feature of the system that saves message-handling time is a group of automatic message-recording devices. They greatly simplify the complex logging, or message-accounting procedures, required with the old torn-tape system. One of these devices is a message-numbering machine, which automatically assigns a serial number to each message sent or received at the switching center. Associated with each group of twenty cir-

cuits terminated in the center are two teletype printers. They automatically record the number, sender, and addressee of each message handled. These page printers type out a complete and easy-to-check log of all traffic.

Western Union "Plan 51" reperforator switching equipment, designed similarly to that used by the Air Force, is now used in communications systems operated by General Electric, United Airlines, Sears Roebuck, the Federal Reserve Board, and an association of 188 banks in 54 U.S. cities. Employment of this equipment in the AIRCOMNET is its first military use. Although restricted at present to operations in the continental U.S., it is intended that reperforator switching will eventually be extended, wherever practicable, to AIRCOMNET facilities around the world.

The automatic message-logging devices provided in the system facilitate complete and accurate analyses of message traffic handled over the AIRCOMNET. These analyses have already led to improved operating procedures throughout the system during its first six months of operations. Continued traffic studies and the resulting refinements in procedures and in the system itself offer the prospect of even further increases in the efficiency and economy of Air Force global communications.—*Directorate of Communications, Hq., USAF*

Air Materiel Command's Food Section

With the creation of its new Services Division, Air Materiel Command has taken over many of the services formerly performed for the Air Force by the Army. Over-all supervision of the Air Force's vast network of dining facilities and commissaries, plus its in-flight feeding program, will now fall to the Services Division Food Section.

Proper feeding of Air Force personnel requires specialists in food preparation and serving, nutrition, research, administration, commissary operation, equipment, baking, meat cutting, and refrigeration. Providing these specialists is one of the responsibilities of the Food Section. Others include aid and investigation of food problems at Air Force installations.

The Food Section prepares estimates for the preliminary subsistence budget, which shows how much the Air Force expects to spend in the future to feed its personnel. It also writes manuals covering the management and operation of food service and commissary activities. In research it works constantly to develop new procedures for the preparation, storage, serving, and conservation of food; conducts continuous studies on food acceptability—how well airmen like what they eat; and determines special feeding requirements for in-flight feeding and feeding in the field.

Food equipment experts have already begun to refurbish dining halls at air bases throughout the United States and at permanent bases overseas. This program will put into service many time- and labor-saving kitchen devices that will mean better prepared, more attractive food for Air Force personnel. Plans are also in the making which will mean better commissary service for all personnel.

Through the Food Service Section the Air Force has a hand in determining future menus. A representative of the Section is on the Master Menu Board, a joint Army-Air Force group in Washington which plans actual service menus.—*Hq., Air Materiel Command.*

Air Drop

Flexible air supply is of major importance to immediate as well as ultimate military success. During the first year of the Korean war, Far East Air Forces demonstrated the effectiveness of this flexibility by the largest sustained air resupply operation in military history. More than 16,000 tons of all types of supplies were successfully parachuted from cargo aircraft. The resupply missions of the C-119 "Flying Boxcars" and the C-46 "Commandos" ranged from the Pusan perimeter to the Yalu River.

In the early days of the Korean campaign air drop requirements were light. Air drops were dispatched only when the meager United Nations forces, scattered throughout South Korea, were seriously harrassed or cut off by Communist guerrillas. When these forces were out of immediate danger, normal ground supply was resumed. These early airlifts were by C-54's and C-47's of the 374th Troop Carrier Wing and C-46's of the 1st Provisional Troop Carrier Group.

Aerial drops increased following the U.N. breakout from the Pusan perimeter. This offensive dictated a new phase of logistics for combat operations. Ground supply was extremely hampered by soggy rice paddies, high, rugged terrain, narrow roads, ox-cart trails, and badly damaged, overloaded rail facilities. Air landing (terminal to terminal delivery) was limited by the mountains and the scarcity of usable airstrips. To cope with the problems of air logistics under these conditions, FEAF activated the Combat Cargo (Provisional) on 10 September 1950 under Major General William H. Tunner—a veteran of the Air Transport Command "hump" operation over The Himalaya during World War II and later Task Force Commander of the Berlin Airlift. Simultaneously the C-119-equipped 314th Troop Carrier Group, trained for airdropping supplies and paratroopers, arrived in Japan. The C-119's, previously untried in combat, soon became the backbone of airlift operations. To improve coordination between air and ground forces, the U.S. Eighth Army assigned the 8247th Army Unit to the Combat Cargo Command. This Army unit assisted Combat Cargo Command in planning and scheduling all Eighth Army airlift requirements (both terminal to terminal and air dropping) and tied and loaded cargo for scheduled missions.

The first major air drop began on 21 October and lasted four days. This drop consisted of ammunition, rations, jeeps, 105mm. howitzers, and other heavy equipment for the four thousand paratroopers of the 187th Regimental Combat Team who parachuted into the Sukchon-Sunchon area thirty-five miles north of Pyongyang. When the Eighth Army linked up with the 187th, the speedy thrust north, outdistancing ground channels, demanded continued air supply.

Though generally successful, these early airlifts exposed a few unforeseen problems. A major difficulty was found in releasing cargo over the drop zone. Webbed fabric straps, which held the cargo in place during flight, had to be slashed in order to free the supplies. The delay in cutting the tie-down straps endangered the mission. If cut loose before entering the drop zone, the load would occasionally shift and wedge itself. Heavy enemy small arms fire frequently prevented the aircraft from making a second pass over the area. Other difficulties stemmed from the lack of understanding by ground force personnel receiving the drops. Drop zones selected were often poor for air-ground operations and were improperly marked. Misunderstanding of air-ground communications lost several aircraft to friendly ground fire. These problems were soon eliminated or eased. The unsatisfactory fabric straps were replaced with bomb shackles, enabling one man to release the entire cargo and minimizing the possibility of a drop zone "miss." Better understanding and coordination between ground and air units doubled the effectiveness of air drops.

The invasion of the Chinese Communists stepped up air resupply and brought on the outstanding air drop operation of the entire Korean campaign. C-119's and C-47's formed an aerial bridge to surrounded Marines and infantrymen near the Choshin Reservoir in North Korea. During this critical period, in early December, over 20,000 troops got most of their supplies by air drop. Operations included the world's first air drop of a complete bridge. In the race for the Hamhung beachhead the U.N. ground forces found their only escape bridge, spanning a deep gorge near Koto, destroyed. Eight C-119's, each carrying one two-ton span, dropped an entire bridge to be hastily erected across the gorge. The ground forces escaped their death trap with all equipment. In a 48-hour period in January 1951 the C-119's parachuted 669 tons of vital ammunition and rations to the U.S. 2nd Division pinned down by the enemy near Chungju.

On 25 January 1951 Combat Cargo Command (Provisional) was reorganized as the 315th Air Division (Combat Cargo) and given the responsibility for all airlifting in the theater. By early March the demand of the embattled U. N. forces for air resupply so increased that C-46's reinforced the C-119's on the air drops. Though not as adaptable for the purpose as the "Flying Boxcars," the C-46's were very effective. The largest air drop of the Korean war came on 23 March. One hundred and forty-five C-119's and C-46's disgorged four thousand airborne troops and complete equipment at Munsan behind enemy lines north of Seoul. Three days of maximum effort followed to resupply the ground forces with vehicles, heavy weapons, ammunition, and supplies. Success speeded the link-up with the north-driving tank columns of the Eighth Army.

