

MILITARY REVIEW

VOLUME XXXI
AUGUST 1951
ARMY LIBRARY
SERIALS SECTION



COMMAND AND GENERAL STAFF COLLEGE
FORT LEAVENWORTH KANSAS

AUGUST 1951 VOLUME XXXI NUMBER 6



COMMAND AND GENERAL STAFF COLLEGE

COMMANDANT AND COMMANDING GENERAL—FORT LEAVENWORTH

MAJOR GENERAL H. L. MCBRIDE

ASSISTANT COMMANDANT

COLONEL M. S. JOHNSON, *Corps of Engineers*

STAFF

COLONEL T. B. HEDEKIN, <i>General Staff Corps</i>	Chief of Staff
COLONEL J. H. HILLS, <i>General Staff Corps</i>	ACofS, G1, G4
LIEUTENANT COLONEL E. O. PECKHAM, <i>General Staff Corps</i>	ACofS, G2, G3
COLONEL P. W. STEINBECK, <i>Artillery</i>	Secretary

FACULTY

COLONEL A. E. HARRIS, <i>Armor</i>	Director of Instruction
COLONEL O. C. TROXEL, JR., <i>Artillery</i>	Assistant Director of Instruction
COLONEL J. C. CROSTHWAITE, <i>Air Force</i>	Chief, Air Section
CAPTAIN G. R. DYSON, <i>United States Navy</i>	Chief, Naval Section
COLONEL G. G. ELLIOTT, <i>British Army</i>	Chief, British Section
COLONEL D. B. WEBBER, <i>Artillery</i>	Chief, Allied Officers Section
COLONEL W. H. FRANCIS, <i>Artillery</i>	Chief, Editing and Publications Section
COLONEL -H. L. MARSHALL, <i>Infantry</i>	Class Supervisor

MILITARY REVIEW

VOLUME XXXI

AUGUST 1951

NUMBER 5

Editor in Chief
COLONEL H. R. EMERY

North American Edition
Editor LT. COL. A. E. CONN
Assistant Editors CAPT. R. H. HANSEN, WOJG R. L. SPENCER

Spanish-American Edition
Editor LT. COL. R. GIMENEZ-DE LA ROSA
Assistant Editors: CAPT. J. VARGAS MATA, *Peruvian Army*
LT. I. R. NEGRONI, LT. G. ENJUTO

Brazilian Edition
Editor MAJ. W. F. BOUÇAS, *Brazilian Army*
Assistant Editors: LT. COMDR. T. N. FRANCA, *Brazilian Navy*
MAJ. E. R. MAIA, *Brazilian Army*, CAPT. N. FREIXINHO, *Brazilian Army*

Administrative Officer
CAPT. J. S. EDGAR

Production Manager
MAJ. R. B. WINNINGHAM

CONTENTS

OUR AUTHORS	2
LOGISTIC LIMITATIONS ON TACTICAL DECISIONS	Dr. R. G. Ruppenthal 3
NEXT MONTH	9
COMMAND ORGANIZATION FOR AN OVERSEAS THEATER	
OF OPERATIONS	Lt. Col. S. S. Hoff, <i>SAC</i> 10
WAR AND REPLACEMENT FACTORS	Lt. Col. F. Bednarek, <i>GSC</i> 21
'WE BUILD: WE FIGHT'	25
G-3 TROOP BASIS PLANNING	Lt. Col. G. E. Muggelberg, <i>Inf</i> 30
SUBSTITUTING THE 'SPEED BALL' FOR THE 'RED BALL'	Lt. Col. P. H. Slaughter, <i>TC</i> 36
IS THE TANK THE BEST DEFENSE AGAINST A TANK?	Lt. Col. J. F. Rhoades, <i>Armor</i> 43
H: THAT HATH EYES TO SEE	Lt. Col. D. A. Nolan, Jr., <i>Inf</i> 49
MILITARY NOTES AROUND THE WORLD	63
FOREIGN MILITARY DIGESTS	73
<i>Airborne Warfare</i>	73
<i>The Underground Army Must Become the Army of the Future</i>	77
<i>Air Superiority</i>	80
<i>The Transport of Casualties by Air</i>	82
<i>Progress in Antiaircraft Defense</i>	85
<i>Does Mountainous Terrain Favor Offensive or Defensive Operations?</i>	90
<i>The Raid on Brueneval</i>	94
<i>The Artillery Attack and the German Defeat on the Eastern Front</i>	97
<i>Tactics in Malaya</i>	100
<i>Combat Forces of the East Bloc</i>	104
<i>The Soviet Union and Maritime Expansion</i>	106
<i>Reflections on Combat in Wooded Areas</i>	109
BOOKS FOR THE MILITARY READER	110

MILITARY REVIEW - Published monthly by the Command and General Staff College at Fort Leavenworth, Kansas, in the English, Spanish, and Portuguese languages. Entered as second-class matter August 31, 1934, at the Post Office at Fort Leavenworth, Kansas, under the Act of March 3, 1879. Subscription rates: \$2.50 (US currency) a year in the United States and other countries of the Western Hemisphere; \$4.50 a year in all other countries. Reprints are authorized, provided credit is given the "MILITARY REVIEW," CGSC, Fort Leavenworth, Kansas.

OUR AUTHORS



Doctor Roland G. Ruppenthal, who received his Ph.D. degree from the University of Wisconsin, served during World War II as a historian with the First and Third Armies in Europe. He is the author of "Ammunition Supply in the Battle for Brest" which appeared in the December 1950 issue of the *MILITARY REVIEW*, together with a brief biographical sketch of him.

Lieutenant Colonel Stuart S. Hoff served, in the first years of World War II, in the Signal Sections of Hqs, 8th Corps Area and Third Army. From 1943 to 1946, he was Assistant Signal Officer, Hq, Sixth Army, in the SWPA. A graduate of the Army War College, in the class of 1951, Colonel Hoff is now assigned to the Office, ACOFS, G4, Department of the Army.

Lieutenant Colonel Frank Bednarek served, during World War II, with the Quartermaster Section, Hq, Eighth Army. Following his return from overseas, he became OIC, Administrative Instruction Group, The Quartermaster School. Upon his graduation from the Command and General Staff College, in 1948, he became Chief, Allowances Section, Requirements Branch, Supply Division, Office, ACOFS, G4, Department of the Army.

Lieutenant Colonel Glenn E. Muggelberg has been an instructor at the Command and General Staff College since 1949. He is the coauthor of "Preparation for a Map Exercise" and "The Technique of Solving Tactical Exercises" which ap-

peared in the December 1950 and January 1951 issues of the *MILITARY REVIEW* respectively, together with brief biographical sketches of him.

Lieutenant Colonel Page H. Slaughter has been a frequent contributor to the *MILITARY REVIEW*, with articles appearing in the issues of October 1949 and August 1950. A graduate of the Command and General Staff College, in 1948, he served as an instructor at that College until 1951 when he was assigned to the Staff and Faculty, The Transportation School, Fort Eustis, Virginia.

Lieutenant Colonel John F. Rhoades commanded the 4th Cavalry Reconnaissance Squadron, Fourth Cavalry Group (Mechanized), from the St. Lô breakthrough until after VE-day. From 1946 to 1950, he served as Assistant Professor, Far East History, United States Military Academy. After graduating with the 1951 class from the Command and General Staff College, he was assigned to the 2d Armored Division.

Lieutenant Colonel Daniel A. Nolan, Jr., served with the 381st Infantry, 96th Infantry Division, in campaigns on Leyte, Samar, and Okinawa as a battalion commander and regimental executive officer. After the war, he studied at the University of Michigan, and then served as an instructor of the Puerto Rican National Guard. He was assigned as an instructor at the Command and General Staff College, after graduating from that College in 1950.

Logistic Limitations on Tactical Decisions

Dr. Roland G. Ruppenthal
Office, Chief of Military History, Department of the Army
(Copyright 1951—Orlando Ward)

This article was adapted from a chapter of Dr. Ruppenthal's forthcoming book "Logistical Support of the Armies (European Theater of Operations)," one of the volumes in the series The U.S. Army in World War II, now being prepared by the Office of the Chief of Military History, Department of the Army. Permission for reproduction may be obtained on request from the Chief of Military History, Washington 25, D.C.—The Editor.

Moselle River in the south. That they were stopped there was due, in part, to the increasing resistance which a re-organized enemy was able to offer from the prepared defenses of the Westwall and along the Moselle, and, in part, to supply shortages. These shortages were the more exasperating and the more highly publicized because they occurred in the midst of spectacular successes, and because they contributed in frustrating a short-lived hope that the war might be brought to an end.

IT CAN be taken as axiomatic that logistic considerations have a strong influence on strategic planning in modern warfare. Logistic factors also have a continuing influence on the conduct of operations, once they have begun. In the history of operations in the European Theater, there is no better example of this than the dilemma in which the Allies found themselves, in mid-September 1944, following the pursuit of the German armies across Northern France. At that time, the Allied armies stood at the German border in the north, and at the

These shortages were only the beginning of a prolonged supply famine, and provided only a foretaste of how logistic limitations could affect the conduct of operations. Within a matter of days, the deteriorating logistic situation led to one of the most reluctantly made, and most debated, decisions of the war. This was the decision which General Eisenhower made, late in September, to halt offensive operations on a large part of the front and to concentrate the bulk of the Allied resources on a relatively narrow front in the north.

The reasons for the desperate supply situation which necessitated this decision

Allied operations in Europe, in September 1944, provide an example of how logistic considerations, repeatedly subordinated, directly influenced both strategic planning and the tactical execution of those plans

should not have been difficult to see. But the inability to continue the pursuit of the shaken enemy forces created an exasperating situation, and it was hardly surprising that the initial reaction of combat commanders should take the form of annoyance with the Communications Zone, the organization responsible for their support. This annoyance reflected both a lack of understanding of the impact which the pursuit had had on supply capabilities, and short memories concerning the invasion plan and the expected course of the operation.

Basic Assumptions

On its operational side, the *Overlord* invasion plan had been predicated on an estimate that the enemy would make successive stands on the major water barriers across France and Belgium and, in accord with this assumption, it was expected that he would make a stand at the Seine River, a line that would not be reached until D plus 90. Furthermore, plans had contemplated a fairly steady rate of advance and not the pursuit of a disorganized enemy. While such a forecast of progress admittedly was conjectural, it formed, necessarily, the basis of logistic preparations. In the belief, for example, that the Seine ports would not become available quickly, great emphasis was placed on the development of the Brittany area, including the port of Brest. In addition, at least a month's pause at the Seine was expected to be necessary to develop an administrative base capable of supporting further offensives. Even on these assumptions, the margin of safety of the *Overlord* logistic plan was believed to be nonexistent.

The development of the *Overlord* operation was quite different than expected, and the assumptions on which the schedules had been based were largely voided. For the first 7 weeks, the advance was much slower than expected, and the Allied

forces were confined to a shallow Normandy beachhead. From the viewpoint of logistic support, the lag in operations was not serious immediately, for it resulted in short lines of communications and gave the service forces added time to develop the port of Cherbourg, whose capture had been delayed.

Facing Realities

Whatever temporary advantage accrued from this situation was eliminated quickly following the break-out at the end of July. By D plus 79 (24 August), Allied forces had closed to the Seine—11 days ahead of schedule—despite a lag of approximately 30 days at the beginning of the break-out. Tactically, the spectacular drive of early August brought definite advantages, for it resulted in the almost complete destruction of the German Seventh Army, and it greatly accelerated the advance to the enemy's border. From the point of view of logistic support, however, the rapid advance to the Seine foreshadowed serious complications. The fact that the *Overlord* objective was reached on D plus 79 rather than D plus 90 was, in itself, not too serious, for the supply structure was sufficiently flexible to accommodate itself to a variation of 11 days. The departure from the scheduled advance actually had been more serious. Because of the initial lag in operations, United States forces were still at the D plus 20 line at D plus 49, and between D plus 49 and D plus 79, a period of 30 days, actually had advanced a distance which, by plan, was to have taken 70 days. The lines of communications could not be developed at the speed with which tanks and other combat vehicles were able to race forward. The result was that the armies already had used up their operational reserves by the time they reached the Seine.

Since rail and pipe lines could not be pushed forward quickly enough, motor

transport facilities were strained to the breaking point in attempting to meet even the minimum needs of the armies, and the Communications Zone, consequently, found it impossible to establish stocks in advance depots. Furthermore, none of the Brittany ports had as yet been captured, and only one major port—Cherbourg—was operational.

Additional Difficulties

The arrival at the Seine marked only the beginning of supply difficulties. Despite the logistic complications which the rapid advance had already foreshadowed, decisions now were made to establish a bridgehead across the Seine; then, to encircle Paris and, finally, continue the pursuit without pause; and to broaden the entire scope of the drive into Germany by ordering an attack along the subsidiary axis south of the Ardennes in considerably greater strength than was contemplated originally. On purely tactical grounds these decisions were logically indicated, for the Allies now enjoyed a definite superiority, and the disintegration of enemy resistance offered opportunities that would have been folly to ignore. From the point of view of logistics, however, these decisions carried with them a supply task all out of proportion to planned capabilities. With the supply structure already severely strained, these decisions entailed the risk of a complete break-down.

The continued advance, late in August and at the beginning of September, consequently brought hectic days and sleepless nights to supply officers. All the difficulties, which had already begun to appear during the approach to the Seine, now were further aggravated. The main problem, as before, was the deficiency in transport. Despite great efforts, rail reconstruction was unable to keep pace with the advance. Air supply repeatedly failed to match its predicted capacity. Consequently, motor transport continued

to bear the principal burden of the forward movement of supplies and it was unable to deliver even daily needs, to say nothing of stocking advance supply depots.

Comparison

The unbearably supply task which the continued advance created can best be appreciated by comparing planned with actual developments. At D plus 90, it had been assumed that no more than 12 United States divisions would be supported at the Seine. Not until D plus 120 was it thought feasible to support these divisions in their first offensive action beyond that barrier. At D plus 90 (4 September), however, 16 divisions already were being supported at a distance of 150 miles beyond the Seine, and, within another week, the United States First Army forces were operating at the German border in the vicinity of Aachen, well over 200 miles beyond Paris. By D plus 98 (12 September), the armies had advanced to a line which forecasts had indicated would not be reached until D plus 350. Between 25 August and 12 September, they had advanced from the D plus 90 to the D plus 350 phase line, thus covering 260 phase-line days in 19 days. The record actually was more phenomenal than these figures indicate, because, in the earlier dash to the Seine, the armies had overcome an initial lag of 30 days. The city of Paris also had become an additional supply liability because of its liberation, 55 days ahead of schedule.

Contrary to plan, therefore, and as a direct consequence of the August decisions, considerably greater forces were being maintained at much greater distances than contemplated. This was accomplished despite an insufficiency of motor transport (which had been predicted even before D-day), despite the failure to open the Brittany ports, and despite the premature assumption of

responsibilities in connection with the civil relief of Paris.