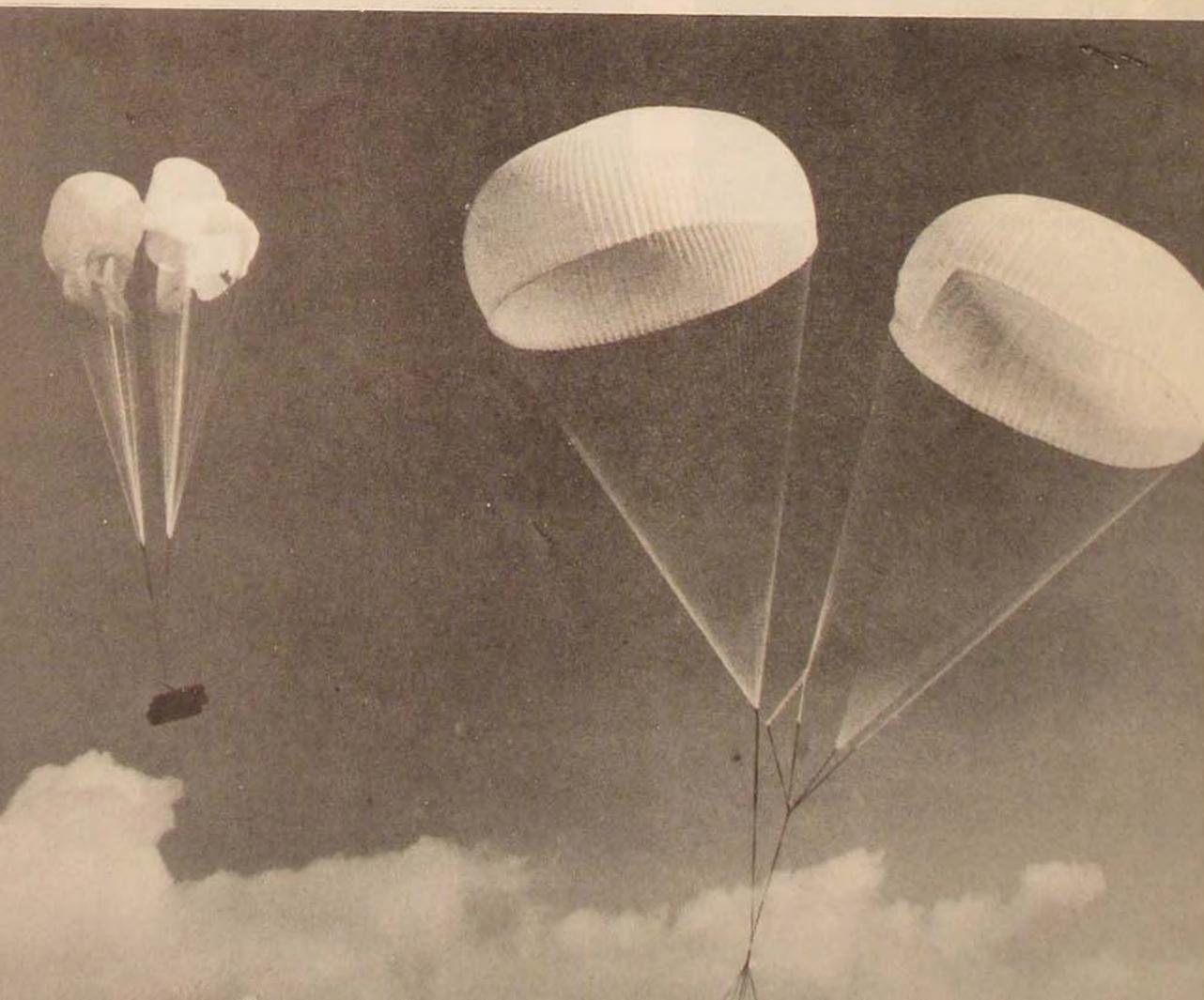
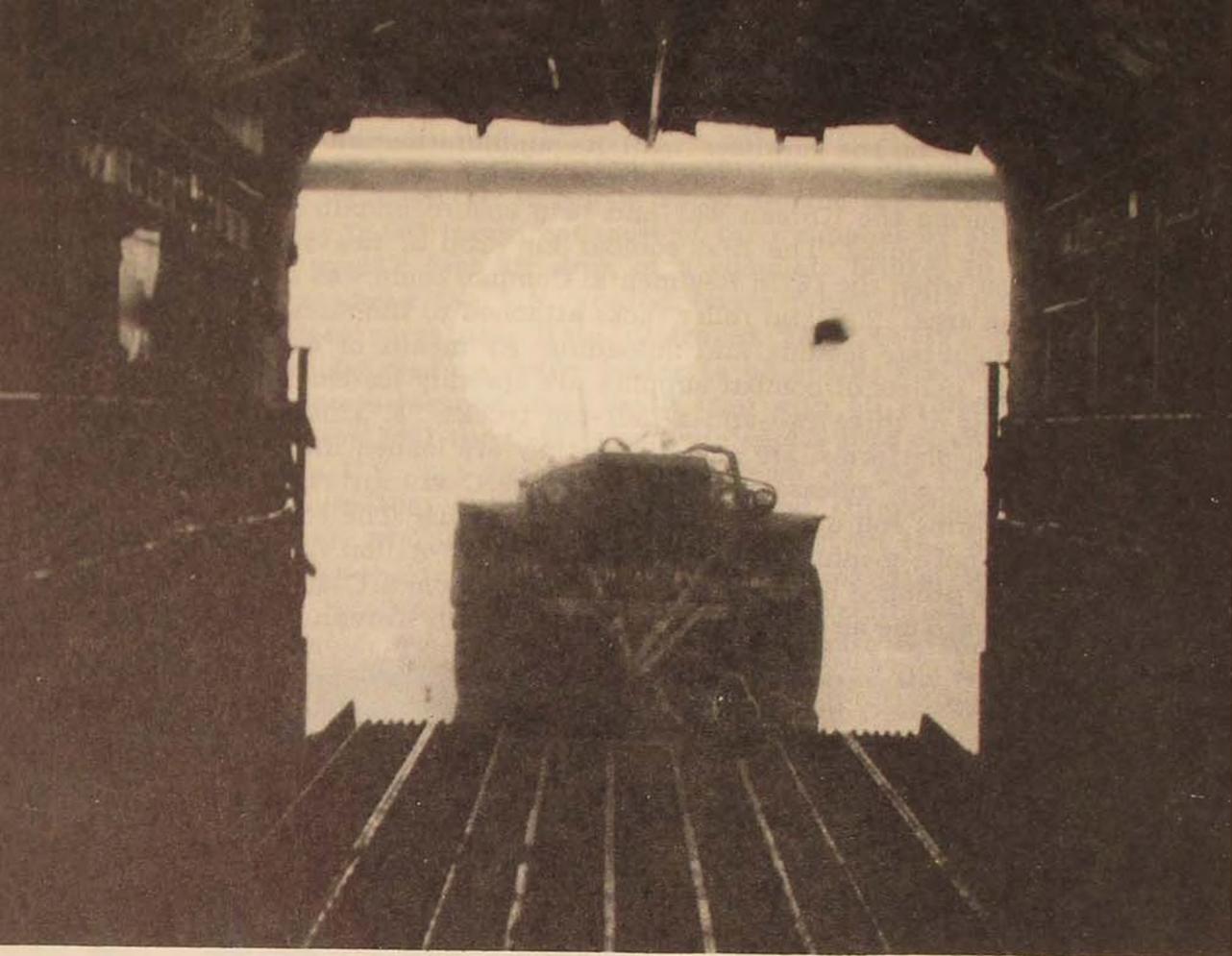
As the battle lines stabilized, air resupply again slackened and ground facilities funneled combat equipment to the front lines from the newly-built forward air-strips, where it had been landed by the cargo aircraft of the 315th Air Division. During the lull in air drops the 315th continues to search for new and better techniques of air resupply.

Stacked at an airbase in Japan, tons of ammunition and rations await loading for air drop delivery to U.N. forces in Korea. In the foreground are the pallets used in mounting trucks, howitzers, jeeps, and other heavy equipment ready for aerial delivery.



Precision loading is extremely important in air drops of materiel. 1. Heavy equipment, such as the loaded jeep or the howitzer with its ammunition mounted on special dropping pallets, is dropped from an altitude of eight hundred feet. The dropping pallets were developed during the Korean war and help ensure undamaged delivery by absorbing the shock of landing. The dropping pallets were developed during the Korean war and help ensure undamaged delivery by absorbing the shock of landing. The first combat air drop of heavy equipment occurred in October 1950, when the 187th Regimental Combat Team was parachuted into the Sukchon-Sunchon area. 2. Metal roller racks attached to the aircraft floor in the cargo compartment facilitate loading and unloading. By means of a roller conveyer from truck to aircraft, pallets of combat supplies are speedily loaded. One C-119 will easily hold the contents of three two-and-a-half-ton trucks. 3. Tins of ammunition, tied securely to wooden platforms, are checked as they are loaded into a C-119. Over the drop zone "kicker crews" release the tie-downs, the C-119 aircraft inclines, nose upward, and the platforms roll down the conveyer into space. The rollers reduce the manpower needed for both loading and unloading. 4. A 55-gallon drum of gasoline, mounted on a pallet, is dropped over a front-line airstrip from a C-46. The drum was part of eighty tons of gasoline airdropped in one day to South Korean frontline troops.





Dramatically suspended in mid-air 800 feet above the ground, this heavy vehicle has just been released from the cargo compartment of a C-119 Flying Boxcar. The giant parachute blossoming in the rear will lower the truck safely to the ground. In a matter of a few hours heavy equipment can be delivered to combat forces anywhere along the battle line. The net weight of the pictured vehicle is approximately 6000 pounds.

Here resupply for front-line troops drops right on the target. A weapons carrier at left and a pallet load of ammunition and other combat supplies drift earthward from a Flying Boxcar. A pair of giant parachutes will support a two-ton load, enabling vehicles, trailers, and heavy artillery pieces to reach advanced U.N. troops in minimum time. Frequently the cargo-laden pallets land within a few feet of the marker that designates the drop zone, a tribute to the skill and precision of 315th Air Division crews.

Scores of cargo parachutes lie collapsed in the drop zone, while others are on their way down with tons of ammunition for U.N. troops isolated from normal ground supply by muddy roads. Air cargoes range from barbed wire to fresh vegetables.



During the first eleven months of the Korean campaign over 100,000 parachutes were used by the 315th Air Division to drop supplies and personnel to U.N. forces. Over sixty percent of the parachutes were recovered and re-used. This record was achieved by cooperation between ground and air units. Since the average-size parachute is valued at forty dollars, retrieval amounts to an enormous saving. During the large-scale airborne operation in October 1950, seven parachute maintenance personnel jumped into the battle area north of Pyongyang to retrieve personnel and cargo parachutes. In that air drop, delivering over four thousand airborne troops and hundreds of tons of vital supplies, ninety percent of the parachutes were retrieved. When only cargo is dropped, no personnel jump to retrieve the parachutes. Ground forces for whom the supplies are intended retrieve parachutes along with the cargo, and deliver them to the nearest Combat Cargo airstrip. Transport aircraft returning to base pick up the bundles of silk and nylon and ferry them to Japan for cleaning, inspection, repacking, and re-use. In the past, the percentage of retrieval has suffered in air drops to troops either surrounded or cut off from regular ground supply, or to units too busily engaged in combat to comb the fields for parachutes.

Improvement in present air drop operations, as well as new and better methods of dropping and retrieving, is expected to result from a series of front-line meetings recently conducted between responsible ground officers and Combat Cargo officials. Mimeographed instructions entitled "Supply From the Sky" have been distributed to all ground units in Korea. This booklet explains in detail all phases and techniques of an air drop operation and emphasizes the necessity for strong cooperation between air and ground for maximum return.

Tangled stacks of valuable parachutes, used to drop supplies to front-line troops, are being loaded into a C-46 at an advanced dirt airstrip after being retrieved by special crews in the battle area. After a major air drop, as many as four C-54's, each loaded with about 1000 retrieved parachutes, have returned to bases in Japan in a single day.



Airman's Reading

New Elements of Strategy in an Ideological Age

Comment by

Colonel Robert Lee Snider, USAF, and
Wing Commander Edward Howell, O.B.E., D.F.C., RAF (Ret)

THE art of war, like its weapons, is constantly developing. But twentieth-century technology has so speeded up the change that the military strategist now must run to keep pace. A generation ago there was time, and time to spare, to study the comparatively static art of warfare. The fatal temptation for the student of war to spend peacetime years trying to improve on the military patterns of the last war, instead of foreseeing and planning new strategies and techniques to meet the unpredictable realities of the future conflict is now, more than ever before, the invitation to defeat and disaster.

The modern military strategist must face a new conception of strategy and its "weapon system" even more radical in its change from old practices than the phenomenal development of the instruments of war themselves. In fact there is now an entirely new kind of war, popularly known as "cold war." Its now familiar pattern is conquest by internal revolution, supported by the threat of armed intervention from without. Its weapons are propaganda, wide-scale espionage, infiltration, subversion, blackmail, and political intrigue, with no holds barred. To combat it requires drastic revision of traditional thinking, including a changed view of the length of war; planning must be, not for two to six years, but for ten to thirty.

The atom bomb and the jet aircraft have in one sense transformed the conception of war. But a consideration of the past few years shows that without resort to hot war six countries have been subjugated since 1945. This does not mean that in any future war military weapons will not play an essential part. But it does mean that there now exist new and extremely effective nonmilitary methods of conquest. Though nonmilitary, these methods are of paramount interest to military planners, and it is not accidental that the author of an important study on the cold war is a distinguished British soldier. It is necessary to understand the new strategy and to act accordingly. It is necessary to learn to plan for, to wage, and to win cold war as well as hot.

Defense in the Cold War

The recent publication of a report entitled *Defence in the Cold War** by

**Defence in the Cold War*, published by the Royal Institute of International Affairs, Chatham House, London (5s).

a Chatham House Study Group under the chairmanship of Major General Sir Ian Jacob, K.B.E., C.B., is therefore of more than usual significance. This report is the first serious attempt to approach these new problems in their widest sense by integrating their military, political, economic, and ideological factors.

The Study Group defines cold war as the waging of war by all methods short of a major shooting war and analyzes the defense problems cold war poses to the democracies. By the successful prevention of cold war a power can impose its will and achieve its object without employing the most drastic of traditional methods, open armed conflict.

Policies of Defense

The Report considers both the Communist aims and methods against a world which has only begun to be aware of them and also the various policies of defense that the free world has so far devised, best exemplified perhaps in American attempts at "containment" and the building up of "situations of strength." It concludes that the main Communist effort will continue in the area where allied military and political cooperation toward containment is weakest, that is, in Asia, rather than in Europe where the rudiments of a system of defense have now been created.

While the atom bomb is not ignored, the Study Group believes that its use is limited in a hot war and that it is of no use in the cold war. The report does not agree with Mr. Churchill that Russian fear of the bomb has been potent in preventing war in Europe. The Group's view is that the Soviets are avoiding war not so much because they fear the bomb as because they do not *wish* to involve themselves in war, since they expect to gain their ends by cold war methods. Although many may disagree with this assessment, its conclusion is unquestionable: the West should not rely exclusively on the atom bomb for defense.

Western Europe and the Atlantic Powers

The Report argues that "Western Europe is the political citadel and the military base of the free world—it is also its heart and brain, the place where its spirit and values are kept alive by men and women in their public and private lives." This is why the defense of the West is the defense of the free world. The Group feels that the British attitude of limited liability in Western Europe needs "drastic if gradual revision." While this is no doubt true as far as the NATO powers are concerned, defense cannot be planned on a purely regional basis, since Asia is much more vulnerable to cold war offensives than Europe. Defense, like peace, is indivisible in an age when war is total. It was Lenin himself who said, "The road to Paris lies through Peking and Calcutta." So while the defense of the West must obviously take first account of the threat from the other side of the Elbe, it must not fail to look to the East as well.

In estimating the forces required for a reasonable defense of the West, the Group was no doubt influenced by the thought that, with such limited resources as will be available to the free countries in the foreseeable future, it was important not to recommend the impossible. It recommends building up the forces of the free nations in Western Europe to a minimum

of fifty to fifty-five divisions, one third to be armored, of which force one third should be stationed in Germany. The air forces, it feels, should be increased to a minimum of five thousand jet fighters and one thousand fighter-bombers. Until such long-term increases are possible, it urges that existing piston-engined fighters be brought back into service.

Before accepting these recommendations, many questions require more thorough examination than has been possible in the Report. For example, will the increased mobility and firepower of land forces ensure success in operations under such a marked inferiority in numbers as one to two or three? There is also the complex problem of gaining and maintaining air superiority, which is so closely tied to the performance of aircraft. Thus the suggestion to employ piston-engined fighters—however useful for close support and even as an interim measure—needs especially careful examination.

What Cost Rearmament?

The Atlantic Powers spent on an average of four per cent of their national incomes on defense in 1949. For 1950 it seems that some agreement was reached entailing the expenditure of about ten per cent by each country. Against that, however, the Soviet Union spent thirteen per cent in 1949, according to the Report. To expect parity in force without at least approximate parity in effort would seem over optimistic.

Concerning the cost of rearmament, the Group offers the opinion that "rearmament which prevents war is cheap at almost any price that is likely to be paid." It goes on to point out that the free countries are faced with the choice between devoting the years ahead to rearming to prevent war and later attaining higher standards of living, or alternatively, enjoying higher standards of living now and then losing them all, this time without hope of recovery. It is not a question of guns before butter but rather peace before extinction.

The Role of the Germans

The Report gives some attention to the role of the forty-eight million West Germans in the defense of Europe, considering the pros and cons of rearming Western Germany to provide either an independent national army or an integrated portion of a West European Army. One thing is made clear: although occupation in its present form cannot go on forever, there can be no withdrawal of troops from Germany either now or in the immediate future. The danger that the Elbe may become another 38th Parallel remains, and a major aim of Western policy must be to provide security for West Germany.

As to the West German contribution to this security, the Group feels that it should take the form of integrated forces within a European or Atlantic framework, as in fact was later proposed by the Atlantic Powers and in the French Pleven Plan. The Report points out, however, that German opinion is by no means united on this issue. The German attitude tends toward apathy and confusion. Moreover it is important not to under-rate the defeatism and genuine pacifism to be found in West Germany.

There is real danger, the authors of the Report to the contrary, that if

the Western Powers do not soon adopt a consistent and firm policy for German defense and make a serious attempt to win the loyalty and support of the West Germans, they may find themselves undertaking the defense of Europe on the Elbe without the support of the German people, without the help of Germany's professional soldiers, and with a strong Fifth Column behind their backs. It is in the nature of the strategic geography of the Continent that Europe cannot be defended against the East without the cooperation of Germany—or at least, Western Germany.

The War of Ideas

The problem of winning allegiance is really basic to the cold war. For over a century now the Communists, from Marx to Lenin and Stalin, have carefully studied and practiced the techniques, or rather the art, of winning the loyalty of the masses to a powerful idea, a technique that has received scant attention in the Western World except in the relatively narrow spheres of religion, domestic politics, and advertising. Force and terror, as well as the gentler art of persuasion, have been enlisted by totalitarianism to capture and hold men's allegiance. Communism has its missionaries in every corner of the globe, a close network of convinced, dedicated, and single-minded men and women skilled in proselyting human beings, preferably those in positions of responsibility. Their success is one of the causes of the present world crisis. We can and must meet the challenge in the various material ways suggested in the Report, but beyond this there remains the necessity to win spiritual and philosophical allegiance.

Most Americans believe that the West is winning. But even in the United States there is a powerful Fifth Column at work. Plans for defense depend to a considerable extent on the vigorous participation of allies. Yet twenty-six per cent of the French and thirty per cent of the Italian electorate voted Communist in the last elections. How effective can these countries be in a war against Russia, unless these high percentages can be eliminated or greatly reduced?

In dealing with "The Struggle of Ideas" the Study Group is perhaps at its weakest. Nevertheless many significant topics are discussed—for example: the disturbing speed with which the youth of Eastern Germany has been captured by Communism since the war, the common fallacy that economic improvements by themselves will automatically defeat Communism, the measures necessary to minimize the Communist appeal in under-developed countries. But to the question of whether the free world can—it obviously should—produce any dynamic force comparable to and more effective than that of Communism, the Group found it impossible to give any answer.

This rather defeatist attitude to what is probably the crux of the cold war will not be generally shared. The Group's arguments against official government action in this sphere of ideas are likewise weak. They fear the use of totalitarian methods and claim that the ideological battle must be waged by devoted and intelligent individual effort. They do not, however, indicate how such efforts can be developed and coordinated. Even if the Group's belief is true that dedicated and convinced Communists can only be combated by equally dedicated individuals, is there no way to recruit and train individuals likewise in the spirit of freedom and to employ them

intelligently in the ideological sphere? If the free countries are to win the ideological struggle on which the cold war is based, they must surely confront the ideas of Communism with better ideas, the technique of Communism with a sounder technique, the followers of Communism with a corps of even better-trained and more devoted fighters.

The title of the Study Group's report is perhaps revealing. *Defence in the Cold War* advocates defensive measures. Certainly these are necessary and long overdue. In pointing them out and in making specific recommendations for both immediate and long-term action, the Group has rendered important service. But unless the West applies itself to the further task of advancing to the offensive in the war of ideas now raging, the best defensive preparations are like the Maginot Line—doomed to be outflanked and overrun.

The Report, therefore, is an impressive reminder of the existence of a fourth dimension in the realm of contemporary conflict, to wit, the psychopolitical front. The four-dimensional attack is being met by the three-dimensional use of hardware, cash, and power politics. But such a defense is being outflanked in the fourth dimension of ideology. There is nothing shameful in learning from and improving upon the enemy's strategy. The West has a superior democratic heritage on which to build adequate counterweapons and with which to mount an offensive against ideological penetration.

The American reader will find much of interest in the Report, although it is written with the particular conditions and requirements of Great Britain in mind. There is an urgent need for a more comprehensive evaluation of the American understanding of the cold war, to take up the offensive as well as to rally to defense. Out of such a study may come a doctrine that combines the Group's findings on "defense in the cold war" with insight derived from the rich experiences of America and other free countries in the not-so-cold war against Soviet aggression.

Air War College

Modern France

Modern France: Problems of the Third and Fourth Republics, Edited by Edward Mead Earle (Princeton University Press \$6), pp. 522.

Comment by

PROFESSOR HENRI M. PEYRE

ON no foreign country, with the possible exception of Britain, is America better informed than on France. None is better appreciated, at least by tourists, intellectuals, adepts of the *arts de la bouche* (by which the French seem to designate both eating like gourmets and kissing like Gallic connoisseurs), fashion magazines, and even by veterans of World War I, who become strangely sentimental and retrospectively heroic whenever they relate their French campaigns at Saint-Mihiel, Chateau-Thierry...or perhaps Bordeaux and Saint-Nazaire.

Every change of cabinet in Paris is covered lavishly in our New York press; every utterance by an Existentialist awakens echoes in Chicago or Los Angeles.

Yet France remains a baffling, mysterious land to most Americans. Both her rapid collapse and her speedy recovery, her unpredictable political behavior and her fundamental stability, her capricious feminine whims and her solid peasant common sense, prove disconcerting to American observers. The paradox of that land of paradoxes is that France is enjoying today the most remarkable prosperity of any European country and yet seems politically unreliable and unable to make up her mind about her regime. The war damages and even the loss in manpower have been repaired with extraordinary speed by France; even her financial credit stands high, and hoarded gold is again plentiful in a country which has not lost the habit of thrift. But Frenchmen appear too little concerned with the future of their country. Their will to rearm is questioned by their foreign friends. It is hard for them to become united on a common program.

The French question mark is a grave one for the world, and not for the French alone, who are not over anxious to provide the answer. For everyone is agreed that France is the sheet anchor of the Atlantic pact and of the preservation of a free Europe, around which America has built her foreign policy. Through her geographical location and that of her colonies (from West Africa to Morocco, Tunisia, even Indo-China), through her intellectual prestige, which is still great in Europe, in the Near East and in South America, through her man-power, her economic resources and the inventive skill of her people, France is more than ever indispensable to the new Europe and to the maintenance of the free world. America has a vital interest in understanding the language, the institutions, the problems of their ally and *protégée*, and in guessing why those curious creatures, the French, behave . . . as Frenchmen.

Modern France is a book made up of twenty-eight essays, naturally of unequal value, but all competent, written on varied aspects of French recent history and of France today by a competent group of younger American scholars from all over the country. The first one, and by no means the most original of the group, is an introductory essay, too general and conventional, by the veteran French analyst of peoples: André Siegfried. It may be regretted that no younger Frenchmen from France were asked to present fresher views on French politics, French education, religion, the press, and the present mood of the youth in France—all topics relatively neglected in an otherwise comprehensive survey. For the volume, with all its honest and conscientious information, occasionally gives the impression of turning around the enigma of France, as a character in a novel by Kafka endlessly baffled in his attempt to enter a castle, but never quite solving it or even feeling it from inside.

The truth is that quantitative and statistical knowledge of such an elusive and complex whole as a country's personality remains exterior if not supplemented by a more intuitive perception and even an imaginative reconstruction. More attention to culture and literature (of greater importance in France than in any other land) would have proved helpful. After all, even in America *Uncle Tom's Cabin*, Upton Sinclair's social novels,

The Grapes of Wrath, and recent novels of disillusionment on World War II have exercised far more influence than dispassionate social and economic analyses. A great historian or a great business man is not the one who analyzes all the elements thoroughly but the one who imagines and reconstructs the motives of men and thus predicts their feelings and their actions.