* Logistic Limitations

The probability that logistic limitations might "strait jacket" tactical operations had been realized as early as 24 August, when General Eisenhower expressed anxiety over the Allies' inability to undertake, simultaneously, the various operations which appeared desirable. Flushed with success, however, the Allies had begun to develop ambitions which they had not dared consider a month earlier. The uninterrupted advance in the next 2 weeks continued to nourish the hope that strong offensives, both north and south of the Ardennes, might be sustained. In the first week of September, General Eisenhower decided that such simultaneous drives to both the Ruhr and the Saar were still within Allied capabilities and, on 10 September, he accordingly authorized an advance across the Siegfried Line by both United States armies. He admitted that the supply organization already was stretched to the breaking point, but he believed the operation was a worth while gamble in order to take full advantage of the disorganized state of the German forces.

The maintenance of the armies was a touch-and-go matter at this time, however, and it was necessary to keep a constant finger on the logistic pulse. Supply capabilities clearly were unequal to the support of sustained operations by both armies against determined opposition, for deliveries were being made at the rate of only 3,300 tons a day to the First Army and 2,500 tons to the Third—about $\frac{1}{2}$ of what they required. The dual offensive was supportable only if it could achieve quick success. General Patton was informed, therefore, that if he was unable to force a crossing of the Moselle with the mass of his forces within the next few days, he was to discontinue the attacks and assume the defensive.

A Forced Decision

Within the next 10 days, the increasing resistance in both the First and Third Army sectors forced General Eisenhower to make the decision which he had hoped to avoid. A survey of supply capabilities at this time showed that the United States port discharge was averaging less than 35,000 tons a day, several thousand tons below requirements. Even this was more than could be cleared from the ports, for the number of truck companies had been reduced greatly as a result of the demands for line of communications hauling. The net effect of these basic deficiencies was inescapable: a restriction on the number of divisions that could be supported in active operations and, consequently, a limitation in the scale of combat operations. As early as the middle of August, it had become impossible to maintain in combat all the divisions which were available. By early September, three had been immobilized and their motor transportation used to form provisional truck companies. Two more divisions arrived in the middle of the month, and it was thought that their motor vehicles might have to be utilized in the same way. Logistic planners estimated that there would be 29 divisions in the 12th Army Group by 1 October, but thought it unlikely, on the basis of the current logistic outlook, that more than 20 could be maintained in combat as far forward as the Rhine at that date.

This gloomy forecast served to underscore two conclusions which already had been accepted at Supreme Headquarters—that even should it prove possible to capture both the Saar and Ruhr objectives, these areas were at the absolute maximum distance at which Allied forces could be supported for the time being; and that it would be absolutely imperative to develop additional logistic capacity before attempting a power thrust deep into Germany.

The situation, in mid-September, clearly indicated an urgent need both to shorten the lines of communications, and to secure additional port capacity. The maximum force which could be supported through Cherbourg and the beaches was being reached rapidly. In fact, the capacity of the beaches was certain to decrease with the advent of bad weather, and new capacity also was required to compensate for that lost in Brittany. The obvious solution to this dual requirement lay in the development of the Seine ports and Antwerp.

In light of these circumstances, General Eisenhower, in mid-September, considered two possible courses of action: the concentration of all resources behind a single blow on a narrow front directed toward the center of Germany (a proposal favored by General Montgomery); or an advance along the entire front with the aim of seizing suitable positions on the German frontier where the Allied forces could regroup, establish maintenance facilities, and prepare to support the mass of the Allied forces for a drive into Germany. The first course, often referred to as a "knife-like thrust" to Berlin, was rejected on the grounds of both tactical and administrative considerations. Logistic resources likewise were lacking for the full implementation of the second course. The Supreme Commander, nevertheless, decided in favor of the second plan, which provided that the Allies push forward to the Rhine, secure bridgeheads over the river, seize the Ruhr, and concentrate on the preparations for the final nonstop drive into Germany. Because of the limited logistic capabilities, however, the timing of the Allies' efforts toward the attainment of immediate objectives now became of utmost importance. The implementation of this plan, consequently, required a succession of attacks, first by the 21st Army Group, then by the First Army, and, fi-

nally, by the Third Army, with supply priorities shifting as necessary.

Future logistic needs also were a major factor in the assignment of missions, for General Eisenhower specified that additional bases must be secured simultaneously with the attacks eastward. Accordingly, General Montgomery's 21st Army Group was given the mission of securing the approaches to Antwerp or Rotterdam, and the capture of additional Channel ports; and General Bradley's 12th Army Group was to reduce Brest as quickly as possible and make physical junction with the Allied forces from the south, so that the supply lines leading from Marseille might assist in the support of the 12th Army Group.

Another Deep-Water Port a Necessity

Several days earlier, on 17 September, General Montgomery had launched a combined United States-British airborne operation in Holland to secure a bridgehead over the Rhine and to turn the enemy's flank in the north. However, General Eisenhower had conceived of this operation as having only a limited objective, and he emphasized this point to his top commanders and staff officers, stating that he wanted general acceptance of the fact that the possession of an additional major deep-water port on the north flank was an indispensable prerequisite for the final drive into Germany. He considered even the present operation in the north a bold bid for a big prize in view of the current maintenance situation. Nevertheless, he considered the operation amply worth the risk. But, he stressed repeatedly the conviction that a large-scale drive into the "enemy's heart" was unthinkable without building-up additional administrative capacity, and this meant the opening of Antwerp.

Reasons for the Dilemma .

The dilemma in which the Allies found

themselves at this time was, of course, a direct outcome of the earlier decisions by which logistic considerations had been subordinated repeatedly to the enticing prospects which beckoned eastward. General Eisenhower, himself, admitted that he had been willing to defer the capture of ports in favor of the bolder actions which had taken the Allied armies to the German border. The first such deferment had been made on 3 August, when the bulk of the Third Army was turned eastward rather than into Brittany as originally planned. Logistic requirements again had been subordinated 2 weeks later when the decision was made to cross the Seine and continue to drive eastward. Such deferments were no longer permissible.

Antwerp had been captured early in September, but estimates made later in the month indicated that that port might not begin operating before 1 November. As a result, there was every prospect that the United States forces would have to depend on lines of communications reaching all the way back to Normandy. Because of this, the total tonnages which the Communications Zone could guarantee to deliver were sufficient to support the attacks of only one of the American armies if all the other United States forces reverted to the defensive. Even such commitments required the postponement of many essential administrative measures such as the building of advance airfields, the winterization of troops and equipment, and the replacement of worn-out matériel. In view of the priority which operations aimed at the Ruhr now held, it was inevitable that the burden of the sacrifice should be borne by those 12th Army Group forces operating south of the Ardennes—that is, General Patton's Third Army.

The developments of the next few weeks produced little cause for altering the con-

clusions reached in mid-September. At the very end of the month, the Communications Zone presented figures on its delivery capabilities which revealed even more clearly the impossibility of supporting large-scale operations east of the Rhine. The 12th Army Group had indicated, on the basis of daily maintenance needs of 650 tons a division, that its requirements would total 19,000 tons a day during the first half of October, assuming the employment of 22 divisions, and 23,000 tons a day by 1 November, when the strength of the army group would reach 28 divisions. In addition, however, the army group requested that the Communications Zone deliver 100,000 tons of supplies over and above these daily requirements in order to meet deficiencies in equipment and establish minimum reserves. The Communications Zone's reply was discouraging indeed. It announced that it would be approximately 60 days before any substantial tonnages could be built up in the forward area. September deliveries had averaged only 8,000 to 10,000 tons a day to the forward areas, and, for the entire month of October, deliveries would not even meet daily maintenance needs. Not until mid-November did the Communications Zone expect its port and transportation situation to improve sufficiently to begin building reserves, over and above the daily needs, in all the army areas. The outlook for the next 6 to 8 weeks was, therefore, a depressing one, for there appeared no escaping the prospect that the forces which the 12th Army Group could maintain *actively* operational would either have to be reduced in size or continue on the starvation scales that had characterized their support for the past several weeks.

It also was clear that the maintenance of large-scale operations would remain unsatisfactory until the port of Antwerp

and adequate rail lines of communication were made available. The operations of the 21st and 12th Army Groups, consequently, were to be dominated throughout the fall of 1944 by the necessity of

developing a new administrative base in closer proximity to the front lines. Tactical operations, to paraphrase an old maxim, had definitely become the art of the logistically feasible.

NEXT MONTH

Main Articles

The North Atlantic Treaty Organization by Colonel Maddrey A. Solomon; and *Economic Potential for War: An Element in Military Planning* by Colonel Albert H. Hickey are included among the main articles.

Foreign Military Digests

The foreign digests include "The Last Great Attack of the German Bombers in the Eastern Theater of Operations" from *Europäische Sicherheit* (Germany); and "Arms for Warriors" from the *Canadian Army Journal*.

Books for the Military Reader

Reviews of *Unite or Parish* by Paul Reynaud; and *Seven Decisions That Shaped History* by Sumner Welles are included.

Command Organization for an Overseas Theater of Operations

Lieutenant Colonel Stuart S. Hoff, *Signal Corps*
Office, Assistant Chief of Staff, G4, Department of the Army

The views expressed in this article are the author's and are not necessarily those of the Department of the Army, the Army War College, or the Command and General Staff College.
—The Editor.

THE term "theater of operations," so readily accepted in modern military usage, is of comparatively recent origin. It is defined in the *Dictionary of United States Military Terms for Joint Usage* (1950) as ". . . that portion of a theater of war necessary for military operations, either offensive or defensive, pursuant to an assigned mission, and for the administration incident to such military operations. . . ." However, as recently as 1944, in the *Dictionary of United States Army Terms* (Technical Manual 20-205), the definition was "combat area, including the area necessary for the administration and supply connected with military operations." The refinement in concept over the 6-year period is apparent, with the implication of fixed boundaries and assigned missions first appearing only in the most recent official definition. With even the definition of the term still in development, it is not surprising that the experience of the recent war produced no general duplications of form in the organization of theaters of operation by their commanders. It is considered sig-

nificant, however, that, even with all the variations between theaters with respect to mission, geography, extent, Allies, and the personalities of commanders, upon careful examination a great number of underlying organizational similarities are disclosed. It is the purpose of this article to integrate those similarities into a suggested theater organization of logical structure embodying a maximum of flexibility and incorporating all essential command elements.

The trend toward the inclusion of the concept of a theater of operations, in the modern sense in military thinking, seems to have begun from a study of the battles and campaigns of the Civil War. As late as 1879, a *Military and Naval Encyclopedia* compiled by Captain Thomas Wilhelm, United States 8th Infantry, did not include a definition of the term, although a "theater of war" was defined as "any extent of country in which war is carried on." Two years later, however, in his *Military Dictionary and Gazetteer*, the same author defined a theater of operations (of an army) as "that portion of a theater of war in which an army operates—usually designated *Zone of Operations*." For a first attempt, this definition bears a remarkable resemblance to the current one.

The history of the Civil War is full of examples of campaigns which failed

or were of limited success primarily due to the failure of field commanders to "co-operate," or because there was no responsible co-ordinating commander over the "armies" and other independent forces available for operations in a decisive area. This is particularly true of the Union forces in the earlier years of the war. The actions against the Confederate Forts Henry and Donelson, in Tennessee, furnish a good case in point. General U. S. Grant was successful in reducing the two redoubts, and in capturing their garrisons almost intact. Having a force at his disposal of some 40,000 troops, he then wished to move against the Confederate forces under General A. S. Johnston, at Nashville, which numbered about 14,000. General Halleck, Grant's superior, was fearful of possible Confederate offensive operations in Illinois and Missouri and, therefore, disapproved the move proposed by Grant, or, at any rate, delayed a decision for 10 days—sufficient to permit Johnston to withdraw from his precarious situation. The other Union commander in the area, General Buell, also failed to employ his forces against Johnston, possibly because of the current bad weather, or because he had been at odds with General Halleck over the campaign against Forts Henry and Donelson. Had there been in the area a common commander over both Generals Buell and Halleck, with a designated area in which to operate and with the mission to destroy all Southern forces in that area, it is

Familiarity Means Adaptability

Because of the painful and embarrassing recollection of fairly recent inept performances of American military leaders, it is gratifying to realize that we have profited by our mistakes. One of the distinguishing military virtues of the modern United States Army is the comparative ease with which trained personnel can be transferred between units, and trained units shifted within large commands, without material interference in the smooth continuation of military operations. This indispensable attribute is incontestably due to the fact that certain valid principles of organization and function, collected and codified over the years and used in training the future commanders of armies, corps, and divisions, have supplied that essential lubricant to the military machine—universal common understanding of military methods.

It is well recognized that, as a military task grows in magnitude and diversity, the problem of designing an organization to complete that task increases in difficulty, and the applicability of the familiar guides becomes less well defined. While the design of the organization of a theater of operations could hardly be classified as the ultimate in difficulty, it should qualify as a problem of respectable complexity.

Geographic Conditions Vary

In the development of a theater com-

Experiences of World War II provide the basis for the organizational design of a theater of operations, obviating the necessity of taxing our military leaders with the creation of new organizational structures.

quite probable that General Johnston would have been intercepted, his force destroyed or captured, and the subsequent capture of Vicksburg made infinitely easier.

mand organization, it is appropriate to consider the possible conditions under which it will be required to function. In passing, the boundaries of the theater should be well defined and easily recog-

nizable, and should logically include one or more objectives of strategic importance, it being hardly conceivable that a military force would be committed to war without an objective in view. Also, if the authority designating the extent of the theater has any choice in the matter, it would appear wise that the boundaries of the theater enclose an area adapted, as nearly as possible, to the conduct of operations of a form to which the troops and commanders can become habituated.

That this was recognized, in World War II, is evidenced by the campaigns in the various theaters. Operations in the China-Burma-India Theater consisted, almost entirely, of land warfare or land based air operations. In North Africa and Europe, extensive land warfare and land based air operations were preceded by a limited number of major amphibious landings. The Central and South Pacific Theaters were occupied with a whole series of amphibious landings followed by brief land campaigns with limited objectives, principally for the establishment of naval and air bases. The campaigns in the Southwest Pacific also were primarily amphibious in character, except that, in the culminating operations in the liberation of the Philippines, the objectives of the land phases threw the fighting forces into situations which completely lost any of their amphibious characteristics. Thus, it is possible to simplify the problem of the organization of any one theater through the judicious establishment of theater boundaries, and through the elimination of unnecessary diversification, within the theater, of the methods of employment of theater forces.

Theater Missions Vary

The basic theater organization must be designed to deal, also, with strategic missions, varying all the way from the pure defensive to protect decisive objec-

tives from enemy encroachment to the all-out war-ending offensive culminating, possibly, in the occupation and establishment of a military government for erstwhile enemy territory. Examples come readily to mind. The present mission of the Caribbean Theater is to ensure unmolested access by the United States to that area, and to protect it from invasion by an enemy. Initially, in World War II, all Pacific theaters were assigned the task of holding territory from which later offensives could be mounted against the enemy. In a later phase of the transition from the defensive to the offensive, the South Pacific Theater staged the invasion of the Southern Solomons, an operation, limited in scope, to prepare for the later offensive exploitation of the advantages gained thereby. The European Theater, beginning with the preparations for the Normandy invasion, avowedly was committed to a major offensive effort to terminate the war in that theater.