The first part of the book discusses the decline of the French *élan vital*, not very conclusively and perhaps not very keenly. But one of the clearest factors in the gradual weakening of French influence in the last eighty years is sensed, if not adequately studied: the desiccation of the French bourgeoisie. One might also call it the failure of nerve of the ruling class. During the fateful days of 1940, in fact ever since the Dreyfus case and especially since the advent of the *Front Populaire* in 1936, and now again with the Gaullist party, it has been the misfortune of France that many army and navy officers, many higher civil servants, ambassadors, judges, many business men had inwardly lost faith and even respect for the regime which they had to serve.

The section on French letters and science comprises two excellent chapters; but they are necessarily brief and enumerative. The balance of the volume would have required far more emphasis on those keys to the understanding of modern France. Ten chapters are devoted to French politics: they assess the Third Force, the Left (Socialism, Communism), and the conservatives, rallied today around the banner of De Gaulle and heirs to a strange Bonapartist complex which has never deserted part of the French electorate since the 18th of Brumaire 1799. In truth, the parties mean little in France: men have always counted far more than groups for the French voters, and individualism has always had the better of party discipline. Under the shifting fabric of parties and their deceptive labels, there have always been in France a left and a right.

But, and most Americans find it hard to accept the point, the French, and most other continental Europeans outside Scandinavia, will never have a two-party system. The whole game of their complicated politics consists in avoiding the division into two parties. For, the French (and continental) temperament being what it is, a mixture of logic and passion, or rather of passion placed at the service of ideas and of logic, politics with them are not a sport in which rules of fair play are observed. It is an *affaire de coeur*, and all is fair in war and love. Two parties, bound to gravitate around the Left and the Right and refusing to agree on French history and on the political regime, would soon cut each other's throat. A "civil war," said an Englishman who had some French blood, Hilaire Belloc, "is a standing function of Gallic energy." A two-party system would soon involve the country in civil war. And a civil war in France today would also be an international war, with Russia on the one side and America forced, willy-nilly, to align herself with the Right.

France therefore needs a Third Force, or a series of buffer parties preventing the Left and the Right from coming to blows. The crux of recent political difficulties has been that the Communists, numbering 26 per cent of the voters and practically the whole of the industrial workers, having affiliated themselves with Moscow, cannot be represented in the French government. Hence the working classes are, for all practical purposes, disfranchised, for they have not gone over to Socialism, which is now a

petty bourgeois party. The government in France is thus thrown back to the right of the center. The Right looms more important than it actually is, since the whole extreme Left of five million voters or more is systematically left out of the government.

The section on social and economic problems is precise and well informed. The surprising upward trend in French population, which has lately given France a much higher birth rate than she had enjoyed for over a century, is clearly analyzed. The effects of the Marshall Plan in France are assessed. They have been of vital significance, for France has wisely utilized American help to build up her steel industry and her hydro-electric energy. She is now in a position to become a truly important industrial power and, what is more, she has outgrown her age-old complex of diffidence of industry, that is to say, of the modern world. The last two sections study the military problem of French security and, all too briefly, the position of France in world affairs.

Two points might have been stressed more conspicuously, for their significance is great today. The first concerns French capitalism, as it is called. It has not been a success and is very generally considered in France with hostility. Big business in France, and indeed in most of Europe, has been selfish, sluggish, narrow-minded. It has not expanded industry sufficiently; it has not developed productivity; it has not kept abreast of technological innovations; it has not granted decent wages and other benefits to workmen. American business men may deserve some of the sarcasms which literature and folklore aim at them, but their spirit, their methods, their devotion to the public good, one might even say their socialism, spontaneous or fostered by the Sherman Act, the New Deal, and other measures, are very different from those of European "free enterprise." That is one of the reasons for the existence of a strong Communist party in France and in Italy. The workers' grievances are real. They have not yet, since their bloody rebellions of 1848 and 1871, received a fair deal. France has much to learn from American capitalism.

But, and this is the second vital point, France, like most of Europe today and indeed most of Asia, does not trust America. She seems unwilling to learn from her powerful ally; reluctant to rearm, fearful of American economic imperialism, spiteful in looking down upon American mechanization, gadget and coca-cola civilization, distrustful of American motives in Europe and the Near East. Such a reaction is in part due to the regrettable but natural ingratitude of men, and to the humiliation of Western Europeans forced to admit that they are no longer masters of their fate. But it is also due to an inadequate mutual understanding between the two continents.

A volume like this Princeton symposium on modern France, in spite of some inadequacies and a certain lack of imagination, will serve a valuable purpose in enabling many Americans to take stock of the French situation and to see more clearly into the background of recent developments. A country like France, rich, indeed almost overwhelmed by her past, can only be judged in the perspective of the history which molded her. One may wish that a similar volume, undertaken jointly by Americans and Europeans, could be published, which would interpret America to a misinformed and suspicious world. The propaganda of America has been notoriously shortsighted; it has stressed the material benefits of the American way of

life, which are certainly not contemptible. But it has failed to stress the idealism which is still part and parcel of the American soul, the generosity, the faith in man's potentialities, the confidence in the future with which Americans are endowed. And it has not sufficiently showed that American intelligence deserves even more credit than American know-how and the American gift for making and running machines. After all, the leading military men of this country (a Frenchman may well say it) in World War II proved the equals of any of Napoleon's generals and won with their brains and those of their officers, as well as with machines. The interest in foreign countries evidenced by this book on France is all to the honor of modern American culture which will only help other nations save themselves through sympathetic understanding of them and sincere appreciation of their merits and of their problems.

Yale University

The New Soviet Empire, by David J. Dallin (Yale University Press, \$3.75), pp. 216.

Comment by
PROFESSOR HAROLD H. FISHER

MR. DALLIN might have called his interesting and informative book "Communist Imperialism: Its Causes, Symptoms and Treatment," for he deals less with the empire itself than with the forces, aims, and methods the Russian Communists have used to win their empire and are still using in their efforts to extend it. Mr. Dallin has not written a history or a scholarly treatise, and he has not used the apparatus of scholarship in the shape of a bibliography or abundant footnote citations of sources. He has, instead, discussed the manifestations and background of current Soviet policies. His chief sources are current Russian publications and the testimony of Russians who were captured by the Germans during the war and who have refused to be repatriated. To these sources Mr. Dallin brings his own knowledge as an old Marxist of Russian birth and as a widely read and exceptionally well-informed veteran student of Russian affairs.

The first five chapters deal with Soviet foreign relations; chapters six and seven with the problems of nationalities and nationalism in the Soviet Union; and the last five chapters characterize the new ruling class, the Soviet system, and how it operates in this post-war period. That system he sums up as "the applied form of Stalin's version of Marxism." It is a system that looks much stronger than it really is, for "one inch below the surface the rot at the heart of the Communist state begins." And then, also, just below the surface are the people, "tired, despondent, mute . . . too intelligent to be deceived but too weary to rebel," the people who wait for help or some token of help from the free world.

Mr. Dallin does not explicitly answer the \$64 question: Is war between the United States and the Soviet Union inevitable? He says that the Communist leaders believe war is inevitable, he says that empires collapse when

prestige and the legend of infallibility are exploded, and he adds that this has usually been the result of military action. He then suggests that if there is a remote chance of recovering security and liberating the enslaved peoples it will be by refuting the inevitability of Russian advances and victories and forcing the Soviets to retreat. Mr. Dallin agrees with George Kennan about containment, but he disagrees with Mr. Kennan's suggestion that the Russians be given a chance to withdraw without loss of face. Mr. Kennan believes that the Communist leaders might fight rather than lose face. Mr. Dallin appears to believe that if they fought or if they lost face without fighting, the Soviet empire would collapse from a combination of pressure from without and from below. He does not make a guess as to how long such a war might last before the imperial collapse or what would be left of either the free world or the Soviet world if such a war lasted very long. The effects of a third round of total war with atomic and biological trimmings might well be catastrophic for the Soviet empire, but who can say where catastrophe would stop?

What holds the Soviet Union together? One theory, according to Mr. Dallin, and this is one he shares, is the concept of the impact of power through a totalitarian dictatorship based on force, persuasion, and a new social class at the top. The other, more primitive, theory is that the Russian national character is brutal, aggressive, and imperialistic, and that in Stalin and his henchmen the Russians have got what they deserve. He refers to an anthropologist's explanation of Russian national character in the alleged old Russian custom of swaddling babies. This form of "diaperology," which has incensed many persons of Russian descent, is about on a par with another theory that explained Japanese national character as the result of the toilet habits of Japanese children.

Mr. Dallin says that to accept the notion that the Russians take naturally to the Stalinist dictatorship and really do not mind, is to play into the hands of the Communists. He believes that a fraternal appeal to the Russian people, an appeal that would alienate them from their government, a "pro-Russian anti-Communist policy," would be a sound and effective program for us and our allies. He implies that an "unconditional surrender" slogan such as we used in World War II would be bad policy since Russia could not be conquered and occupied as Germany and Japan have been. We should take into account not only Russia's powers of resistance but also the "stupendous weakness" of the entire Soviet structure, a weakness which is revealed by the Communists' desperate efforts to hide from their subjects the true image of the outside world and to hide from the outside world the true image of the Russian people.

Another problem arises from the fact that the Soviet Union is not composed of a single national group like France or an amalgamation of national groups like the United States but is made up of sixty ethnic groups speaking some 200 languages. Seventeen of the Soviet republics have more than a million population. Would a Russia broken up into ten or fifteen independent national states help or hinder world peace and security? Like most persons of Russian birth Mr. Dallin is against dismemberment. He agrees that the three small Baltic states should be independent but not the much larger Ukraine or the Central Asian republics. He argues that Germany sooner or later will re-emerge as the great power on the European continent and that the only way to maintain a balance of power against a

re-united Germany is to maintain a Russian federation within its 1939 boundaries.

The United States has quite consistently opposed a break-up of Russia, but I believe that a good argument could be made for a change of policy now. Surely we are not going to oppose a break-up of the Soviet empire. A political and psychological strategy based on the right of national self-determination seems to me to be the most effective strategy to check Communist Russian expansion and to weaken the powers of aggression of the Soviet empire. There are other and better ways of taking care of Germany—such for example as its integration in a European Union.

In speaking of the six wars waged by Soviet Russia (Poland 1920, China 1929, Poland 1939, Finland 1939, Germany 1941, Japan 1945) Mr. Dallin notes that the Communists have tried to carry and in most cases succeeded in carrying their defensive wars into enemy territory and in adding to the number of communist-ruled republics. He says that Russia took advantage of America's "light-hearted, almost sentimental approach to international affairs" to take over Poland, the Balkans, Hungary, Czechoslovakia, North Korea, and China. I think this rather over-simplifies the situation, but there is no doubt that for most of the post-war period we have not known what the score was.

Mr. Dallin describes Communist foreign policy as the internal class struggle "externalized." In the internal class struggle between the proletariat at one extreme and the capitalists at the other, the proletariat tries to win over the "intermediate elements"—small businessmen, peasants, intellectuals. In the externalized class struggle Soviet Russia is at one extreme, the United States at the other; and Russia is trying to win over the intermediate elements—the states geographically and politically between. This notion of the international class struggle is one of the many illuminating and stimulating observations in this excellent book.

Stanford University

The World of the Slavs, by Albert Mousset (Frederick A. Praeger, \$3), pp. 198.