A Fixed Organization Is Undesirable

Brief reflection will reveal the folly of an attempt to devise any *fixed* and *detailed* organization capable of invariably efficient and economical operation under the variety of possible missions and methods of employment outlined in the foregoing paragraphs. It is not unreasonable, however, to set as a goal the design of a *flexible* and *general* organizational structure which will accommodate the elements essential to any situation, and which will be well adapted to any expansion and modification to meet changing conditions or differing operational requirements.

Similarities Exist

Having been mentioned earlier in this article, it would be appropriate to examine the similarities existing among the several theater organizations as now established or as developed in World War II. Figures 1, 2, and 3 illustrate the

general scheme of organization of three examples considered representative. In each case, there is a supreme commander with a joint staff and three major elements representing the three military departmental services. In each case, the

Staff Unified Command Plan, dated 11 December 1946, which follows the Pacific Ocean Area organization quite clearly.

Unity of Command

The principle of the unity of command

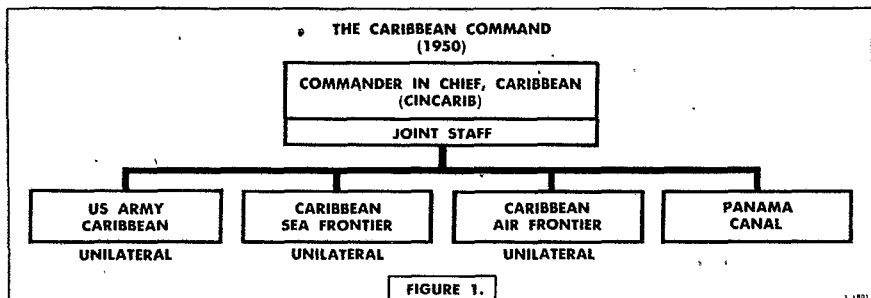


FIGURE 1.

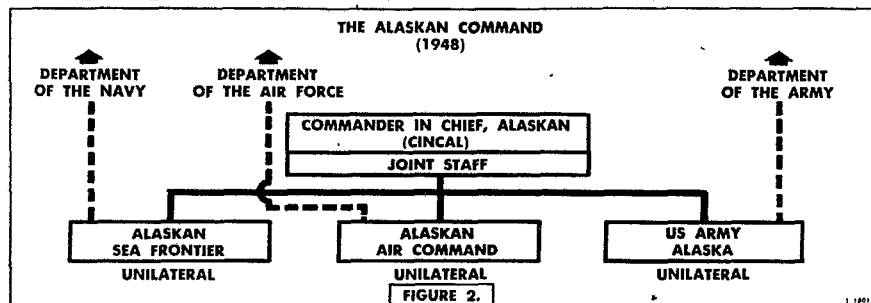


FIGURE 2.

theater is a unified command, its chief reporting to the Joint Chiefs of Staff. Administrative and operational responsibilities of the subordinate elements are not identical in the three examples, but the structure of the organization is the same for each. For simplicity, additional organizational elements with special responsibilities, such as strategic air groups, have not been shown.

The distinctive channels of the Alaskan Command and the Zone of Interior are worthy of special note. It is also considered significant that the two more recent examples of theater organizations are as prescribed by the Joint Chiefs of

has become firmly established and, except at the very highest military command level—the Joint Chiefs of Staff—the concept of a single commander controlling all the military resources within an area of military responsibility has come to be expected and accepted. Intelligent military authorities no longer argue the point as to whether there should be a single commander for a theater of operations as opposed, possibly, to a theater war council. However, although the supreme theater commander appears to have emerged as the undisputed and personified final authority within his area of responsibility, the question of the technique by which theater control is ex-

exercised still appears to be subject to some firm disagreement. The relative merits of control by *joint command* or by *unified command* are still in dispute, with each technique having its adherents. Although a distinction between the two is not always easy to draw, there appears to be one basic difference which it will be profitable to isolate.

Joint command contemplates the *operational control* by the commander of the immediate subordinate elements of his command, without regard to the military department of origin of those elements, but without any violation of the normal channels of that element. It also usually contemplates direct command of his own service element. Thus, a naval officer, as theater commander, would, exercising joint command, *have direct operational control* over an army or army group assigned to his theater.

To develop this concept further, operational control is defined as comprising ". . . those functions of command involving the composition of subordinate forces, the assignment of tasks, the designation of objectives, and the authoritative direction necessary to accomplish the mission. . . . It does not include such matters as administration, discipline, internal organization, and unit training, except when a subordinate commander requests assistance."

Unified command contemplates the control by a commander of the elements of his command through the commanders of those elements of common military departmental origin with the elements commanded. Thus, a naval officer, as theater commander, in this situation, would command an army assigned to the theater through a Commanding General, Theater Army Forces. In actual practice, exercise of command by theater commanders in the recent past ordinarily has been accomplished by a combination of the two methods. Theater joint expedi-

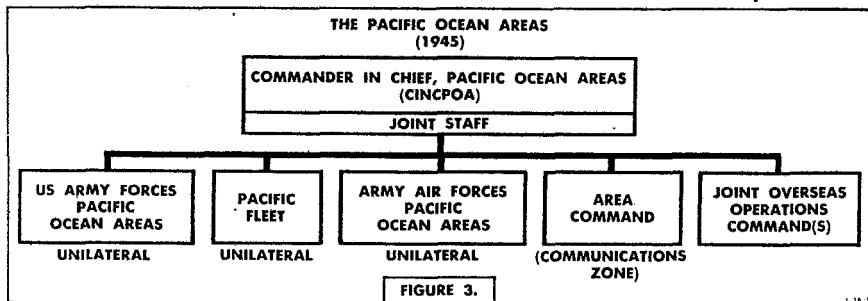
tionary forces are retained under theater joint command, while administrative matters are directed and supervised through theater departmental commands—army, navy, and air. Although current doctrine prescribes that the theater commander will not function in an additional capacity as commander of a departmental service, except as directed by the Joint Chiefs of Staff, such direction usually is given. Admiral Nimitz was both Commander in Chief, Pacific Ocean Areas (CINCPAC), and Commander in Chief, Pacific Fleet (CINCPAC); General MacArthur was Commander in Chief, Southwest Pacific Area (CINCSWPA), and Commanding General, United States Army Forces, Far East (USAFFE).

Joint Staff Required

If it is established that a theater commander requires a staff at all, it readily appears that a theater commander exercising unified command and employing forces of significant magnitude provided by two or more of the military departments logically would utilize a joint staff. The fact that General MacArthur, in conducting current operations in Korea (1950), did not use a joint staff, as such, is significant only in that the functions which a joint staff would perform were discharged, in part, by various groups specially organized for the purpose. There exists in the General Headquarters, Far East Command (GHQ FEC) a Joint Strategic Plans and Operations Group of 11 officers, of which 3 come from the Navy and Air Force respectively. The remainder, including the chairman (G3, GHQ FEC) and his deputy, are from the Army. This group together with the Plans Division, G3, GHQ FEC, formulate long-range theater military plans. There is also a joint group within the Theater Intelligence Section (G2) representing the Army, Navy, and Air Force. Three officers, one from the Navy, the Marine Corps, and the Air Force, are

found in the G4 Section and a single Air Force officer is serving in the Theater G3 Section. In addition, a joint committee, comprising the Chief of Staff and the Deputy Chief of Staff, GHQ FEC; the Chief of Staff Naval Forces, Far East (NAVFE); and the Vice Commander,

the provision of inadequate means for the accomplishment of a task. Without question, it must be conceded that a prompt and profitable reaction to opportunities presented in an operational sense depends, in part, upon the immediate availability to a commander of complete, accurate,



Far East Air Forces (FEAF), meets infrequently, usually not more often than monthly.

The limited capabilities for joint staff action of the organizations cited above force the conclusion that the most of such work is accomplished by the utilization of the commanders and staffs of the major subordinate unilateral commands: USAFFE, NAVFE, and FEAF. It need hardly be said that such an arrangement would occur only under the compulsion of an extraordinary local situation, and not by deliberate design. It is entirely possible that the broad experience of General MacArthur himself could be regarded as a reason for dispensing with the requirement for the extensive staff action which might be needed by a less experienced commander preparatory to arriving at decisions. However, a reasonable inference is that *any* joint or unified commander would profit by the availability of a staff fully qualified to facilitate intelligent decisions, formulate practical plans, and supervise the execution of orders in any medium. Reliance on individual brilliance does not justify

and current information regarding the location, situation, and readiness of all elements of his command. In an active theater employing major elements of land, sea, and air forces, as well as Allied contingents, it follows that the only staff capable of supplying the commander with such information, whatever other functions it might be assigned, should be a joint staff.

Subdivision of Responsibilities

To subdivide and group the collective resources of a theater, human and material, into an organization, it is necessary to subdivide the responsibilities of the theater. First, there is the primary function of combat against the enemy, paralleled by the necessity for the administrative support of the forces assigned to the theater and committed to action. Always a major problem is the operation of installations and activities within the theater boundaries which ordinarily are not in contact with the enemy. There will exist, probably, the requirement for special theater management of major basic common resources

such as transportation means, for use in support of the several theater enterprises as the situation requires. Broadly grouped, then, theater responsibilities appear to fall into six major categories:

1. Over-all strategic planning and supervision.
2. Administrative execution and support.
3. Combat operations execution.
4. Communications zone operations.
5. Area defense.
6. Basic resources control.

The theater organization depicted in Figure 4 supports the division of the theater effort into the six general classifications considered desirable. The theater commander, deriving his authority from the Joint Chiefs of Staff, prepares strategic plans, formulates and promulgates theater general policies, constitutes operational combat forces and controls their employment, and commands and supervises logistic and administrative activities within the theater. Direct control is retained over combat operations, the basic resources shown, the Area Defense Command, and the Communications Zone Command. Direction of activities which can be grouped under the unilateral control of theater army, navy, air, and Allied administrative commanders is accomplished through those commanders.

The Administrative Commands

The current organization of the United States military establishment into three departments, with the attendant variation in administrative methods and procedures employed, is the basis for recommending the adoption of theater army, navy, air, and Allied *administrative commands*. Their commanders are the link between the theater and the governmental military departments and Allied governments. Their functions, while manifold, ordinarily will not include tactical control of combat forces. For example, they will conclude all arrange-

ments, appropriate to the theater, in the Zone of Interior for the provision to the theater of those resources originating in their departments. They will co-ordinate the movement of those resources to the theater with the preparation of accommodations therefor on arrival. They will command all departmental or Allied troops in the theater not actively committed to a theater mission, either tactical or logistical. They will be responsible for the operation of the theater rotation and replacement system pertaining to their respective services, including individual training and retraining. In general, they will be familiar with the broad plans of the theater commander, probably assist in their preparation, and be responsible that the means are at hand to enable the theater to accomplish the objectives of those plans.

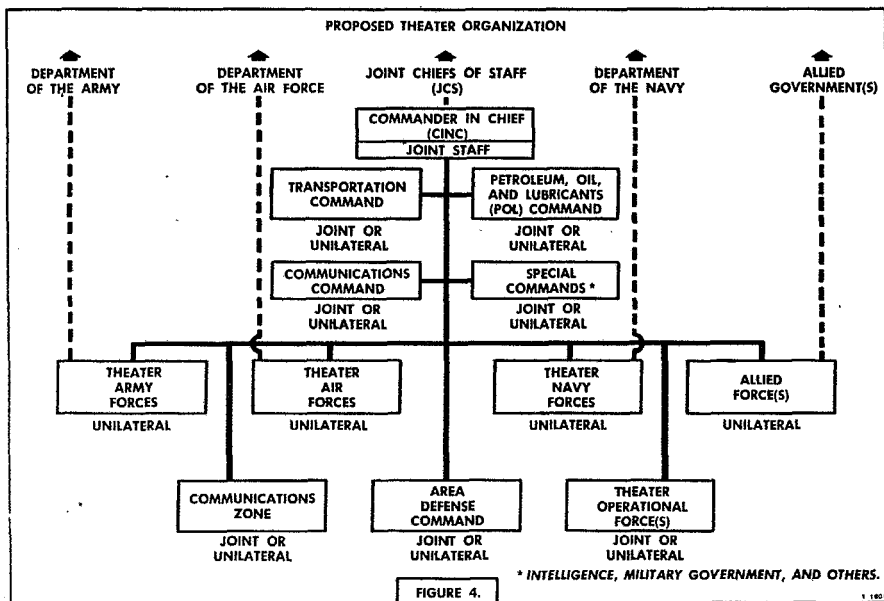
All of the foregoing can be expected to apply, in varying degrees, to such Allied commanders as may be assigned to the theater. The governing factors, of course, will be the magnitude of the Allied effort, and the capability of the Allied nation to support its forces in the field. Finally, it is conceivable that, in exceptional circumstances, theater administrative commanders may be assigned tactical roles by the theater commander, as in a theater employing naval or air striking forces or Allied troops in defense of their own country. This responsibility, if assigned, will be wholly apart from the general and broad responsibilities for ensuring the availability, within the theater, of human and material resources to support the aims of the theater commander.

The Communications Zone

The communications zone commander is the *operator* of the installations, facilities, and activities in noncombat areas. He is responsible for the conservation and distribution of theater resources of manpower and matériel, made available

by the action of the administrative commands, in accordance with the directives of the theater commander. The communications zone exists primarily for the purpose of relieving combat commanders of the responsibility and concern for logistic support. It may be either a joint

It may be expected that there will exist within the communications zone permanent or temporary areas or activities exempt from base, area, or even communications zone control. It remains paramount, however, that the entire energies of the communications zone commander and his



or unilateral command, depending upon the forces supported and the geographical characteristics of the theater. In any case, the communications zone, as such, will be under a single commander directly subordinate to the theater commander. It will, in all probability, be subdivided into areas or sections for administrative control. These areas, or sections, under a single commander, may be divided further into separate bases. The bases usually will comprise separate installation under the unilateral command of one of the service representatives, but subordinate and reporting to the base commander.

organization always must be devoted, primarily, to the support of activities *not* under his command, and, secondarily, to the maintenance of his organization's capability of providing that support. His is the task of ensuring, by the intelligent conservation of material resources and the efficient operation of facilities, that the assets, allocated to the theater commander by the nation and assured through the activities of the administrative commands, are available promptly for application in furtherance of the decisions and plans of the theater commander. He has no further responsibilities except the defense of his area against enemy at-

tack, using troops assigned for that purpose. In the event of a major enemy effort, he will probably even be relieved of that responsibility. Antiaircraft defense, except in the case of an isolated island base, will be the mission of the Area Defense Command, leaving to the communications zone only its usual service functions.

The Combat Forces

The combat task forces, as the principal executors of the decisive military actions of the theater commander, are retained under his direct command for increased facility of control. They may be either joint commands or of a single service, depending upon the mission assigned and the forces available. They are constituted from the units and material resources secured for the theater by the administrative commands. They are supported logistically by the communications zone and, within the priorities established by the theater commander, have first claim on the supplies available in theater stocks, particularly when those supplies are located in supporting areas contiguous to the combat zone. Their assigned missions, when offensive in nature, should eliminate, as completely as possible, any responsibility for the defense of, or operations within, the communications zone. In a defensive situation they will, of course, by the accomplishment of their missions in the combat zone, defend the areas to its rear.

Area Defense Command

Finally, there is provision for an Area Defense Command. This command is visualized as concerned primarily with the defense of the communications zone. It may vary from a simple, unilateral antiaircraft command, charged with the co-ordination of a relatively few installations, to that of a unified command, blanketing the theater with ground, sea, and air defense elements, and operating

extensive detection, warning, and control systems.

Common Resources Control

The three theater common resources control operating groups are provided to permit the theater commander to direct the employment of available transportation facilities, to govern closely the consumption of petroleum products, and to ensure the existence and the efficient operation of an adequate theater communications network. In all three instances, this will be accomplished by a decentralization of operations, thereby eliminating the utilization of theater headquarters staff sections in an operating capacity.

The *Transportation Command* will perform the movements control function of the theater. It will operate regulating stations, and holding and reconignment points. It will maintain day-to-day records of the status of all transportation means under theater control, their capacity, condition, commitment, and current availability. It will prepare the theater movements control plan and will supervise its execution. Operation of the transportation system will be the responsibility of the communications zone, the navy, or the air force, as appropriate. The *Transportation Command*, in the final analysis, will provide the theater commander with the means of employing, to the fullest advantage and with minimum delay, all the capabilities of the theater for the movement of troops and supplies. It, with its agencies, will be the focal point of all requests for transportation service for emergencies or routine continuing needs. It will allocate that service on the basis of theater policies and priorities, or upon the specific decisions or directives of the theater commander, as the situation may warrant.

The *Petroleum, Oil, and Lubricants (POL) Command*, by keeping constantly informed of the location and size of the

ater POL stocks, both in storage and in transit, will provide the theater commander with the capability of promptly applying those resources in support of operations. It is not contemplated that the command will operate any storage installations, but it will control the accumulation and consumption of POL stocks. It will guard against excesses in one locality and shortages in another, direct such transfers as may be necessary, and, in times of short supply, make bulk allocations under a priority system.

The *Communications Command* is provided to construct, operate, and control command communications, the system required to keep the theater commander in constant touch with the forces of the theater, its installations, and activities. It will be responsible for the theater headquarters terminal of all circuits linking that headquarters with the Zone of Interior, advance theater command posts, the administrative commands, the communications zone headquarters, combat task forces, and such intermediate relay and distribution points as may be necessary in the system. It will provide the means whereby the Transportation and POL Commands will have the direct communications necessary for the accomplishment of their assigned functions. It will *not* operate the interior communications facilities of the subordinate commands.

Provision also is made in the theater command structure for the inclusion of additional small commands at theater level to facilitate control of such activities as a theater intelligence service or military government administration. All of these smaller (numerically) groups are considered eligible for command status. They will employ personnel, frequently in small groups or even singly, widely distributed over the theater, working directly under theater control. Personnel so deployed are entitled to the

direct interest, from an administrative point of view, of a commander who will be more immediately concerned with their personal performance of duty and welfare than would a headquarters staff section chief with myriad other responsibilities and functions, or a communications zone base commander who may, in the last analysis, regard their presence in his area as a minor irritation.

Flexibility Is Attained

Referring back to Figure 4, it will be seen that any element shown on that chart can be eliminated without affecting the others. A variation in the size of any element does not change its relative position in the system or organization. In a defensive situation, the combat task forces remain the executors of the theater commander's will. The communications zone commander continues to supply the theater from stores secured by the administrative commands. During the occupation of enemy territory, the Military Government Administration would grow in size and importance, but it would continue to maintain its relative position as shown in Figure 4. It is believed, therefore, that the organization, as developed, satisfies the stated conditions of flexibility, and includes, in a simple logical structure, all the elements necessary to command and control the forces in a theater of operations.

Organization Is Not an End in Itself

It is recognized that an organization, however carefully designed, is not the whole solution to the problem of theater command, and conversely, it is acknowledged that qualified professionals are capable of devising, on the spot, an organization adequate to solve almost any problem confronting them, if given the requisite components.

Acceptance is hoped for, however, of the principles that military ability, in

wartime, should be devoted to the maximum effective operational employment of resources, rather than on the design of organizations to facilitate the employment of those resources; that advance knowledge of an organizational structure based on previous experience or study obviates much improvisation and unnecessary explanations of function, and reduces

shakedown time; that efficiency is promoted and expedited by the peacetime adoption and inclusion in programs of instruction of the principles developed in wartime; and, that the free interchange of personnel and units is facilitated by a minimum of variation in the plan of distribution of responsibilities and functions.

The survival of our Nation and of the entire free world may depend upon how well we succeed in producing sufficient mobility and fire power for our ground forces. In this endeavor we must not permit recent experience to obscure what we may need in the future. For example, we must guard against the tendency to look upon the Korea fighting as a "Preview of Future War."

General J. Lawton Collins

We must show that the free world is the world of the future. It has both the resources and the will to resist effectively whatever aggression may confront it. We must be ready and willing at all times to back up our commitments to assist in securing a free world for all members of the society of nations.

Major General Anthony C. McAuliffe

War and Replacement Factors

Lieutenant Colonel Frank Bednarek, *General Staff Corps (QMC)*
Office, Assistant Chief of Staff, G4, Department of the Army

A FACT not commonly known is that it costs approximately \$100,000,000 to replace the equipment in one infantry division in order to maintain it in combat for 1 year. This amount exceeds the cost of equipment initially issued such a division by about 20 percent.

In determining the requirements for supplies and equipment to support a division in combat, the technical services use replacement factors and consumption rates. These factors and rates, in themselves, are statistical tools developed for the purpose of facilitating and providing a basis for forecasting supply requirements. They are designed for use, directly or indirectly, in all requirements forecasting, as, for example, the budget, the determination of stock levels, and for automatic supply.

A *replacement factor* is a number expressed as a decimal which, when multiplied by the total projected quantity of an item in use, will give the quantity of that item required to be replaced during a given period of time.

A *consumption rate* is the average quantity of an item expended or used up during a given period of time on a "per man per day" or "per 1,000 men per month" basis.

When we consider the enormous quantity of supplies and equipment needed to

maintain the Army in the field, and when we also consider the need to conserve the Nation's dwindling resources by producing only what we need of each item, the necessity for accurate replacement factors and consumption rates becomes evident.

Development of Factors and Rates

The experience data of a past war are always considered the most important basis on which to forecast future requirements. At the outset of World War II, only limited experience was available. Factors were based on a combination of judgment and experience which dated back to the American Expeditionary Forces in World War I. Available data from the French and British also were used. In many instances, prewar factors were established on a purely arbitrary basis.

After the beginning of World War II, initial attempts to secure additional information from overseas areas as to the adequacy of the then established factors, from the standpoint of field experience, were unsuccessful. This was due to the desire to eliminate or prevent implementation of additional theater reports, and to the apparent lack of a comprehensive plan for the reporting and utilization of this experience.

The invasion of North Africa was con-

Important methods of reducing consumption and replacement factors are adherence to supply discipline, development of a sense of pride in ownership of equipment, and a realization of the cost of Army matériel

ducted without any provision being made for the determination of loss and expenditure rates, or the submission of such data to the War Department. Except for scattered data assembled after the conclusion of the fighting, and the inferences that could be drawn from the volume of requisitions on the United States, the African operation afforded no recorded experience that could be utilized in the establishment of, or revision of, replacement factors.

Finally, in June 1943, a War Department directive was addressed to overseas commanders which stressed the importance of field experience in the more accurate determination of replacement factors. Overseas commanders were directed to submit complete data on the replacement issues of each significant item of clothing, equipment, and other supplies issued to the United States Army troops in their theaters. In addition, theater commanders were to indicate the extent to which the data could be used as an index for forecasting future requirements. To assist theater commanders in the compilation, evaluation, and use of replacement factor data, especially selected and trained officers were sent to overseas theaters. This project was only partially successful since considerable difficulty was experienced in obtaining the complete co-operation of theater commanders. Moreover, theater commanders frequently diverted these specially trained officers from their primary tasks by the assignment of additional duties.

As a result of further studies, the "Report of Matériel Consumed" was established, in February 1944, for use by overseas commanders in the submission of experience data. Through this report, the War Department was informed of the total quantities of significant items of equipment which were lost each month. The quantities reported included losses due not only to capture, wearing out beyond repair, and destruction, but also those losses due to pilferage, poor supply conserva-

tion, and inadequate training. Using this report and all other data available from World War II experiences, the Department of the Army has established replacement factors and consumption rates for use as one of the means of determining and forecasting future mobilization requirements, and for the initial estimation of replacement quantities required during actual combat operations in any given theater.

During World War II, there was a widespread lack, in some theaters, of a full understanding and appreciation of the vital importance of replacement factors and the need for data required from overseas areas. As a result, full command support was lacking, procedures in effect were not fully enforced, and the coverage of all sources of data was incomplete. Studies and tests, conducted by the Department of the Army, are now under way to establish a system of reporting procedures for wartime use in theaters of operation which will ensure efficient reporting of true replacement and consumption issues in order that such factors and rates can be adjusted promptly and properly. However, regardless of the system that is devised, unless field commanders and installations are cognizant of the full need for such information, the best results cannot be obtained.

Reduce Factors—How

In time of war, the Army must place emphasis on providing all the supplies and equipment considered necessary to carry out its mission successfully. Cost becomes a secondary consideration, and criticisms can be expected when there is a shortage of matériel. In time of peace, the Army must plan for and determine the quantities of equipment and supplies that will be required to meet future emergencies. However, during this period there is a natural desire to reduce Army expenditures and the pressure to economize is strong and steady. As a result, critical appraisals are made of the various fac-

tors and bases used in determining requirements, with the view that reductions in these factors and bases will reduce the required quantities of various items of matériel. While such appraisals are desirable, the arbitrary reduction of any factor, and thereby the quantity of the item that the Army should plan to provide, is unrealistic, and may result in unforeseen and disastrous shortages. What, then, should be the approach to this problem?

The United States has, in recent wars, indulged in providing an overabundance of equipment and supplies which it cannot again afford if it is to retain its present standard of living and economic stability. We must, therefore, learn to live and to win battles and wars on an austerity basis rather than by producing an overabundance of matériel. We must learn the real meaning of supply economy.

Supply Economy

Many of the Army's critics of poor supply economy or supply discipline in the field, and the resultant high replacement factors, are the very men who brought about this condition in time of war. The soldier who discarded his equipment because it was soiled or heavy, and because he knew a replacement was readily available, is frequently the same person who tells stories about seeing "perfectly good equipment spread all over the battlefield." The commander who pressured his supply officer for extra equipment now says that our replacement factors are too high. Reports frequently are heard about units turning in all of their clothing and equipment and receiving new items before going overseas during World War II. This may be desirable under certain conditions. However, when those conditions do not exist, and when the equipment thus turned in is serviceable, such an action creates, in the mind of the unit, the feeling that wasteful practices are be-

Historic Example

Supply economy or discipline only will be as good as the intent and determination of the commanders and the training of troops at all levels. For the purpose of emphasizing supply discipline to his corps and division commanders, General Bradley, as the Commanding General, First Army, had tabulated for him the monthly rates of loss of certain critical items in terms of the numbers of those items. The rates were based on actual losses for the number of days of actual combat experienced by each division during a 37-day period. The following table is an extract from this tabulation for four infantry divisions, identified here as Divisions "A," "B," "C," and "D." General Bradley

Item	Authorized per Division	Monthly Equipment Losses			
		Div "A"	Div "B"	Div "C"	Div "D"
Gun, machine, cal. 30, M1917A1	90	15.9	17.7	63.5	81.2
Gun, submachine, cal. .45	93	18.0	20.0	33.5	5.7
Mortar, 60-mm	90	40.0	4.6	90.0	70.6
Mortar, 81-mm	54	5.3	8.4	25.3	45.4
Mount, tripod, cal. 30, M1917A1	90	16.5	13.9	67.0	78.5
Rifle, automatic, cal. 30	243	45.5	58.5	152.	189.
Binoculars, M3	1229	8.4	5.4	38.8	41.4
Compass, M2	121	15.0	8.4	3.5	5.7

stated, in part: "I wish to emphasize that supply discipline is a common responsibility. Such losses are a definite indication of the general state of discipline existing in the organization, rather than the manner in which the supply service of the organization is functioning."

There is no denying that the problem of developing effective supply economy or discipline has been and will continue to be most difficult in our Army for some time to come. Since we enjoy a high standard of living, with an abundance of the comforts of life available to all men, we have not had the necessity of developing these habits which result in appreciating fully the value of property, particularly property which, in the minds of

Implementation of Supply Economy

The implementation of an effective system of supply economy or discipline should stress the following points:

1. Informing the newly recruited soldier that the Nation's resources are not inexhaustible, and associating this fact with his own family's future welfare.

2. Keeping every individual in the Army aware of the cost of his equipment and the impact of this cost, not only on his tax bill, but on his future buying power, as our resources become depleted.

3. Developing in every individual a sense of pride in the maintenance and ownership of his equipment, pointing out how his own life might depend on a well-cared-for piece of equipment.

4. The development of policies and standards which will foster conservation.

It is important that the new recruit's introduction to Army life should stress the reasons why he should save. This appeal for conservation must be associated with each man's own personal interest. If he feels that his contribution is of no con-

sequence, he must be taught that, collectively, such contributions will result in the conservation of much equipment. In stressing the training of the individual for the purpose of developing a keen awareness of the need for conserving his equipment, it is particularly important that the commanders themselves, at all echelons, practice supply economy in order that a proper example is presented to the command. Additionally, Army policies must ensure that all clothing and equipment is utilized fully. A unit that has learned to use the sewing kit should be commended more highly than one dressed completely in new uniforms.

Conclusion

Every effort must be made to develop accurate experience data by the Army in order that the Army's future needs can be forecast realistically. However, if that data indicate excessive needs, the effective way to reduce or trim such needs is by learning to conserve; to fight and win wars with smaller quantities than have been used in the past.

Our national resources are limited. We cannot repeat our past errors of trying to produce high quantities of everything that might conceivably be useful in war. In order to win, the military forces of Democracy must be qualitatively superior, and must be employed so as to make the most of our qualitative advantage.

Lieutenant General Elwood R. Quesada

'We Build; We Fight'

The Amphibious Construction Battalions

TRAINED in techniques developed during World War II, men of the Navy's Amphibious Construction Battalions (CBs) are emulating the feats of their predecessors in the fighting in Korea. Once again they are bridging guns, tanks, and heavy equipment through surf and over beaches, supporting the assault troops of the Marines and the Army.

Their special equipment is steel pontoons, each 5 feet square and 7 feet long, which are bolted into strings to form causeways.

During the last war, these pontoons were the "weapons" which surprised the Axis at Sicily by enabling the Allied forces to land on the gently shelving and relatively unprotected southern beaches. Thereafter, they became known as the "magic boxes" of the CBs and were used in every major invasion of the war, including Normandy.

(In Korea, the CBs solved the problem presented by the 30-foot tide range at Inchon, placing pontoon strings to form causeways for bringing guns and ammunition ashore.)