Reviewed by

PROFESSOR JOSEPH S. ROUCEK

DURING the last hundred years or so the use of the ideology of Pan-Slavism by Russia has influenced the course of world politics to a remarkable degree. Specifically it has been a powerful ideological weapon designed to promote the aim of Russian imperialism under the guise of appeal to the racial ties among the Russians, Czechoslovaks, Poles, Yugoslavs, and Bulgarians, not to speak of a number of subdivisions such as the Macedonians and Lusatian Serbs. Before World War I the Czarist Pan-Slavistic spokesman used this ideology to dismember the Austro-Hungarian and Turkish Empires by helping to liberate the Slavic "brethren" in these vast territories. Right after World War I Soviet Russia toned down its Pan-Slav agitation, only to revive it a few days after its "dissolution" of

the Comintern during World War II. Pan-Slavism was used to unify the Slavs the world over by making the struggle against the Nazis appear to be a continuation of the ceaseless historical competition between the Slav and the Teuton. Branches of this movement have sprung up everywhere Slavs are found, including the United States. In fact the movement became so important here that it was the subject of a special report of the Committee on Un-American Activities of the United States House of Representatives in 1950 which proclaimed that the American Slav Congress is "a Moscow-inspired and directed federation of Communist-dominated organizations seeking by means of propaganda and pressure to subvert the 10,000,000 people in this country of Slavic birth or descent."

Since there have been so few studies of Pan-Slavism in English, this translation of Mousset's volume is a welcome survey of the genesis of the Pan-Slav movement from its very beginning. The book is not without its minor mistakes. It also lacks references to several specialized studies which have explored particular aspects of the ideological growth of Pan-Slavism. These shortcomings, however, do not prevent it from being a short and readable introduction to the background of current Pan-Slavic propaganda.

Especially interesting are the two concluding chapters showing the use of the Muscovite Patriarchate and the present troubles that the Soviet Union faces as a result of Tito's resistance.

University of Bridgeport

BRIEFER COMMENT

Collision of East and West, by Herrymon Maurer, pp. 352.

An outstanding evaluation of the impact of Western culture on the peoples of the East and of the fundamental cultural conflicts that divide the East and the West. Mr. Maurer's sensitive penetration into the imponderables of important alien thoughtways and his lucid exposition make his book required reading.

Henry Regnery, \$4.50

The New Turks, by Eleanor Bisbee, pp. 298.

The story of the Turks' adaption in twenty-five years to the ways of the modern world through radical changes in personal and national life from the ways of their Ottoman predecessors. The author, who was professor of philosophy and

psychology in Istanbul colleges for eight years, is primarily concerned with the way Turkish people live and work but develops her concern in a solid frame of information.

Univ. of Pennsylvania Press, \$5

Rumania: Political Problems of an Agrarian State, by Henry L. Roberts, pp. 414.

The object of this book is to analyze the five major political movements in Rumania since the First World War in terms of their programs and achievements and especially in regard to the chronic agrarian crisis. The author's conclusion is that both the political and economic life of Rumania reflect dislocation under the overwhelming impact of Western industrialized society upon an agrarian society during the last century.

The author teaches history at Columbia University.

Yale University Press, \$6

The United States and France, by Donald C. McKay, pp. 334.

This new volume in the American Foreign Policy Library edited by Sumner Welles undertakes to explain the national temperament, cultural heritage, economic resources, political institutions, and international role of France in the past and today. Useful.

Harvard University Press, \$4

The Tropics: World of Tomorrow, by Charles Morrow Wilson, pp. 275.

Good narration, largely in terms of personalized "case histories" of representative individuals. Readers can expect to acquire pleasantly a good store of factual knowledge and enriched conceptions of various tropical areas and their peoples.

Harper and Brothers, \$3.50

The Malays: A Cultural History, by Sir Richard Winstedt, pp. 198.

An account of the many-sided civilization of the Malays by an author with an international reputation in the subject. The book ranges from the origin of the Malays through their social, political, legal, and economic systems to their beliefs, religions, arts, and crafts.

Philosophical Library, \$3.75

The Navy and the Industrial Mobilization in World War II, by Robert H. Connery, pp. 527.

An administrative history dealing with contracts, prices, controlled materials and manpower, financing, plant expansion, renegotiation, priority scheduling, and other problems faced in the

building of a wartime Navy.

Princeton University Press, \$6

Britain Today, by C. F. O. Clarke, pp. 248.

A study by an English radio commentator, diplomat, and foreign correspondent of the evolution of present British democracy. Analyzing the forces released by 19th-century Lloyd George Liberalism and their effect on the present party system and government and tracing the progress of the Labor Party since 1945, Clarke portrays Britain from Empire to Commonwealth and outlines the main aspects of British foreign policy in application to the problems of the post-war world.

Harvard University Press, \$3

The World In Crisis, by J. Salwyn Shapiro, pp. 429.

The author holds that present world tension has been precipitated by acceleration of tendencies which he explains through analyzing the political, social, and economic movements of the first half of the twentieth century. Into this analysis is woven the historical background necessary for an understandable picture.

McGraw-Hill, \$5

Political science for study or for reference

Russia, Past and Present, by Anatole G. Mazour, pp. 785, Van Nostrand, \$10.00.—A history of Russia arranged topically rather than chronologically and devoting much space to recent times.

Twentieth Century Economic History of Europe, by Paul Alpert, pp. 466, Henry Schuman, \$6.00.—The economic history of eastern and western Europe since 1914 by a former foreign editor of the Paris financial daily *Le Capital*.

A Short History of American Diplomacy, by L. Ethan Ellis, pp. 604, Harper and Brothers, \$5.00—

A college text that emphasizes the major matters concerning American foreign relations and the apparatus that has conducted them. *The Soviets in World Affairs, 1917-1929*, by Louis Fischer, 2 vols., pp. 892, Princeton University Press, \$10.—A reissue of a standard basic work for those concerned with Soviet affairs. Indispensable on matters within its scope.

The Bolshevik Revolution, 1917-1923, by Edward Hallett Carr, pp. 430, Macmillan, \$5.—Volume one of a projected *History of Soviet Russia*. The author has held many important positions in the British Foreign Office.

Reference

German-English Technical Dictionary, edited by Kurt F. Leidecker, 2 vols., pp. 968, Vanni, \$35.

—Based on data compiled by the U.S. Air Force, this dictionary contains the official translation of scientific terms found in the secret documents captured after the fall of Germany. Its terminology has been adopted in the official papers of both the governments of the United States and Great Britain. Approximately 100,000 terms are listed, including symbols, abbreviations, and code words.

NBC Handbook of Pronunciation, Second Edition, compiled by James F. Bender, pp. 372, Crowell, \$4.50.

—Outstandingly useful with its 15,000 entries for current terms and names in the news as well as for traditional puzzlers. Pronunciation is indicated by the precision method of the international alphabet, as well as by respelling. *The New Military and Naval Dictionary*, edited by Frank Gaynor, pp. 295, Philosophical Library, \$6.

—Too limited in coverage of Air Force terms to be a good buy.

The Year Book of World Affairs 1951, edited by George W. Keeton and Georg Schwarzenberger, pp. 427, Frederick A. Praeger, Inc., \$6.—A compilation of thirteen articles by distinguished authorities on widely divergent phases of current world problems.

The Aircraft Year Book 1950, edited by Fred Hamlin, Arthur Clawson, Eleanor Thayer, and Robert McLarren, pp. 477, Lincoln Press, \$6.—The official compilation of facts and figures on military and civilian air developments in the U.S. for the Aircraft Industries Association of America.

Political Handbook of the World 1951, edited by Walter H. Mallory, pp. 230, Harper and Brothers, \$3.50.—Published for the Council on Foreign Relations, listing by country pertinent facts on composition of the present government and a running history of major political events in the last year. *The Development of Tactical Services in the Army Air Forces*, by John M. Coleman, pp. 298, Columbia University Press, \$4.—The author, a former historian in the Air Service Command, has written a well-documented history of the service and maintenance organizations of the Army Air Forces during World War II.

Technical publications of value

High-Speed Aerodynamics, by W. F. Hilton, pp. 598, Longmans, Green, \$8.50.

Airplane Aerodynamics, by D. O. Dommasch, S. S. Sherby, and T. F. Connolly, pp. 520, Pitman, \$6.50. *Basic Wing and Airfoil Theory*, by Alan Pope, pp. 294, McGraw-Hill, \$5.

Air Systems for Aircraft, by C. M. Pollitt, pp. 176, Pitman, \$6.

Refueling in Flight, by C. H. Latimer-Needham, pp. 191, Pitman, \$4.

Parachutes, by W. D. Brown, pp. 322, Pitman, \$8.50.

The Performance of Civil Aircraft, by F. B. Baker, pp. 302, Pitman, \$7.50.

The Psychology of Flight, by Alex Varney, pp. 269, Van Nostrand, \$3.75.

The Physical Nature of Flight, by Ray Holland, Jr., pp. 287, Norton, \$4.

Cloud Physics, by D. W. Perrie, pp. 119, Wiley, \$4.50.

The Flight of the Thunderbolts, by B. J. F. Schonland, pp. 152, Oxford University Press, \$3 (subject: lightning).

Methods of Operations Research, by Philip M. Morse and George E. Kimball, pp. 158, John Wiley, \$4.

Antennas, by John D. Kraus, pp. 553, McGraw-Hill, \$8.

Air Command and Staff School Publications

Evaluation in Air Force Instruction, by George W. Gregg et al., pp. 64.—This booklet contains practical examples of different types of test questions and explains how to analyze test items.

Air Base Development and Maintenance, by Lt. Col. Gregory J. Skinner, pp. 81.—The latest Air Force publication on doctrine, policy, and procedures affecting air base development and maintenance, with emphasis on changes under unification.

Air Organization, by Lt. Col. Warren S. Baker and Lt. Cols. T. F. Osborne and M. F. Peterson, Part I, pp. 28; Part II, pp. 89.—Part I deals with the fundamentals of all organization, the need for its being, and its logical development from Biblical times to the present. Part II details the

latest information on the dynamic, ever-changing organization of the Air Force and its commands.

Limited copies of the above are available for military personnel in the office of the Secretary of the Air University.

Suggestions for the personal library of liberal arts and sciences

China, A Short Cultural History, by C. P. Fitzgerald, pp. 619, Frederick A. Praeger, Inc., \$7.50.—A readable interpretation of the seven major epochs of Chinese civilization. Political and dynastic history are outlined, but art, literature, religion, and economy are preferred for emphasis. Well illustrated with maps and plates (no color).

The Divine Comedy of Dante Alighieri, translated by Jefferson Butler Fletcher, pp. 471, Columbia University Press, \$3.50.—A reissue of the most successful translation, in our opinion, of the Divine Comedy into English verse. Done into Dante's measure, the rhymed tercet—but unlinked tercets—Professor Fletcher's rendition comes closest to offering in alien English, of all attempts at the task, both the meaning of Dante's rigorously precise thought and the beauty of his difficult, melodic music.

The Sea Around Us, by Rachel L. Carson, pp. 230, Oxford University Press, \$3.50.—A first choice. Here is beautifully written oceanography dealing with the mysteries of the mother oceans, of which some are the beginnings of life, the shape of ancient seas, the birth of islands, the moving tides, the mineral riches, and the life in the deep waters.