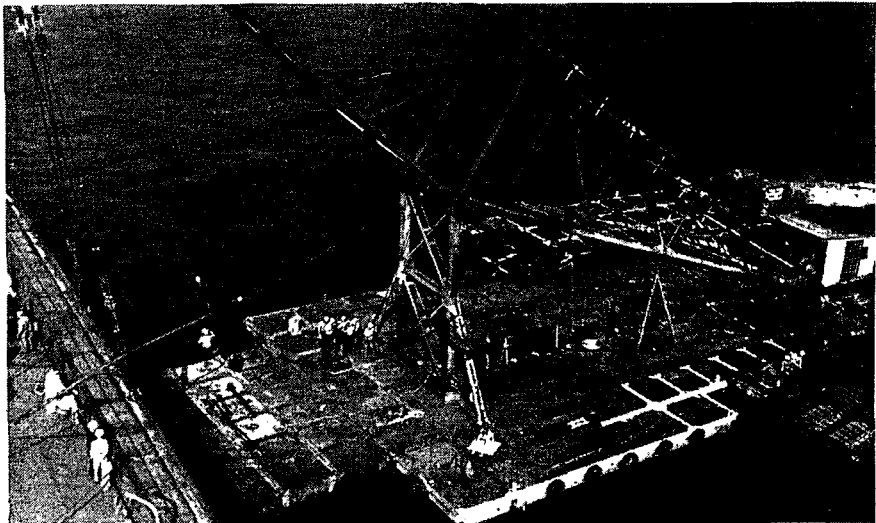
The CB pontoon detachments eventually were formed into full battalions as World War II drew to a close in the Pacific. These were the prototypes of the pres-

ent amphibious construction battalions.

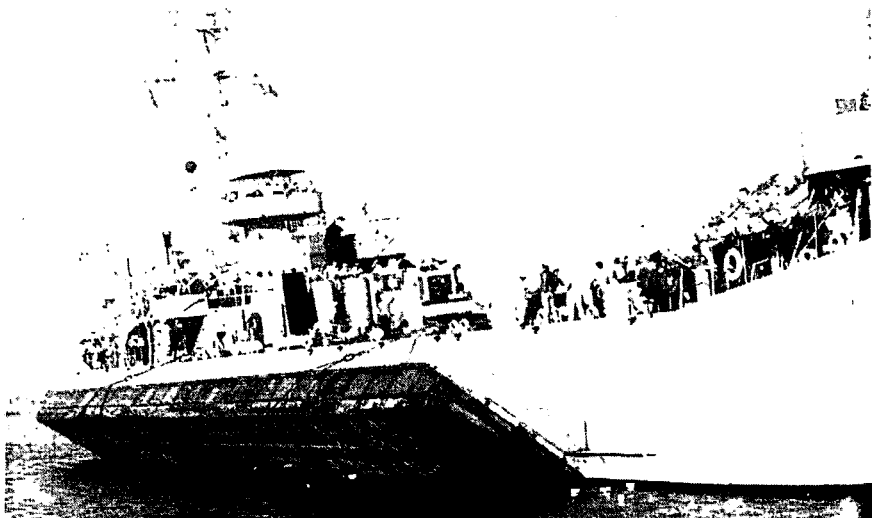
The CBs use their pontoons today principally as causeways and barges. They hang their pontoon strings on the sides of landing ships, tank (LSTs), then cut them loose as the ships near the beach. The causeways then are towed until the ships ground, and momentum brings the pontoons on in to shore. Causeways then are "married" to the LSTs whose bow anchors are carried into position by pontoon barges, while CB bulldozer operators build sand ramps at the inshore end of the causeways.

The amphibious construction battalions then go full speed into their second major function—building beachhead bases. Bulldozers, trucks, and equipment roar over the causeways to the beach. The work of cutting access roads to locations less exposed to enemy fire starts immediately. Supply dumps and revetments are thrown up, emergency first aid shelters are built, perimeter guard posts dug, mobile power units put into operation, water distillation units started, messing and temporary housing facilities built, and sanitation provided. Meanwhile, the CBs stand ready to defend against counterattacks in carrying out their motto: "We Build; We Fight!"

Amphibious construction battalions, the natural outgrowth of the CB pontoon detachments of World War II, are emulating the feats of their predecessors in carrying out their motto: 'We Build; We Fight'

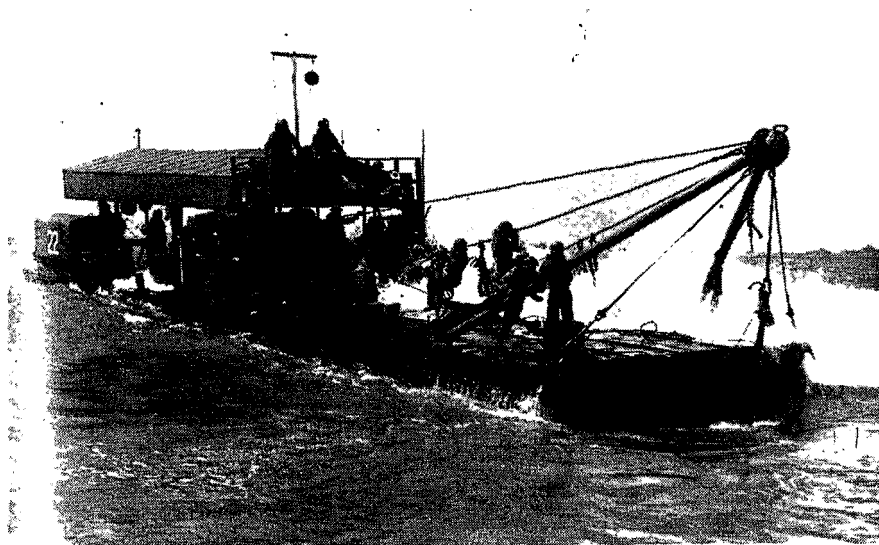


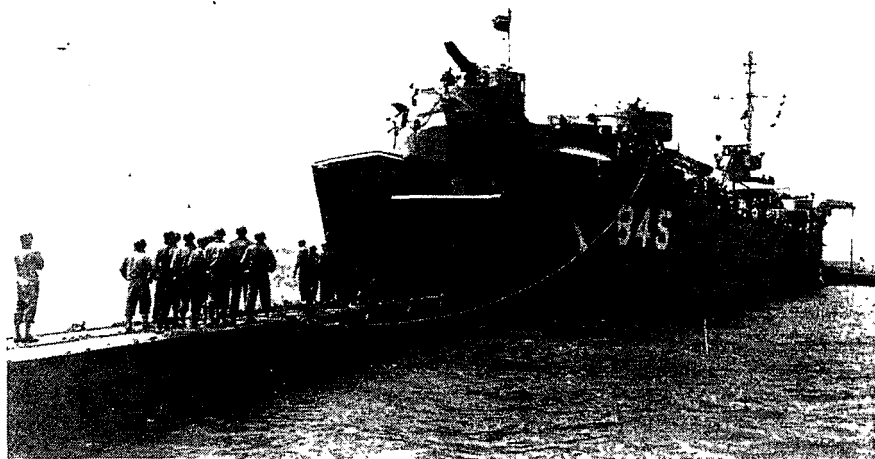
The CBs carry their piers with them, prepared to bridge guns, tanks, and heavy equipment through surf and over beaches in support of assault troops. Above, a cantilever crane on a pontoon barge lifting a causeway section into place. Below, a pontoon causeway section being lifted aboard an LST prior to side carrying it to a landing site.



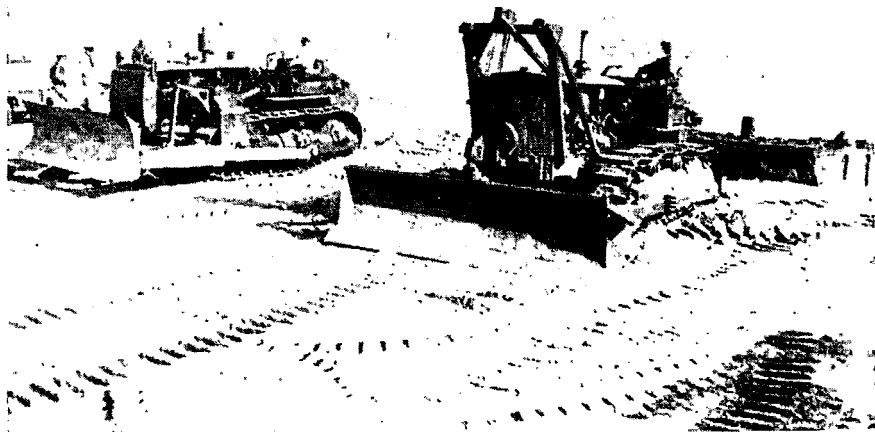


Here comes a steel roadway! Soon, supply ships will be able to unload their vital cargoes to support the combat troops. Above, CBs rush ashore ahead of one of their pontoon causeways, which soon will be bridging trucks and supplies from an LST. Below, a warping tug, a collection of 36 steel pontoons, laying surface anchors for securing a causeway pier.





Under the CBs' know-how, an LST does more than carry a cargo. The LST, above, is "married" to a causeway. Soon, the ship's cargo will be going ashore as if it were rolling off an assembly line. Below, bulldozers, the work horses of the Construction Battalions, jockeying a pontoon string into position until the sea anchors can be set.





Speed is one of the keynotes of CB operations. Above, as the fighting forces secure the beachheads, the CBs bring supplies and equipment ashore over their causeways. Below, CBs fight to build and then build to fight. They handle their weapons as efficiently as they do their construction equipment, fulfilling their motto: "We Build; We Fight."



G3 Troop Basis Planning

Lieutenant Colonel Glenn E. Muggelberg, *Infantry*
Instructor, Command and General Staff College

THE manpower and industrial potentials of the United States and its Allies are not unlimited. In any war against an enemy employing seemingly unlimited manpower, we cannot afford to make the same errors we have made in the past. We cannot waste our national resources by activating, equipping, training, and transporting a unit to an overseas theater only to find that we have no need for it. Conversely, we must ensure that sufficient personnel and equipment are furnished to complete a planned operation as efficiently and expeditiously as possible. If a force is reduced to the point where it cannot accomplish the mission for which it was assigned in the time allowed, the total force is lost for planned future operations as a result of *false economy*.

To illustrate this concept, let us assume that a force is given a mission to take an objective by D plus 10. At the end of that time, it is to be used for other missions. If the force, through false economy, is deprived of the resources required to take the first objective in the time allotted, it is not available, at the time desired, for planned future operations. We must learn to tailor our forces so as to obtain maximum utilization of personnel and equipment. Troop basis planning is the means used to achieve this end. It is the process by which we determine our requirements. The technique explained in this article is offered as a guide to the future troop basis planner.

Troop basis planning is the procedure used to determine the troops required to accomplish a given mission. For any given command, it is based on the troop ceiling authorized by the next higher headquarters. The total number of personnel authorized the command is broken down into those personnel spaces carried in units organized on Tables of Organization and those carried in an overhead bulk authorization. Troop basis planning is a continuous process. A troop basis designated for certain operational requirements often must be changed as the situation changes. It may become necessary to add new units, to relieve old ones, or augment current units with personnel and equipment to perform special tasks.

Factors Affecting Troop Basis Planning

In every situation, we may be confronted with factors peculiar to it, which the troop basis planner must consider when determining his troop requirements. However, those factors which are normally present in every situation, and which affect troop basis planning are:

The mission—administrative as well as tactical.

The terrain and climate.

The enemy situation.

The attitude and capabilities of the local civilians.

The industrial and economical development of the area of operations.

The availability of units.

The status of training of the available units.

The sources available to meet troop requirements include units furnished by higher headquarters, provisional units, units organized from the bulk authorization, conversion of surplus units, civilians, and prisoners of war.

Considering the many variable factors, it is apparent that troop basis planning is not a science—rather it is an art, in which the planner continuously must analyze the factors involved, and design the force to fit the conditions. In this respect, experience data developed from similar type operations, and the data contained in Field Manual 101-10, *Organization, Technical, and Logistical Data*, are valuable guides to the troop basis planner.

Technique

As stated above, troop basis planning is an art, rather than a science. The works of the outstanding masters in each field always can be recognized because of the techniques they have developed. This applies with equal force to the troop basis planner, who must develop the necessary techniques so as to make his work valuable.

Listed below is one technique which has proved invaluable to the troop basis planner in determining his requirements,

The troop basis planner, through the development of adequate techniques, can assist in ensuring that the mission of the command is accomplished and that our resources of manpower and matériel are conserved

both in the combat zone and the communications zone, together with a brief explanation or example of each step in the technique.

Combat Zone

Troop basis planning logically breaks down into the following steps:

1. The establishment of tentative troop ceilings for the elements of the command.

a. The determination of the major combat units.

b. The determination of the units to support the major combat units.

2. The detailed planning within the tentative ceilings to arrive at the actual units needed by type and number.

3. The adjustment of the requests for type units so as to balance the force within the over-all troop ceiling.

4. The submission of the request, with justification, for the units needed by the command to accomplish the mission.

Tentative Ceilings

The G3 normally has staff responsibility for establishing the tentative ceilings for the elements of the command. He is assisted in this function by the remainder of the co-ordinating staff. Tentative ceilings are used as a guide for those responsible for detailed planning, and as a medium of initial co-ordination in balancing the force. In large troop planning problems, the form of the staff study can be used as a guide by the staff officer to ensure that he has considered all aspects of the problem.

Example 1

(Extracts of a staff study made by a G3 to arrive at tentative ceilings.)

2. ASSUMPTIONS.

a. Type units required are available at full strength and are sufficiently well trained to perform their combat functions at maximum efficiency.

b. We will be opposed, initially, by approximately three Red infantry divisions and, later in the operation, by elements of four to six Red divisions, one of which may be armored.

c. Red forces will be heavy in artillery support.

d. Weather will be warm and dry, which is normal for the season of the year.

e. Most bridges over the numerous streams and the locks in the Mid Canal will be destroyed by the enemy as we advance.

f. Indigenous population will be friendly.

g. The corps will operate as an independent corps for approximately 31 days.

h. We will have air superiority.

i. We will have naval superiority in the Mediterranean Sea and the Gulf of Lion.

3. FACTS BEARING ON THE PROBLEM.

a. Mission.—The corps attacks east in the direction of Toulouse to the Gulf of Lion, thence northeast along the Mediterranean coast of France, seize the line of the Vidourle River by A plus 21 in order to open the south coast of France for future operations north in the Rhone Valley.

b. Corps is authorized a total of 213,600 troop spaces.

c. Corps is limited in division strength to four infantry and two armored divisions.

d. Corps is responsible for the complete administrative and logistic support (field army type) of all its elements. The corps will receive its support direct from theater army and communications zone (ADSEC-S).

e. Terrain is mountainous except for the Carcassonne Gap, the Mediterranean coastal plain, and the Rhone Valley.

f. Corps will provide only minimum essential civilian relief.

g. Military government units other than command teams will be trained and provided as needed by theater army. They will not be included in corps troop ceiling.