History of Painting, edited by Germain Bazin, translated from the French by Rosamund Frost, 2

vols., pp. 747, distributed by Macmillan, \$7.50.—A pictorial history of painting with 126 pages in color and 480 black and white reproductions (page size is approximately seven by five inches). The critical notes and short biographies of the artists are written by various experts.

The Main Stream of Mathematics, by Edna E. Kramer, pp. 321, Oxford University Press, \$5.00.—A sound though popular exposition of the fundamental concepts of mathematics that are important today. The account runs from primitive number notions to relativity, at the same time exploring numerous anecdotal byways.

The Burden of Egypt, by John A. Wilson, pp. 332, University of Chicago Press, \$6.00.—An interpretation of ancient Egyptian culture that is a vivid narrative, embodying the latest in Egyptology, of the rise and decline of a great civilization.

The Nature of the Universe, by Fred Hoyle, pp. 142, Harper & Brothers, \$2.50.—A small book that yields in good prose the enormous amount that has been learned about the universe in the past quarter of a century. Simply integrated for the layman.

Insects in Your Life, by Dr. C. H. Curran, pp. 309, Sheridan House, \$3.50.—The Curator of Insects, National Museum of Natural History, offers a prosaic account of the curious lives of numerous insects that, for one reason or another, are important to man.

The Renaissance: Its Nature and Origins, by George Clarke Sellery, pp. 296, University of Wisconsin Press, \$3.75.—An extended essay, rather than a history, on the age of Chaucer, Machiavelli, the Medici, Villon, Gutenberg, Columbus, and Copernicus, the twelfth to the

fifteenth century, when the Middle Ages died and modern times were born.

The Meaning of Shakespeare, by Harold C. Goddard, pp. 691, University of Chicago Press, \$6.00.—A study of Shakespeare's plays as derived from a great poet's religious, moral, political, and social convictions applied to judgment of the world of his times.

An Introduction to Music, by Martin Bernstein, pp. 446, Prentice-Hall, \$4.25.—A listener's guide, rather than a history of music or a technical manual, this "introduction" considers the principal composers and their major works and provides detailed analysis of representative selections.

The Paris We Love, edited by Dore Ogrizek, pp. 511, McGraw-Hill, \$6.50.—A deluxe guidebook with over three hundred illustrations in color. Printed in France.

Science and Common Sense, by James B. Conant, pp. 371, Yale University Press, \$4.00.—The president of Harvard explains the methods of science.

Soviet Russian Literature, 1917-1950, by Gleb Struve, pp. 414, University of Oklahoma Press, \$5.—Detailed and somewhat pedestrian but a serious attempt at exhaustive treatment.

Also recommended are *The Rise of Scientific Philosophy*, by Hans Reichenbach, pp. 333, University of California Press, \$3.75; *A Concise History of Astronomy*, by Peter Doig, pp. 320, Philosophical Library, \$4.75; *The Origins of Modern Science*, by Herbert Butterfield, pp. 187, Macmillan, \$3.00; *A History of Greek Literature*, by Moses Hadas, pp. 327, Columbia University Press, \$4.25; *Man is a Microcosm*, by J. A. V. Butler, pp. 162, Macmillan, \$3.00 (biophysical chemistry).



The Periodical Press



H. A. de Weerd, "Lessons of the Korean War," *Yale Review*, Summer 1951, pp. 592-603.

In this article H. A. de Weerd, author, professor of history at the University of Missouri, and formerly an Army historian, describes the weird and curious character of the Korean war, the peculiar setting, and the strange participants—all of which, in his estimation, produce a bizarre conflict with befuddling objectives and a baffling situation to the experts and military prophets. In most of its major problems and aspects it is not analogous to World War II.

At the outbreak of Korean hostilities, the American occupation forces in Japan were far from adequate. Though supposedly battle trained in World War II concepts, they were not trained to fight a North Korean army. In spite of the heavy losses and expense, Korea, in a military and political sense, has been an enlightening and valuable experience.

The following lessons, the author claims, have been learned on the battlegrounds above and below the 38th parallel. These he discusses, evaluates, and traces in their historical background: (1) the desirability of maintaining in the United States a mobile striking force of air-ground-sea power, for use in any future emergency like Korea; (2) in dealing with ideologically-based military operations, normal concepts of motivation and timing are not trustworthy. He cites, for example, the Chinese intervention, which did not occur when our intelligence and military experts thought such a move would be most logical; (3) the refugee problem—it may be a moral concept and obligation of our way of life for an army to deal with refugees in a humanitarian way, but in all-out war a more realistic policy must be adopted. Refugees too often are used for infiltration purposes, espionage agents, guerrilla fighters—and especially as human ballast to further complicate the existing difficulties of an army in the field; (4) assessment of the theater of operations to arrive at strategic objectives. An example of such strategy-to-fit-the-circumstances is Ridgway's "Operation Killer"—limited gains with heavy enemy casualties, in comparison to MacArthur's wide sweeping end runs; (5) the impossibility of isolating any local conflict from the designs and aims of Communist imperialism; (6) the need for more, and not less—as many experts advocate—equipment and firepower, a substantiation of the fundamental lesson of the second World War. The need is not for more men to increase fire-power but for more machines and better weapons.

Edward Ashley Bayne, "Crisis of Confidence in Iran," *Foreign Affairs*, July 1951, pp. 578-590.

IRANIAN oil production last year amounted to 31 million tons—a fact sufficient in itself, the author believes, to make the ancient kingdom now

called Iran a serious world force. Iran is "in the throes of 'emotional xenophobia,' national frustration, a compensatory fear and resentment, and traditional 'split-the-opposition' diplomacy." All this, along with "new and ill-digested elements of Comintern activity, and . . . modern technology" has caused Iran to "become a sore that does not respond to the traditional healing measures of diplomacy or commercial negotiations."

After recounting the historical events leading up to the Iranian oil crisis, events of which he had first-hand knowledge as financial consultant to the Prime Minister of Iran and as Loan Officer for the Middle East for the International Bank, Bayne surveys current Iranian social, religious, economic, and political conditions and offers a terse conclusion that unless the West extends immediate aid, it must be prepared to lose another Asian nation to the Soviet system. Exploitation of oil has provided a base for the endemic virus of nationalism and the longing for a recrudescence of the power of Islam—a virus which may infect even Turkey.

The basic cause of the present crisis, the author believes, is the failure of the West to create a Marshall Plan for Iran. Relying on a proviso in the Teheran Declaration which promised aid, Iran, assisted by United States engineers, drew up an extensive national development program and applied to the International Bank for a loan. The Bank decided Iran could not afford a program of the size submitted without increased oil royalties and refused the loan on the grounds of "unsuitable risk." With the defeat of the development program went the desire of the Iranians to develop their country on any realistic basis. The major political blunder was the inability of the West to see in this scuttled program an orderly economic revolution—a last-ditch effort by the Iranian liberals to erect a bulwark against political chaos and inevitable Soviet intervention. Had Iranian economic recovery been underwritten, like that of western Europe, the story would have been different.

In Bayne's opinion the whole Iranian debacle resulted from a lack of British political acumen. In leaving things of a political nature to economists, Britain attempted commercial solutions to political problems and failed to take cognizance of Iranian self-confidence. An Asian's belief in himself, his ability to perform his job, and his country are absolute prerequisites for any progress or reform. Disregard for this factor has resulted in deep-seated hatred, contempt, and reaction.

Bayne concludes that to rebuild confidence of Iranians in themselves and the West, America must bear the heaviest burden of a new policy which will recreate Iranian desire to develop Iran by a bilateral approach with the British and through international effort. It is not too late for this—but it is too late to speak of oil concessions.

Touvia Ashkenaze, "The Middle East—Vital Outpost of European Defense," *The New Leader*, June 18, 1951.

Ellen Deborah Ellis, "Tensions In The Middle East," *Current History: Part I, "Internal Pressure,"* May 1951, pp. 262-265; *Part II, "External Pressure,"* June 1951, pp. 330-334.

ASHKENAZE, a renowned Orientalist and Arabic scholar at the Hebrew University in Jerusalem, has traveled extensively throughout the Near East and writes with authority about it. His article presents the Near East as

a vital strategic frontier of European defense: its geographic importance to European defense, the ethnic composition and value of the regional races as allies, European dependence on Near East oil, the strategic Suez Canal, and the important location and national determination of Turkey.

Crises resulting from tension in the Middle East, Ashkenaze points out, are chronic occurrences. Three current controversies, which directly or indirectly concern the stability of the Near East and carry global implications, are analyzed and discussed: (1) Pakistan against India over Kashmir; (2) Britain against Iran over oil nationalization; and (3) Britain against Egypt over the control of the Suez and the withdrawal of British troops. These disputes indicate a lingering distrust of the West in the Near East.

The above-mentioned tensions are thoroughly treated by Ellen Deborah Ellis, long a resident in the Middle East and Professor Emeritus of Political Science, Mt. Holyoke College. She points out that the Middle East "is and has been peculiarly a land of tensions," produced by both internal and external pressures. As the hub of three continents and the permanent meeting ground of East and West, the area is bound to play a decisive role in the future of the modern world. Nowhere on this globe, the author maintains, have conflicting internal forces been so consistently at odds with each other or "has the impact of outside interests and policies exercised such a determining influence upon an area torn by so many conflicting movements of its own."

Every phase of life is marked by extreme internal tension, for the inhabitants still must extract, as they have in ages past, a living from the stubborn desert. Modern technology, introduced to ease this struggle, has created additional strains. Pulling against each other are conservatism and liberalism, wealth and poverty, religion and secularism, urbanism and ruralism, a deeply rooted past and an ultramodern present, and the old and new in every conceivable phase. Political ideologies and systems have stiff competition where there exist vestiges of an old tribal system, parliamentary democracy, autocracy, republicanism, monarchy, and Russian Communism. In addition there is present a confused nationalism, "torn between the separation of individual Arab States and the older concept of a larger Arab Unity now exemplified in the Arab League." Socially and politically there exists a basic tribal structure of society founded on tribal loyalty and blood relationship, factors which cut across state boundaries and disturb an emerging nationalism. Contrast between life in cities and the life of nomadic and agricultural peoples is increasing. Modern technology has given wealth to a few and in the process has created a rudimentary middle class, but two thirds of the population are nomads and peasants who exist in frightful poverty, and who are becoming dissatisfied. In spite of remedial measures by the various states and foreign corporations, they are easy prey for political agitators from the "outside." The religious problem has widespread implications. Islam, during the Moslem era, made for unity rather than tension. Strong as its unifying influence was, it failed to establish a permanent political unity among believers—largely because despotic means to maintain Arab unity were employed by the spiritual and political heads of the Caliphate after Mohammed. Divergent and heterogeneous patterns of a virulent nationalism thus appeared and exist to this day.

External pressures, negative and positive, creating tensions in the Middle East are of equally decisive influence. These pressures, more active since World War I, are an expression of power politics between the European powers and the Ottoman Empire and among the European powers themselves, with the United States a recent addition to this group. The most conspicuous external pressures listed by Ellis are (1) "Britain's encouragement of the Arab World;" (2) "the war-time and post-war diplomacy bearing on the parcelling out of the conquered Arab lands among the victorious Allies;" (3) "the operations of Russian Communism;" (4) "the activities of the European powers and the U.S. in acquiring the concessions for the development of the vast oil deposits of the area." The author emphasizes that the interplay of indigenous and external sources of tension create issues (such as the dangerous oil question) which are potential hotbeds of extended unrest.

The tensions in the Middle East can be resolved, Ellis believes, by mutual moderation, restraint, and confidence. Modern technology can relieve economic instability, but its benefits must be placed at the disposal of the Middle Eastern people without the thought of political or economic exploitation. The present U.N. program of technical assistance and economic development, plus the Point Four program, would aid the region immeasurably. To end the rivalry of nationalistic states, there must be an "effective political union on supra-national level" dictated not by foreign intervention but by regional common interests and based on a democratic order guaranteeing individual justice and personal economic, political, and religious rights.

"Indo-China: Gateway to South East Asia," *The World Today*, June 1951, pp. 240-248.

James McAree Jr., "Burma Faces the Communists," *Current History*, June 1951, pp. 340-343.

LOCATED on the underbelly of China, Indo-China is the rice bowl of the Orient and a prize coveted by its overpopulated and under-fed neighbor to the north—all the more so because it blocks the corridor leading to rich mineral lands of southeast Asia. If this barrier were opened, the Communists could pour into Burma, Malaya, and Indonesia.

Emphasizing the importance of Indo-China in the peripheral strategy of the West, the article brings up to date, as far as possible, the story of developments inside the country, tracing economic progress and the growth of nationalism up to 1945. Upon the surrender of Japan the Nationalist parties in Indo-China amalgamated under the title of Vietminh, issued a declaration of independence from France, and assumed control of a government modeled on that of the United States. The pro-French Emperor Bao Dai abdicated and accepted a post as political adviser to the opposing Vietnamese government. In 1946 the French moved back in and were opposed by Vietminh led by Ho Chi Minh. From 1946 to 1950 civil war has plagued the land. Also discussed is the arrival in Indo-China, in December 1950, of French General Jean de Lattre de Tassigny as Governor-General and Commander-in-Chief and the current phase of the Indo-China drama.

Of equal significance in the corridor to southeast Asia is the ancient

kingdom of Burma—now threatened by Communist intrigue and revolution. Under British control, James McAree asserts, the economic prospects of Burma were good. With the departure of the British and the birth of the Union of Burma on 4 January 1948, civil disorder and economic chaos set in, and Communism, feeding on poverty and ignorance, thrived. The Burmese, without political and economic experience, were unprepared for freedom. Their economic inexperience stemmed from a national distaste for commerce, while politics were suspended in a vacuum after years of political movements dedicated to one proposition—freedom from British domination.

Tracing the growth of the Communist opposition and the political events in Burma, the author, a lecturer in the Department of General Studies at the University of Southern California, warns that hostilities are far from an end. Predictions of the early restoration of civil order are pure optimism. And failure to achieve economic stability and civil order may kill Burmese independence and pave the way for another Communist "liberation." Burma's abundant resources and strategic location—astride the highway leading out of China and Indo-China into southeast Asia and India—may irresistably lure Communist imperialism. Burma's venture in freedom may be costly.

"A National Estimate," *Fortune*, April 1951, pp. 87ff.

A NATIONAL ESTIMATE, unheard of by many Americans, is the sum of the agreed judgments on the high level of the National Security Council. It consists of "all that is known or guessed of the capabilities of both sides [ourselves and the enemy] . . . assembled in one document, along with what is known or assumed of the other side's [enemy's] intention." This document is based on intelligence collected by the various branches of the service—the Federal Bureau of Investigation, the Economic Cooperation Administration, and the Departments of State, Commerce, the Treasury, and Agriculture. Most of the document's facts are remarkable only for the reason that they are common knowledge, available to any reader of newspapers and magazines. The important difference between the usefulness of the material to the NSC and to the average reader is that the NSC gathers together all pertinent facts, adds to them what secret information there is, and studies the sum in a trained and objective manner. The correlating and reassessing is done by General Smith's Central Intelligence Agency (where additional information is added), and the product is shaped into a working paper for the NSC. After the NSC has added its own information on U.S. capabilities, the National Estimate has become a document containing the most complete information available on ourselves and the enemy. Upon it are based the discussions, decisions, and implementation of U.S. policy in international relations.

The article in *Fortune* is an unofficial National Estimate, but as the editors state, "in its conclusions it probably does not differ too much from the one that is [official]." The reader will find here the "sober analysis of all the known factors that have to do with the intentions, capabilities, and weaknesses" of ourselves and of the Russians. It reveals the magnitude of the task this country faces.

Five basic conclusions are drawn from *Fortune's* National Estimate:

(1) the United States and its allies far surpass in potential strength and power any force which Soviet imperialism could muster; (2) the free world possesses the advantage in the realms of recent political, technical, and military developments; (3) too much of the free world's power is latent or potential—there is a need for increased mobilization to discourage any future aggrandizement by the Kremlin; (4) should Russia decide to strike during August and September 1951, the U.S. and the free world would not be ready; (5) U.S. rearmament is increasing our strength faster than Russia's expansion is increasing hers.

Albert L. Warner, "How the Korea Decision Was Made," *Harper's Magazine*, June 1951, pp. 99-106.

THE memories of a number of top participants in the conferences in Washington, official records, memoranda on telephone calls, and teleconference exchanges, reveal in this article the sequence of events and actions which occurred in Washington and at the United Nations during the days of "decision" following the attack upon South Korea. The author, a top-flight radio commentator on foreign and military affairs, does not assess or judge. He merely sets forth a play-by-play account of events, beginning on Saturday, 24 June 1950, at 2200 hours with a press association call that reported the aggression to the State Department, Far Eastern Division, and continuing through 30 June.

Partial answers to five current questions can be found: (1) Was the use of American ground troops in Korea adequately discussed in advance? (2) Why was it decided to immunize Chiang Kai-Shek? (3) Did the U.S. step ahead of the U.N. rather than proceed under its auspices? (4) What were General MacArthur's immediate reactions? (5) Why and how did the U.S. get into the war?

George R. Taylor, "Rearming With Ideas," *The Virginia Quarterly Review*, Spring 1951, pp. 162-178.

THIS thought—provoking article deals with the world-wide battle for men's minds—the furious ideological conflict between East and West. Mr. Taylor makes use of his experience in the Far East in the OWI during World War II, in the State Department, and currently as Director of the Far Eastern and Russian Institute of the University of Washington, in his analysis and evaluation of America's accomplishments, defeats, and needs in this important struggle.

America has made great gains in the conflict, Taylor decides, but unless we find an answer to the relentless, world-wide attack on our traditions, our values, and our institutions, we are jeopardizing all past success. Taylor believes that the American answer lies in a sincere and honest world-wide application of national aims. These aims are easy to recognize and not too difficult to state, but they must be formulated simply and effectively into a program of action. To win the battle for men's minds, we must present what we stand for in terms understandable, acceptable, and beneficial to people in other lands. This calls for, first, a complete understanding of other people and, second, statement of our case in their own terms. Too often, in attempting to implant its way of

life, America has erred by defining its concepts in the particular terms of its own environment. Through an analysis of America's past relations with China and the Philippines, Taylor points out where, why, and how, in his opinion, we have failed in the crusade of ideas. In contrast he compares our efforts at mental rearmament with those of Russia. The magnetism of the American dollar or the strength of American military forces is not sufficient to make lasting allies or to produce ways of life parallel to ours. We must offer our own concepts and ideals as positive, objective, and workable solutions to the complicated age-old problems of other lands.

James R. Thayer, "Japanese Opinion on the Far Eastern Conflict," *Public Opinion Quarterly*, Spring 1951, pp. 76-88.

JAMES R. THAYER, a former staff member of the National Opinion Research Center and presently a member of the Army's Civil Information and Education Section in Japan, discusses a number of domestic and foreign issues recently subjected to a Japanese opinion poll. Several of the more important conclusions were: (1) the ideas of the Japanese people regarding the future political course of their country have not crystallized; (2) the majority of Japanese believe their country should refrain from active participation in the Korean war; (3) there is increasing Japanese good will towards the U.S. and an increasing fear of the Soviet Union; (4) a less favorable attitude exists toward permanent U.S. military bases in Japan; (5) the idea of cooperation with the U.N. is gaining popularity.

Thayer also discusses the impact of the Korean war on the Japanese; the increased attention of the Japs to war news; and the revival of the Japanese army.

Alexander W. Rudzinski, "The Influence of the United Nations on Soviet Policy," *International Organization*, May 1951, pp. 282-299.

EXAMINING the Soviet policy and Soviet change of attitude toward the U.N. from 1945 to 1950, Mr. Rudzinski, distinguished Polish jurist, professor of law, and formerly adviser to the Polish U.N. delegation, attempts to answer several speculative questions of paramount world interest. Did the creation of the U.N., the Russian participation in it, and the actions of the U.N. exert any influence on Soviet policy? If so, where, how, and to what extent? Why do the Russians, who belittle the world organization, periodically stage walkouts, and brand it as a tool of the American imperialists and Wall Street capitalists, nevertheless retain their membership in the face of constant criticism, diplomatic defeats, and overwhelming opposition?

In general, the author believes, the actions and decisions of the U.N. succeeded in temporarily halting Soviet expansion, but they did not affect Soviet long-range strategy and political objectives, other than requiring the Russians to revamp their immediate tactics. The diplomatic rebuffs suffered in the U.N. are tolerable so long as the Russians can use the world organization for channeling their policy. It is extremely unlikely the Soviet will stage a permanent withdrawal. They need the U.N., according to Rudzinski, for eight specific reasons: (1) for world political propaganda

purposes, (2) to maintain legal residence in the world community, (3) to prevent an anti-Soviet coalition, (4) to paralyze speedy action in the Security Council, (5) to attack and split the Atlantic Pact Nations, (6) to delay or prevent rearmament of the West, (7) to delay a general war—in order to acquire gains without war, (8) to transact diplomatic activities with lands in which they have no normal diplomatic relations.

"Psychological Warfare in Korea," *Public Opinion Quarterly*, Spring 1951, pp. 65-75.

THIS is an interesting, informative, if generalized, narrative of a branch of the service which is increasingly important in modern warfare. An interim report compiled from material released to the press by the Far East Command, the article outlines the work of the Psychological Warfare Branch of G-2, FEC. It is a preliminary account of the U.N. Psychological warfare activities during the first six months of the Korean war and limits its concern to leaflet, radio, and other forms of propaganda aimed at North Korean soldiers and civilians.

Many aspects of the varied and complex activities of the Psychological Warfare Branch are discussed, including organization and personnel; methods and means of dissemination: leaflet operation (sample leaflets are reproduced), airborne and ground loud-speaker operations, radio activities and operations; preparation of the material; printing of the material by the Printing and Publication Center of FEC; and miscellaneous lesser phases.

All methods and operations of the PWB fell into three carefully studied major objectives: (1) to undermine the effective resistance of North Korean troops, (2) to present the Korean people with the truth about the war, and (3) to bolster the morale of the South Korean troops and civilians. The article also discusses the major themes which PWB directed at enemy soldiers and enemy civilians.

Randolph Leigh, "What Russia Needs for War," *Harper's Magazine*, June 1951, pp. 78-82.