4. DISCUSSION.

a. Mission.—The mission requires an advance of approximately 140 miles. This advance must be conducted, initially, either through mountainous terrain or through the Carcassonne Gap to the Gulf of Lion, thence up the coastal plain. It will necessitate the crossing of the Orb and Herault Rivers. Since the corps will be operating independently, a highly mobile, balanced force capable of sustained operation will be required.

b. Administrative and logistical responsibilities.—Since the corps normally is a tactical unit with limited administrative and logistical functions, the mission of furnishing complete administrative and logistical support to all elements of the corps will result in a major build-up of the corps in technical service troops, and in the G1, G4, and special staff sections of the corps headquarters.

c. The corps tactical mission, together with logistical and administrative responsibilities, gives the functions of an army. Hence, for troop planning purposes, it can be considered as a small army. Troop basis experience factors for a type army should apply. However, these factors should be modified in the light of the existing situation. Experience factors will be modified by the following:

(1) Commander's concept. (Annex A) (Omitted).

(a) The commander's concept of the operation and the time limit imposed for its completion, demand a highly mobile force capable of rapid movement and sustained action. This will affect our transportation needs greatly. In order to achieve the required mobility, we should be capable of motorizing at least half of our combat elements, in addition to maintaining adequate logistical support over the extended supply lines that will result from a rapidly moving situation. The increase in transportation will require an increase in ordnance maintenance and quartermaster Class III supply facilities. However, since the anticipated duration of

the operation is so short, certain of the otherwise essential services can be reduced, i.e. laundry, fumigation and bath, and special service.

(b) Since the commander's concept visualizes only limited operations in the mountains, no special type mountain troops are required.

(2) Weather. (Annex B) (Omitted).

Anticipated warm, dry weather will permit the use of highly mobile and mechanized units.

(3) Terrain. (Annex C) (Omitted).

5. CONCLUSIONS.

a. I Corps, for Operation Wab, in essence, will be a small army. In order to perform its mission, it must have a highly mobile, balanced force, capable of providing complete administrative and logistical support to all of its subordinate elements for a sustained period.

b. Essentially, the experience factors for a type army provide sufficient data on which to base tentative troop ceilings.

c. In order to provide a properly balanced force for the operation, the situation demands that these factors be modified to weight our forces in:

(3) Ordnance

(4) Transportation

d. The situation permits that the factors be modified to provide a slight reduction in the normal proportion of separate tank battalions.

e. Ceilings for all other elements of the corps including the corps headquarters, can be based tentatively on an exact ratio with the type army.

Example 2

(Extracts of a G3 worksheet used to compute tentative ceilings based on his staff study.)—(See chart on page 33.)

Detailed Planning

Detailed troop basis planning, for the several arms and services, must be performed by the staff officer technically qualified and responsible to the commander for the proper functioning of that element of the command. For example, the artillery officer should prepare the detailed artillery troop requirements necessary to support the operation. In so doing, he should take advantage of experience factors derived from similar operations. He must, however, realize that the experience factors used must be modified in light of the existing situation. There is no definite guide or formula that can be used to revise experience factors. The staff officer must apply his own military knowledge and background,

so as to arrive at the best estimate possible. In so doing, there are certain fundamental considerations which must be kept foremost in mind. These are:

Command.—The command structure is a basic consideration in the formation of any organization. In fixed tactical or-

required to operate one of the depots in a given maintenance area. Rather than using two companies, one company can be augmented with quartermaster 500-series teams and perform the assigned mission. The planner must be alert constantly for ways to reduce manpower

Units—Type Army (Divisional units not included)	Aggregate Strength Type Army	Strength per division Type Army	Equivalent strength for 6- division corps	Remarks	Ceiling
Quartermaster	13,740	1,145	6,870	Reduction in labor and service units should balance need for additional Class III supply units	6,870
Signal	9,134	761	4,566		4,566
Special Service	393	33	198	Reduce by 67. One company adequate	131
Transportation	8,001	667	4,002	Add 1,498 for additional truck battalion and driver detachment (CN)	5,500

ganizations, control headquarters are organically incorporated in the Tables of Organization of the units. However, in flexible tactical organizations, appropriate headquarters must be provided. They may be battalion, regimental, or group headquarters as provided by Tables of Organization, or they may be headquarters detachments of the 500-series which provide command functions for cellular and composite units. Regardless of the source, the grouping of units under a headquarters for the control and supervision of operations and administration is necessary for the economical and efficient performance of the mission of the units.

Economy of force.—In a future national emergency, we will, no doubt, face the same great problems that we did in World War II—an ever increasing shortage of qualified personnel. The proper and economical employment of this critical asset—manpower—therefore, must be kept uppermost at all times in the mind of the troop planner. The force must be designed to fit the task. For example, 11 quartermaster depot companies are

requirements to the minimum essential. This is particularly true in service units. A few of these troop economy measures are:

1. To use prisoners of war and native civilian labor to the maximum extent possible.
2. To operate minimum essential installations.
3. To consolidate installations where practicable, thereby saving on overhead and "housekeeping" personnel.
4. To use units on jobs for which they are specifically trained. If this is not possible, substitute units should be employed in which the skills of the individuals can be used. In employing substitute units, extreme care must be taken to avoid unnecessarily lowering the efficiency of the service from which the substitute unit was taken. Further, it must be realized that the substitute unit will not perform with the same degree of efficiency as the unit specifically trained for the job.

Use of cellular and composite units.—The purpose of cellular units (500-series units) is to provide small teams whose

personnel are trained in specific technical tasks. They are tailored to do a highly specialized and technical job. They conserve manpower by eliminating the waste inherent in using a full-size Table of Organization unit on a job which does not provide sufficient work for that unit. Cellular units may be used in many ways. For example:

1. As a separate detachment.—An engineer 500-series detachment of 3 men can maintain 30 searchlights. A company, or even a platoon of these specialists probably would be far too many to take care of the searchlights in any given area.

2. As an augmentation to a regular Table of Organization unit.—It is possible to augment truck companies with driver detachments and operate 24 hours a day. In this connection, the use of personnel in bulk also must be kept in mind. In many instances, units, particularly headquarters units, can be augmented by bulk authorization personnel to do the job.

3. As composite units.—Composite units can be formed by combining 500-series detachments of several different specialist types under one administrative headquarters. For example, in establishing a leave center, it is possible to combine an engineer utility team, a quartermaster supply detachment, and a signal switchboard detachment under one administrative headquarters as a part of the operating force.

Balanced force.—The troop requirements of each arm and service are not considered individually but collectively. An increase in the strength of one arm or service has a direct bearing on the strength of the other arms or services. For example, it will take 10 additional truck companies to furnish the necessary transportation support for an operation. This additional transportation will require an increase in ordnance maintenance

support. This, in turn, may result in a need for more quartermaster units to support the additional ordnance units required. The finance troop list might have to be increased in order to pay the increased strength.

The problem of balancing the force is a continuous one. The planner must consider the importance of the mission of each unit and the relative difficulties of the task to be performed. He must also consider how the need for each type unit will affect the need for other type units. In so doing, the planner is confronted continuously with the problem of keeping the personnel requirements within the allotted troop ceiling.

Adjustment.—It is seldom that the initial ceiling authorized for any element of the command will prove to be the exact, final ceiling. More often than not, adjustments will have to be made. The G3 should provide for these adjustments by maintaining, initially, a small number of troop spaces in reserve.

General staff co-ordination of detailed planning should work generally as follows: Let us suppose the Quartermaster and Ordnance Officers have submitted their requests for units to the G3, through the G4. The G4, on studying their requests, determines that the troops are adequate to support his logistical plan. Further, the need for each unit is justified. However, the Quartermaster has asked for an increase of 200 spaces in his tentative ceiling, while the Ordnance Officer needs 150 spaces less than he was authorized originally. The G4 has determined that there is no need for the 150 spaces which were excess to the ordnance service elsewhere in his field of primary interest. He would then recommend to the G3 that the 150 spaces, excess to the ordnance service, be reallocated to the Quartermaster, and that the necessary action be taken to obtain the other 50 spaces. The G3, upon examining

the requirements of the unit as a whole, may find that he has the spaces available and would make the adjustment. If he finds that he cannot make the adjustment within the means available, then he will have to request additional spaces when he forwards the troop basis for approval to higher headquarters. (He will have to justify his request.) If the request for additional spaces is disapproved, the G3 will have to re-examine the complete troop basis to determine where the adjustment best can be made. In this examination, he will co-ordinate with all the staff sections concerned.

Submission.—The troop basis, when approved by the commanding general, is forwarded to the next higher headquarters for approval. In its final form, units are listed by number required and Table of Organization and Equipment. Justification must accompany the request.

Co-ordination

Co-ordination in all the steps of troop-basis planning is a continuous process and is a responsibility of each planning officer. It is a function of the general staff to ensure co-ordination between all the elements of the command within their respective fields. The G3 maintains staff responsibility for the over-all co-ordination in this field.

Communications Zone

The planning technique used in the communications zone is essentially the same as that used in the combat zone. However, the combat troops to be supported have been fairly well determined by higher headquarters, and the communications zone planning is directed primarily at the service troops needed.

The factors on which to base troop requirements in the communications zone are somewhat more exact, and planning can more nearly approach a science. Units required are based on such factors as troops to be supported, industrial development of the area, tonnages to be handled, port facilities available, military government responsibilities, and the attitudes of the populace.

The communications zone offers us one of our most fertile fields for reducing the number of able-bodied troops employed in noncombat jobs. The communications zone planner constantly must strive to use, to the maximum, indigenous civilians, prisoners of war, and Allied personnel not suited for combat. When planning for the establishment of a new communications zone in an area with a highly industrialized economy, troop ceilings should reflect the following: *The military strength employed in a communications zone should increase in the initial stages of the operation, reach a peak early in the operation, and, finally, begin to decrease, even though the amount of territory taken over and the volume of business may increase.* This is permitted by improved efficiency in the operations as portions of the communications zone become stabilized, and by the maximum utilization of all available nonmilitary personnel.

Summary

Only when our plans and policies provide for the maximum utilization of all available personnel in the best interest of the country, will we have achieved true personnel economy. Honest and accurate troop planning will contribute much to this ultimate goal.

Substituting the 'Speed Ball' For the 'Red Ball'

Lieutenant Colonel Page H. Slaughter, *Transportation Corps*
Staff and Faculty, Transportation School

This is an example of the savings that can be effected by running an old operation with new ideas.

The basic data upon which this article is based were prepared in the Troops and Staff Branch, Highway Transport Service Division, Office of the Chief of Transportation.—The Editor.

The Service Troop Problem

IN RECENT days, a great deal of national publicity has been given to the "division slice"—the total number of troops in the Army divided by the number of combat divisions—and the figures quoted reflect unfavorably on the Army. It appears that our present world-wide "division slice" is about 76,000 to 78,000 men, which means that we have three to four soldiers in supporting roles for every one in a combat division. Upon analysis, this is not as bad as it sounds, for we have but a limited number of divisions today, while our overhead requirements are high. As we activate more divisions, the overhead will not increase proportionately. However, effective utilization of our manpower remains a major problem, and planning estimates indicate that we will still require 23,000 additional men in a theater of operations for every combat division we send overseas (or a total of 40,000).

Our manpower experts are not blind to

this problem, and recommendations are being made which will reduce the proportion of service support troops to combat troops. The problem is so large, and has so many ramifications, that it is most difficult to discuss it in general terms. Perhaps the best approach is to examine each of the vast number of subordinate problems involved, and increase our efficiency in each of them. Undoubtedly, we can eliminate entirely some of the services we now feel we must have, and, in the end—by elimination and increased efficiency in many operations—we will come up with a substantial over-all saving in noncombat, Army manpower. The remainder of this article is devoted to a discussion of the increased efficiency and material savings in manpower and vehicles that can be made by applying the latest doctrine, organizations, and techniques to a long-haul, line of communications highway transport operation.

A Backward Look at the Red Ball Express

One of the most publicized logistical feats in World War II was the now famous Red Ball Express, a highway operation from St. Lô to Hirson and Sommesous, in support of the United States First and Third Armies in their dash across northern France. Later, the operation also served the United States Ninth Army and the Paris area. Organized on a provisional basis, the Red Ball Express moved the

requisite supplies for the two armies until such time as the rehabilitation of railroads permitted movement of the tonnage by this more economical means of transportation. The Red Ball Express operated from 25 August 1944 to 16 November 1944—a total of 81 days—and moved 412,143 tons during the period. This is a daily average of 5,088 tons. The average forward distance was 303 miles, and the average number of 2½-ton truck company equivalents used was 83. Although this operation accomplished a staggering task at a critical period, and received much praise for a job well done, a backward look will bring out the fact that there were many details that could now be performed much more efficiently.

Operating Details

Command.—The commander of the Red Ball did not have full control over the operation. He was given an assigned mission without the organization or the full authority necessary to accomplish it. The operation was subjected to varying degrees of co-operation (or interference) by the commanders of the areas through which it passed, and was dependent upon them for many of the services and much of the personnel necessary for the successful completion of the mission.

Routes.—A one-way return loop highway system was used; two approximately parallel routes being available. The northern route (the shorter) was used for

forcement of this reservation was poorly executed.

Over-the-road procedure.—Bivouac areas were located midway along each route so each driver was required to make only half of the one-way trip. Vehicles, of course, made the entire trip without transferring loads, stopping for required servicing en route.

Terminal delay.—Due to the use of trucks rather than tractor-semitrailer combinations, it was impossible to operate a shuttle system for loading and unloading at terminals. The result was a terminal delay for loading, unloading, and other incidentals of approximately 16 hours a vehicle on each trip.

Highway regulation.—Highway regulation points were few and far between, communication was poor, and convoy serials were out of contact for long periods of time. Highway regulation personnel normally were furnished by the commanders of the areas through which the Red Ball passed, and, consequently, operational control was weak and poorly co-ordinated.

Troop basis.—744 officers and 20,098 enlisted men were assigned to operate and control the Red Ball Express.

Vehicle basis.—5,509 powered units, principally 2½-ton, 6x6, cargo trucks, were assigned to this operation.

Postwar Study and Research

During the latter phases of the European campaign, and since the conclusion

Every military activity must be explored with a view to reducing the 'division slice.' Application of modern methods and equipment to highway transport operations proves that manpower savings can be made

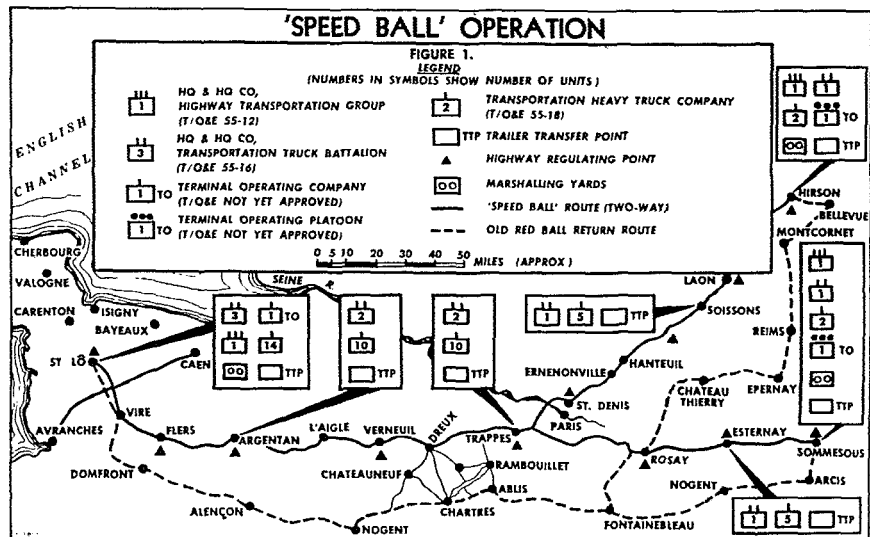
"up" traffic, and the southern route (the longer) for "down" traffic. Both were capable, however, of supporting two-way traffic. While the use of these highways was reserved for Red Ball vehicles, en-

of World War II, many productive studies have been made of the problems of long-haul highway transportation. Close scrutiny has been given to modern commercial methods for hauling cargo long distances,

to include the use of the latest type equipment, methods of dispatch, over-the-road procedures, terminal operations, driver supervision and well-being, and the overall supervision and control of a large-scale money-making enterprise. The results of

headings used earlier in this article.

Command.—Our present doctrine would dictate the establishment of a long-haul, line of communications highway operation as an intersectional service under command of the Commanding General, Com-



these studies have been evaluated in the light of military requirements, and necessary adjustments made. As a result, new organizations and techniques have been developed which have increased greatly the efficiency of military, long-haul highway operations. Using these new developments as a basis, let us re-examine the old Red Ball Express and see what improvements could be made if we had to do the same job over again.

'Monday Morning Quarterbacking'

Based on our study of the original Red Ball Express and the latest practices that have been developed, there are a number of changes we would make if we instituted a new "Speed Ball Express" in the same area today. For convenience, these changes can be grouped under the same general

communications Zone. It would be operated under the control and supervision of the Communications Zone Transportation Officer through a Table of Organization and Equipment unit to be designated as the Headquarters and Headquarters Company, Transportation Highway Transport Service. This organization would have assigned sufficient operating, service, and maintenance units to support the operation. Dependence on other units assigned to other commands would be necessary for only emergency or unexpected requirements and normal co-operation.

Such centralized command and control, with detailed operations decentralized to subordinate units, will result in a much more efficient long-haul system.

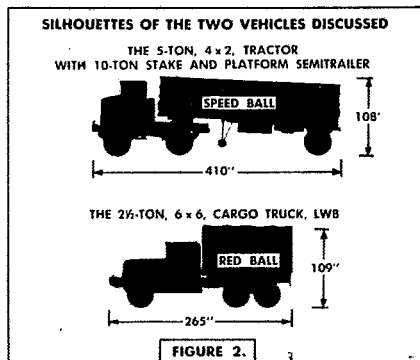
Routes.—With highways capable of sustaining two-way traffic, only the

shorter northern route would be used, with a consequent saving in time, gasoline, and manpower. This highway would be reserved for the use of "Speed Ball" vehicles only. The use of the highway for two-way traffic over a 300-mile distance favors the use of a relay system which is discussed in the following paragraph.

Over-the-road procedure.—Substituting tractor-semitrailers for trucks permits the establishment of "trailer transfer points" where tractors exchange semitrailers. With this type of operation, it is advisable to have two-way traffic to reduce or eliminate unnecessary tractor travel. The exchange of semitrailers at designated points by the tractors is comparable with the changing of locomotives on railway trains at division points. Several benefits accrue from this practice. It permits units to operate their tractors over only a portion of the total forward mileage (in this instance one-quarter), with the assigned drivers remaining with their vehicles. It also permits the carrying out of such activities as the requisite servicing of tractors and the scheduling of driver rest periods, without stopping the loaded semitrailer at the same time. Additional advantages include the return of drivers to their own *bivouac* areas daily for vehicle servicing, rest, and control by their own unit commander. Trailer transfer points would be established at the terminals of the route, and at such intermediate points as Argentan, Trappes, Soissons, and Esternay. Unit bivouac areas and headquarters also would be located at these points, together with the necessary service stations and second echelon maintenance shops. (See Figure 1 for locations mentioned.)

Terminal delay.—To reduce the terminal delay in loading and unloading to a minimum, terminal operating companies would be stationed at the terminals at both ends of the route. These "shuttling" companies would "spot" semitrailers for loading, later pulling them, when loaded, to

a marshalling yard. They would return from the marshalling yard with other empty semitrailers to be loaded. The same process would be carried out, in reverse, at the unloading end of the route. By this method, over-the-road tractors and

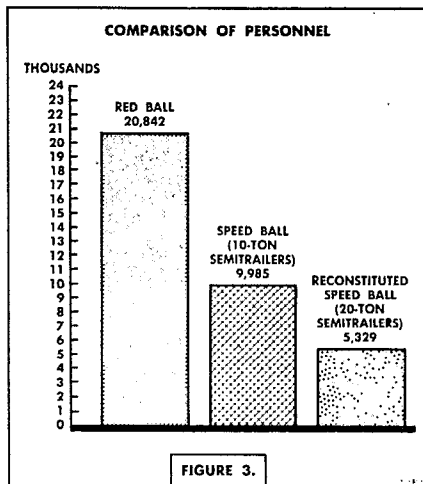


drivers are not held up during loading or unloading, and merely pick up or deliver loaded or empty semitrailers to the marshalling yards with a time loss that is negligible. (See Figure 1 for the locations of the terminal operating companies and the marshalling yards.)

Highway regulation.—To permit the operation of the entire route on fast, tight "express schedules" comparable with normal railway operations, tight centralized control is necessary. Convoy serials must be followed carefully on a master march graph board to record their positions at all times. To permit this accurate recording of movements, 12 highway regulating points would be set up along the route, about 35 miles apart. (See Figure 1 for these locations.)

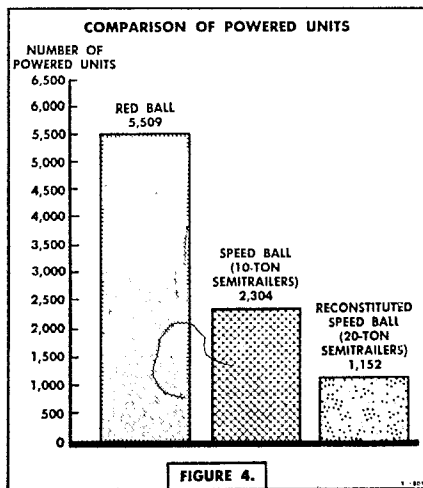
Troop basis.—Under the new type of operation proposed above, 541 officers and 9,444 enlisted men would be assigned to the "Speed Ball Express."

Vehicle basis.—Operations, with the tractor-semitrailer combinations, would require the assignment of 2,304 power units.

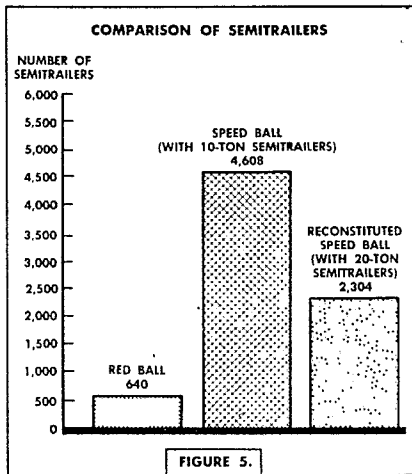


Comparison

By comparing the original Red Ball Express with our modern "Speed Ball Express," we arrive at some very interesting observations. The computations for the "Speed Ball" are based upon the use of the 10-ton semitrailer (Figure 2) which



is now standard equipment for the transportation heavy truck company. With the standardization and use of a 20-ton semitrailer, which the Transportation Corps advocates for this type of operation, further great savings can be realized. Graphic comparisons of the number of personnel, powered units, and semitrailers for each



of the three types of operations are shown in Figures 3, 4, and 5.

Under the reconstituted operation of this route, there are several other factors that bear consideration. First, two semitrailers will be available for each tractor used so as to eliminate terminal delays for powered units while the semitrailers are being loaded or unloaded. Second, the round trip running time has been reduced from 78 to 47 hours, based on an average speed of 15 miles an hour. However, with a better training program for drivers, it is believed that an average speed of 25 miles an hour could well be maintained. Such an increase in speed is practical, and would reduce the round trip running time (exclusive of terminal and transfer point halts) from 40 to 24 hours. This would make possible a further saving of person-

nel and equipment of *approximately 33 percent*. Third, changes in operating headquarters and units have strengthened their maintenance, highway regulation, communications, and operations capabilities while still reducing greatly the number of personnel required to do the job. In Figure 6, some interesting comparative performance data will be found, based on the use of the 10-ton semitrailer on the "Speed Ball."

Tracing a Shipment on the "Speed Ball"

Let us assume that a requisition for radio tubes and signal spare parts from the United States First Army has arrived at the Signal depot at St. Lô. It is determined that this shipment will fill one 10-ton semitrailer, and that it

upon arrival at the destination. The intermediate delay at the three trailer transfer points has been held to a minimum by having the outbound tractors ready for immediate pick-up when the inbound tractors deliver the loaded semitrailers at those points. Lost time in the movement of supplies due to vehicle maintenance, driver rests, meals, and other incidentals has been reduced to a negligible factor. The key to efficient operations is accurate information and split-second timing in the dispatching of tractors for all of the pick-ups and deliveries. This information and efficient dispatching are provided by the highway regulating organization and the battalion and group headquarters which supervise the operation of the truck companies. An extensive and reliable signal com-

SPEED BALL		ACTUAL RED BALL	
Operational data			
Average round trip miles (over-the-road)	566	Average round trip miles (over-the-road)	606
Average speed (miles per hour) (includes terminal delays)	15	Average speed (miles per hour) (includes terminal delays)	10.2
Average load time (trailer exchange)	4 hours	Average load time	9.9 hours
Average unload time (trailer exchange)	4 hours	Average unload time	6 hours
Average turn-around time	47 hours	Average turn-around time	78 hours
Average daily forward movement	5,760 tons	Average daily forward movement	5,088 tons
Average miles per day (planned)	300	Average miles per day (planned)	150

Figure 6.

will be moved directly to the First Army Signal depot at Hirson. The simplified chart (Figure 7) shows the major movements involved, and may assist in the visualization of just how this new operation would work.

Thus, we can see that we have delivered this particular load of supplies from the St. Lô Signal depot to the First Army Signal depot, using seven different drivers and tractors, in a road haul time of approximately 19 hours. The terminal delay has been held to a minimum by having the loaded semitrailer ready for immediate pick-up by the road convoy at origin, and by releasing it immediately

communications net is essential for the elimination of lost time.

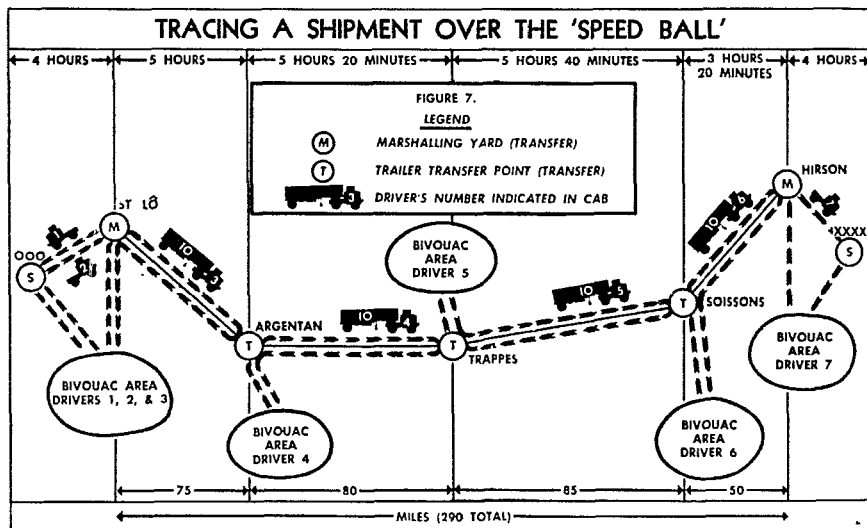
What Have We Accomplished?

We have revamped our ideas somewhat by using the experience and "know-how" of competitive American truck-line operators, combined with an analysis of the military application of their operations. As a result, we have accomplished a significant saving in the personnel and powered equipment required for a long-haul highway operation.

We have developed a new method by which we can accomplish the same job

we did in World War II with a 67 percent saving in personnel and a 58 percent saving in powered units. By using equipment with still greater tonnage capacity, these savings can reach 75 percent and 79 percent respectively. Of course, we

equipment for men, and thus potentially increased the number of men available for combat duty. In the case of this one operation, we have saved enough men to form two infantry regiments, three field artillery battalions, an engineer combat



cannot accept these impressive figures as the net savings accomplished. There are other factors to consider—such as the cost of the tractor and two semi-trailers operating combination being over three times that of our 2½-ton, 6x6, cargo truck; the additional cubage and tonnage of the equipment that will have to be transported to the theater, and many others. However, the figures are still impressive when we consider the reduced tonnage of powered unit spare parts; food, clothing and equipment for personnel; and the requirements for “service troops to serve the service troops” which will result from these savings. In increasing the efficiency of our operation, we have substituted modern

battalion, and an infantry division headquarters!

We must readily admit that long-haul highway transport operations are only one small fraction of the logistical support that must be rendered to combat troops. However, what has been done in this case can surely be done in many more. By a careful study of each one of the thousands of logistical functions, it is entirely possible that similar reductions in requirements may be developed. Hard work, progressive thinking, advance planning, and co-operation can solve the problem of the “division slice” and bring our combat strength into a more realistic position with respect to our total military manpower.

Is the Tank the Best Defense Against a Tank?

Lieutenant Colonel John F. Rhoades, *Armor*
2d Armored Division

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

IN A recent article in the MILITARY REVIEW, the following statement was made: "In general, it can be said that the only way to stop effectively large numbers of tanks is by means of other tanks, thus giving rise to the saying that, on the battlefield, 'armor attracts armor.'" ("Deliberations On Armor" by Lieutenant Colonel Frank F. Carr, MILITARY REVIEW, April 1951.) Certainly we must find the best solutions to the problems posed by meeting an enemy force which is heavy in armor. These "best solutions" must provide an effective means of countering, and preferably destroying, enemy armor on the battlefield. They must also constitute the most efficient use of our own military manpower, of our industrial capacity, and of our matériel resources.

As quoted above, in the last war armor did attract armor on the battlefield. Why? Because armor presented the

greatest threat, on the ground, to the basic arm—the infantry; and because the most effective way to destroy large numbers of tanks in that war was by meeting them with other tanks. At present, it appears to be true that the tank constitutes the best defense against the tank. However, is it desirable that our armored divisions, our corps tank groups, and our infantry division tank battalions be saddled with the primary responsibility of providing for the defense against enemy armor? It is the purpose of this article to study this problem, and to suggest another solution for consideration.

Let Armor Roll!

To understand the problem under consideration, it is necessary to reach a common agreement as to the role of armor. In general, it is true that the role of an arm is determined by the characteristics of that arm. The three distinguishing characteristics of armor are its superior battlefield mobility, its armor-protected fire power, and its tremendous shock effect upon ground troops, when committed in mass. It follows then that armor should be so employed as to exploit most effectively those characteristics. Employ-

Today, tanks are the best defense against armor, and so they may be tied down to defensive, antitank roles. We must develop other weapons that can assume this role, freeing our armor for offensive missions

ment which falls short of this will be necessary, upon occasions. However, it should be recognized that such employment fails to use armor to its best advantage, like using a thoroughbred hunter to pull a milk wagon.