REGARDLESS of whether Russia is in an advanced stage of science and technology with a huge military machine or on a retarded military level which relies on waves of robot-like soldiers to overwhelm an enemy, her readiness for war should be examined in terms of her strength in oil, steel, and food. An experienced newspaper editor, an author, and an Army historian in Europe during the second World War, Leigh bases this point of departure on the type of war civilized man has developed. Analyzing U.S. and Russian production and supply, he points out that Russia cannot match the U.S. in present capabilities and potentialities with regard to these three essentials. To survive the long haul of a global war, she needs new sources of supply and development. The oil fields of Iraq, Iran, and Saudi Arabia and the steel mills of Western Europe, if added to Russia's present facilities, would result in more than a favorable balance. But the problems arising, should Russia acquire these new oil resources, would be tremendous. The political, military, economic, and production difficulties, which the author discusses, may well turn them into liabilities of the Soviet military and industrial structure.

The problem of food is likewise acute. With a tremendous civilian population to feed, with antiquated agricultural methods, and a deficiency of farm machinery, capacity for food production is insufficient for the long haul. Arable land, developed and undeveloped, is plentiful, but farm machinery is being sacrificed for war material. If major emphasis is placed on food production, Russia could produce, presumably, sufficient food for survival—although to what depths the standard of living would sink is speculative. Another factor is drought, characteristic of the agricultural regions of Russia. Irrigation and hydro-electric projects, irrigation canals, shallow river canals, and rail lines, all strategically a part of the food problem, are highly vulnerable to an enemy air force. A crisis in food supply could well undermine production in the factories, the majority of which are located in food belts.

"The Balance of Military Power," *The Atlantic Monthly*, June 1951, pp. 21-27.

FROM 1945 to 1949 the world was dominated by two factors which formed the balance of military power: the American monopoly of atomic weapons, together with its Strategic Air Force, and the Russian monopoly of ground power. The equilibrium of 1949 no longer exists now that Russia has atomic power. American build-up of ground forces reduces Russian domination in that area, but the American build-up can never equal that of Russia, nor is such an attempt necessary. Equalization in the field of ground power can be attained through a system of foreign alliances.

The future balance, the author believes, will lie mainly in the realms of air power and atomic weapons and will depend upon three things: stock-piles of bombs, ability to deliver them, ability to defend against enemy attacks and bombs. Each of these is discussed in relation to America's estimated strength and Russia's potential for retaliation. According to this reasoning, America must strive for overwhelming air power and at the same time outflank Russia on the ground by broader and stronger strategic alliances. Should areas of unequal potential develop, the deficiency must be made up by (1) new and more powerful weapons, (2) new techniques and skills in air, land, and sea operations, and (3) new allies.

The greatest danger to American strength, the article emphasizes is some period of laxness in which Russia is permitted to narrow the gap in air and A-bomb power and during which America fails to convert all positive possibilities into realities. In addition the American moral position in the eyes of the world must attract—not repel. An ethical point, under the right conditions and circumstances, can be as weighty as a new weapon or many well-trained divisions.

George W. Herald, "How Strong is Franco's Army?" *United Nations World*, June 1951, pp. 14-17.

HERE is a pessimistic analysis of the combat readiness of Franco's armed forces. Included are tables showing (1) personnel strength; (2) number of units; and (3) quantity and types of equipment of the Spanish army, navy, and air force. As an experienced foreign correspondent who traveled 2000 miles in Spain gathering material for this article, Herald reports dismal

living conditions, training, and pay, and antiquated weapons and equipment. He declares that Spanish troops would be a burden to Eisenhower's European army. Conversely Spain's geographical position in the over-all European defense plans is relatively important. But to transform Spain into an effective military power, America would need to re-equip, retrain, and maintain Spanish armed forces, at tremendous cost. The author believes, therefore, America should aid Spain only in matters essential to the over-all strategy.

A. Th. Polyzoides, "Germany—Our Major Problem," *World Affairs Interpreter*, Spring 1951, pp. 57-71.

"Germany Plans to Rearm," *The Nation*, July 21, 1951, pp. 48-50.

IN the opinion of Polyzoides, a lecturer on international relations at the University of Southern California and managing editor of *World Affairs Interpreter*, the German problem, containing as it does the most complex and intriguing assortment of issues to be found anywhere, poses a far greater threat to world peace and security than does any other "power keg" area—Korea included—because Germany has become indispensable to European (and thus world) stability.

After briefly filling in the history of occupied Germany from 1945 to 1950, the author discusses the various aspects of the German problem—political, social, economic, industrial, and military—and shows their significance to European stability, their relation to world affairs, and their inherent global ramifications.

The Korean war "brought Germany out of the dog house." Rearmament plans for West Europe underscored the absolute necessity for full German political, economic, and military cooperation in the over-all defense. But opposition both inside and outside Germany has frustrated any concrete proposals for German participation and has left the West with the gigantic task of defending Europe without full support of German industry and manpower. The author continues with the problems of German and Western European rearmament, emphasizing the major difficulty—how to combine rearmament with continued production, exports, and improved living conditions—a perplexing situation that has forced the revision of many of Europe's recovery programs.

The Germans, occupying a key European position, find themselves wooed by East and West. The Russians are injecting the masses with avid nationalism and dangling before them the former East German provinces, including East Prussia. The United States has released many top German war prisoners and offers economic freedom, billions in cash, political equality, and world stature.

According to the article "Germany Plans to Rearm," the dynamite in the critical German situation is the Russian statement that Western German rearmament will not be tolerated. The author claims the existence of a definite plan for restoration of German military power.

Strongly supported by the U.S. and Britain, this plan is opposed by the French, who see in it a U.S.-British lever to compel increase of French armed might in order to meet German armament. The French hope the fruition of Eisenhower's European army will forestall it. They will fail at entirely thwarting German rearmament, the author believes, because of

the need for U.S. support in Indo-China and North Africa, but they will succeed eventually in watering down the program with the plea that the French Communist Party will thrive on the fear of a remilitarized Germany.

The creation of Stalin's East German police force compelled the west to consider the plan and thereby produced the peculiar situation in which the Germans are not asking permission to rearm but may do it by request. They are thus in a position to demand a peace treaty which not only will end the occupation but ensure them equality of treatment in the future.

How long will it be, the author questions, before they again break their chains? When their military muscles are flexible and large enough, how much will the lost territories of Pomerania, Silesia, and East Prussia inflame German nationalism?

Walter D. Edmonds, "What Happened at Clark Field," *The Atlantic Monthly*, July 1951, pp. 19-33.

WALTER D. EDMONDS (also author of *Rome Haul* and *Drums along the Mohawk*) has written a story of the Air Force in the Philippines in the first year of World War II. The book is entitled *They Fought with What They Had* and is scheduled for early publication.

This article is a portion of Edmonds' book considered by the editors of *Atlantic Monthly* as "the most crucial single episode . . . the first Japanese attack on the airfields north of Manila." Using for his sources official records as well as interviews with eighty survivors of the early Philippine campaign, Edmonds narrates the grim days following Pearl Harbor. He discusses the airfields, the USAF units, the planes (types and numbers in and out of commission), the radar warning system, the deployment of U.S. fighter and bomber aircraft, the planned air strategy against the Japanese, enemy bombing and strafing attacks, and the responsibility for actions and conduct of the Air Force units. The selection is a vivid portrayal of a fight against steadily mounting odds.



The Quarterly Review Contributors

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We deeply regret the death of **Mr. Douglas C. Heimburger** (B.S., Drury College, Springfield, Mo., M.S., Purdue Univ.), 31-year old Stratojet project pilot for Boeing Airplane Company, 1 September 1951, in a collision between two Stratojets near Wichita, Kansas. Experienced in many types of aircraft, Mr. Heimburger was one of Boeing's most valued engineer test pilots. From 1942 to 1945 he was an Air Force flight and ground school instructor at Randolph Field.

W. Phillips Davison is a member of the Social Science Division of the Rand Corporation. He was formerly editor of the *Public Opinion Quarterly*, published by Princeton University, and during the war was a member of the SHAEF Psychological Warfare Division.

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Lt. Col. Glenn T. Eagleston, a veteran with 96 missions and credit for 23½ enemy aircraft destroyed in WW II, has 84 missions in Korea and credit for 2 MIG-15's destroyed, 1 probable, and 7 damaged. A graduate of AC&SS in 1949, he has been prominent in developing combat tactics in Korea, where he commanded the 4th Fighter-Interceptor Group.

Lt. Col. Bruce H. Hinton, a graduate of AC&SS in 1949, is credited with the first official MIG-15 kill. He has a total of 87 combat missions, 900 hours jet time, and has been prominent in developing combat tactics in Korea with the 4th Fighter-Interceptor Group. From 1940-1944 he served with the Training Command, and from 1945-1947 he was in command of various overseas fighter units.

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ning Staff, 5th Amphibious Force, Pacific Fleet; Chief of the Policy Section, Strategic and Policy Group, Operations Division, War Department General Staff; and Deputy, A-5 (Plans), Hq., U.S. Twentieth Air Force in the Pacific. After the war he was a member of the advanced Study Group, Plans and Operations Division, War Department General Staff, later known as the "Eisenhower Committee." **Captain William W. Vickery** (B.S., Alabama Polytechnic Institute), now Assistant Professor of Air Science and Tactics and Senior Instructor, Flight Operations, at Memphis State College, has served with the AAF Southeastern Flying Training Command, the 51st Fighter Wing (FEAF) on Okinawa, the 2d Bombardment Wing (SAC), and on the AROTC Staff of North Carolina State College.

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Colonel Robert Lee Snider (USMA, 1938) is now a member of the Air War College faculty. During World War II he commanded a heavy bomb gp., Second AF and later was Assistant Operations Officer, Hq., Strategic Air Forces in Europe, and served as Air Force member of Cover Plan Committee for the Normandy Invasion. After V-E Day he served as Chief, Scientific Branch, Military Intelligence Service on the War Department General Staff and as Wing Commander, 5020th Wing, Alaska.

Wing Comdr. E. A. Howell, RAF (Retired), now working with ranking officers on cold war problems, was wartime commander of a fighter squadron, a member of the Air Staff, British Air Ministry, chairman of an Anglo-American Weapons Committee, and a member of the Joint Target Group, Washington.

Harold H. Fisher (L.H.D., Univ. of Vermont), past Professor of History, is now Chairman of the Hoover Institute and Library at Stanford University. He was an officer in the Field Artillery during WW I, after which he did relief and reconstruction work in Eastern Europe and Russia. During WW II he was Director of the Civil Affairs Training School and the Civil Communications Intelligence School at Stanford and later Director of the School of Naval Administration for training officers for civil administrative duties. Among his many published books are *The Bolshevik Revolution*, *America and the New Poland*, *Famine in Soviet Russia*, and *America and Russia in the World Community*.

Joseph S. Rouchek (Ph.D., New York Univ.), is Professor and Chairman of the Departments of Political Science and Sociology, Univ. of Bridgeport. During WW II he worked on special assignments for the U.S. Intelligence services. He is the author, co-author, and editor of some 28 books, the latest of which have been: *The Slavonic Encyclopaedia*, *Central-Eastern Europe*, and *One America*.



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