Armor is merely the mobile arm in modern dress. While a new name does not make for new tactics, it is true that new weapons do demand new techniques. Thus, though the role of armor has assumed the historic role of the cavalry, new techniques have resulted in a substantial deviation from the patterns—but not the principle—of employment established for the horse cavalry. Nevertheless, the necessity for determining the best techniques for employing our mobile arm should not and must not cause us to lose sight of the basic role of this arm.

In the offense, this role calls for armor to destroy the enemy's basic arm—the infantry. The proper and most decisive employment of armor capitalizes on the arm's inherent mobility to drive home heavy attacks in a decisive direction and to exploit enemy weaknesses. Thus, armor is used to turn a position, to envelop or roll up an exposed flank, or to hit the enemy before he is prepared to defend himself. When, due to such considerations as the terrain and the tactical situation, its employment, in a decisive role, is not practicable, then the mobile arm should, like the horse cavalry, contribute to the success of the infantry by exploiting its mobility, by performing reconnaissance, counterreconnaissance, covering, screening, or other security missions.

Hit the Profitable Target

Obviously, when employed on one of the secondary (less decisive) missions, one of the responsibilities of the mobile arm is to deny to the enemy the effective use of his armor against our infantry.

That will result in armor fighting and throwing back enemy armor before it can interfere with our infantry. To be perfectly clear, there is no contention that our armor will not have to engage and defeat enemy armor. Our armored units must be capable of breaking through opposing tank formations to get to the enemy installations and infantry. Again, when overwhelming armored forces are massed against us, *all* means must be used to destroy the enemy's main threat—his armor. From the foregoing, it appears that, even though necessary occasionally, it would be undesirable for our commanders to be placed in the position where they would have to divert their tanks from their most profitable target (enemy foot troops and command, supply, and support weapon installations) to engage enemy armor in what is basically a defensive battle designed to prevent the enemy armor from closing with our infantry.

Calculate All Risks

Bearing in mind our present organization and concepts which, admittedly, of necessity, lead to armor attracting armor on the battlefield, let us assume that you command a corps of three infantry divisions and one armored division. The army, of which you are a part, is on the defensive, holding critical terrain, pending a build-up for offensive action. The enemy is heavy in armor.

In placing the armored division under your command, the army commander felt it desirable to attach the heavy tank group, normally part of your corps, to another corps in order to increase its defensive capabilities. The army intelligence reports indicate that the enemy has the capability of reinforcing his attack (now being conducted by three infantry divisions) with two armored divisions within 48 hours.

You know that the enemy has an open flank, and that the terrain in that area

possesses reasonable trafficability and is crossed by no major natural obstacles. You are holding critical terrain which cannot be given up. Your G3 and your armored division commander estimate that a co-ordinated, limited objective attack with the armored division, suitably reinforced, enveloping the exposed enemy flank, would drive the enemy back across a major river obstacle and would result in the destruction of many of his forces. They estimated that the attack could be completed successfully within 36 hours. Your present defensive position is organized in depth and the terrain lends itself to defensive operations. However, no major natural tank obstacle exists in our area. Our air forces have not achieved air superiority in the area and, therefore, cannot be counted upon to delay effectively the approach of the enemy armored divisions.

The army (to which your corps is attached) estimates that it will be several weeks before the build-up will permit the resumption of the offensive. Are you free to take a calculated risk and commit your armored division in the enveloping attack proposed? Should you hold your armored division in reserve so as to provide a strong force able to counterattack the enemy armor, if it is committed in your zone? Should you locate elements of your armored division so as to deepen the antitank defenses along the enemy avenues of approach into your position, keeping part of it in mobile reserve along with one infantry division?

Of course, the problem outlined contains insufficient information upon which to base a decision. However, it does serve to point up two questions. One, what is the role of the armored division? The other, will the corps (and army) commander feel free to use his armor in its most effective role, if we grant that armor is his primary means for defense against enemy armor? Will not enemy

armor, instead of enemy infantry, still continue to attract our armor? If, on the other hand, the corps commander, in the situation just outlined, had available a corps unit which had the mission and the capability of providing for the defense against enemy armored threats of major scale, would he not feel freer to take the calculated risk involved in launching a limited attack, deal the enemy a crippling blow, and thus gain the use of a strong, natural antitank obstacle?

Tanks Are Vulnerable

As a basic assumption, which appears to be accepted generally, and to avoid a discussion of all antitank means organic to infantry divisions, we may assume that our infantry divisions, our corps, and our armies have need of a weapon which can stop a heavy tank with reasonable assurance at a range of at least 1,000 yards.

We have the contention that the tank satisfies this need. According to this school of thought, field artillery cannot stop effectively a moving tank. This contention appears to be valid. The towed antitank gun is believed to be inadequate for the need. Lacking mobility, it is too inflexible, and sufficient fires cannot be massed at the right place at the right time. In addition, the towed antitank gun is too vulnerable to return fires from the tanks being engaged directly, and from the tanks and artillery supporting the tank unit being engaged. The lightly armored, self-propelled antitank gun of conventional design is, in fact, a lightly armored tank. Thus you are confronting a heavily armored tank with a lightly armored tank on equal terms. The result should be obvious. Furthermore, both the towed and the self-propelled antitank gun units are relatively inflexible in use. They are highly specialized organizations of little value except in an antitank defense.

Thus, as far as the present organiza-

tion and equipment are concerned, we must come to the conclusion that the tank provides the most satisfactory means for destroying enemy armor. However, as already pointed out, the desirability of relying on our armored units for this defense is questionable, as it tends to restrict the commander in his employment of his armor in its most effective role. Disregarding this aspect for the moment, is the tank a suitable answer to our problem?

Dilemmas Have Horns

Again, assuming an enemy of major power and very heavy in armor, we must either match him tank for tank or, by using superior tanks and tactics, plan on containing or destroying his armor with numerically inferior forces. If we assume that the new *T-41* light tank can destroy the heavy tanks opposing us and, even if we assume that by capitalizing on its superior mobility and performance, we can meet the enemy with only half as many tanks and achieve superiority on the battlefield, we still will have to produce, transport, and support many thousands of tanks whose primary mission will be the destruction or the containment of the enemy's armor.

David Licked Goliath

Is it impossible for us to design and produce a self-propelled antitank gun which could live on the battlefield in a tank battle? Would the use of such a weapon necessarily have to be so specialized as to render it a single-purpose weapon, and thus uneconomical? What characteristics and capabilities should it have? As a suggestion, we should have a wheeled vehicle with cross-country mobility equal to a tank; with the speed of the light tank (*T-41*) when traveling cross country, and higher when on roads; with a silhouette comparable with that of a jeep, with open top and lightly armored sides (to stop small-arms fire and

shell fragments); and armed with a light, rapidly operated gun powerful enough to penetrate a heavy tank at a range of at least 1,000 yards.

The advantages of such a weapon are many, and quite obvious. Considering its capability to live on the battlefield, it appears that its mobility and its ability to take advantage of the terrain, both while maneuvering and while in firing position, would make it an extremely difficult target for even a stationary tank to hit. Besides being an elusive target, it would be a dangerous target for a tank to engage. The superior observation enjoyed by the gunner of the antitank gun over the gunner in the tank should enable him to get off the first aimed shot. The tank, being a larger target, obviously is more vulnerable. To mention other advantages, due to its light weight, it could be ferried across rivers with little difficulty, thus providing antitank protection in a bridgehead early in an operation. For airborne operations, it would be invaluable. Its great mobility and its lack of weight would permit an easier and quicker massing of antitank defensive fires under difficult conditions than is the case when those fires are provided by tanks.

An Eye to Logistics

The advantages of such a weapon with regard to the logistical support required for it are both many and important. Beginning in the combat zone, it would appear that the amount of maintenance operations would be reduced materially over those required by tanks. The number and weight of spare parts and tools, of recovery vehicles and maintenance equipment, and, probably, of the number of personnel required to support these vehicles would be appreciably less than that required by tanks. Going back further from the battleline, it is apparent that the amount of fuel and lubricants and the number of maintenance and sup-

ply installations would be decreased greatly.

The single problem of overseas shipments is a big item. In the Zone of Interior, the load on our industrial facilities would be much less. The training centers would find it far easier to train drivers and mechanics for this wheeled, vehicle than to train them for tanks. Thus, it appears that the development of such a self-propelled antitank gun would reduce materially the load on our industrial facilities, on our shipping, and on our military manpower.

Do we have any vehicle now which could be adapted to fit these requirements, and which would not require a materially new list of spare parts, tools, and skills? Do we have any weapons now which possess the penetration power and range necessary, and yet are of such size and weight as to permit their being mounted on a small carriage? It is believed that we are so close to having these items now, that it would justify additional intensive research and development pointed to this end. A 6x6 jeep, with self-locking differential, should have the cross-country mobility equal to that of a tank and possess greater road speed. Either a recoilless rifle with "souped up" ammunition or an improved rocket might provide us with a weapon suitable for mounting on a jeep-type carriage, and powerful enough to stop a heavy tank at 1,000 yards or more.

How It Works

One advantage possessed by armored units over the antitank gun or tank destroyer units is their great flexibility of use. Their value is not limited solely to stopping enemy armor. On the other hand, the value of developing a unit so highly specialized that it can perform satisfactorily but one type of mission is highly questionable. Could the "tank killer," described above, be incorporated into an organization capable of perform-

ing other missions, and not be just another "tank destroyer"? Unquestionably, it could.

In World War II, in Europe, the division reconnaissance companies and corps cavalry groups were prevented from accomplishing their missions more frequently by enemy armor than by any other single force. The other major cause of delay was road blocks, as the armored cars with which the units were equipped were road-bound. Consequently, the post-war reorganization of these units made them tank-infantry teams. The cross-country mobility of the light tank, armed with the 75-mm gun, enabled it to operate around enemy armor and road blocks, and outweighed the disadvantages of a tank in a reconnaissance unit.

If the "tank killer" replaced the light tanks in the reconnaissance companies of the infantry division and the battalions of armored cavalry regiments, the reconnaissance companies would have the means for meeting enemy armor, traveling cross country or on roads, without being burdened with a vehicle possessing the weight of the tank. Weak bridges, that could support the weight of normal vehicles but not the light tank, would not prevent them from operating without their protection against tanks, or without their assault gun fire for use against infantry. When the mission of the reconnaissance company is such that it will need tank support, the infantry division has tanks organic to it which could be attached, and the armored cavalry battalions have a medium tank company organic to them.

David Jeep—The Tank Killer

The mission of defending against enemy armor complements the normal missions assigned to these reconnaissance units. The frequent use made of these units to cover a major element's front or flanks positions them nicely for their antitank role. When the situation is vague and

they are needed for reconnaissance, their "tank killer" capabilities will be especially valuable. If, in the case of the armored cavalry regiment, it is desired to build up the regiment by attachments and give it a zone and an objective, the capability of the resultant task force to eliminate enemy armor would be most desirable. Thus, it appears that the proposed change of equipment in the reconnaissance units mentioned would, in no way, detract from the performance of their normal mission, and would, in fact, increase their value in the division or corps. Most important, their presence would tend to make the armored units organic to the division more readily available for employment in their most profitable role.

For example, an infantry division in the attack has a flank exposed to an armored threat. With his "tank killer" equipped reconnaissance company disposed to cover that flank, the commander is able to commit his divisional tank battalion in the attack at the most favorable moment. Admittedly, the reconnaissance company alone is a small force with which to meet an enemy armored attack of battalion size. However, the company will have sufficient mobility to get well out on the flank, to screen a long front, and yet mass its strength when the threat is located and fight a delaying action. The division commander then would have time to gather his other antitank means and to dispose them to meet this attack, before it can affect seriously his contemplated operation. As the reconnaissance company is now constituted, the commander, quite understandably, would be most reluctant to commit all or any of his tank battalion as long as the enemy armored capability existed.

As another example, an infantry division is on the defense. Its position has been penetrated by an enemy tank-infantry force. A division counterattack is

in order. With the reconnaissance company preceding the counterattacking force to supporting fire positions, the division tank battalion, spearheading the actual counterattack, could devote more of its power to the destruction of enemy infantry and less to destruction of enemy armor than is now the case.

Summary

Today, our armored units are our best defense against enemy armor. Consequently, any commander who is confronted with an enemy armored threat of serious proportions must rely upon his organic and attached armor to meet this threat. As a result, our armor is in increasing danger of being tied down to a defensive, antitank role, and becoming less and less available for those offensive missions which will exploit, to the maximum, its mobility, armor-protected fire power, and shock characteristics.

Our armored units must continue to be capable of meeting and destroying the enemy's tanks. However, as much of the burden of the antitank defense as is possible should be taken from our tanks and assumed by a weapon which is cheaper, in dollars and in manpower, to produce, to ship, to support, and to operate in the field. The best efforts of our research and development program should be directed to this end. The resultant weapon should be mobile. It should be incorporated into the mobile arm such as reconnaissance units and armored divisions, where it can support both the infantry and armored elements in the accomplishment of their mission. Armor is the arm which has the best training facilities and concepts for employment of this weapon. Finally, we must guard against becoming so conscious of the antitank value of the tank that we lose sight of the most profitable use for our armored units.

He That Hath Eyes To See...

Lieutenant Colonel Daniel A. Nolan, Jr., *Infantry*
Instructor, Command and General Staff College

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

THE battle for Okinawa ended officially at 1400 on 21 June 1945. At the cost of more than 50,000 Army, Navy, and Marine casualties, our combined forces had wrested, from the Japanese, a superb base which posed a deadly threat to the life lines and home islands of Japan, and from which the invasion of Japan itself could be launched.

Of these more than 50,000 casualties, almost 10,000 occurred between 31 May and 21 June. These might have been avoided since the battle for Okinawa might well have ended on 31 May. That it did not was due chiefly to a failure to see the significance of certain vital factors and occurrences. These were obscured by the pressure of events that occurred all too rapidly, the terrific tension of making vital decisions on the spot, and the "fog of war" that cloaks occurrences whose vital import is not recognized in the turmoil of the moment. In retrospect, the whole battle scene comes into sharper

focus, and both sides of the picture may be viewed simultaneously. We have the records, and we have the advantage of hindsight. To ourselves, to the country whose professional soldiers we are, we owe the exercise of military foresight by examining past battles to perfect our ability to recognize every key piece of the jig-saw puzzle of war, to determine if our doctrine is sound, and to ascertain how that doctrine may be applied correctly. In this case, the doctrines were sound, but their application was faulty.

The omniscience of the historian, or of the student of history, is not, unfortunately, granted to those who make history. War, contrary to an oft-expressed opinion, is not a chess game; neither opponent can look at Mars' board and see the exact position and capabilities of each piece. If the Tenth Army, on Okinawa, had known of the dispositions of the Japanese Thirty-second Army and of the Japanese estimates of the situation, its scheme of maneuver might well have been planned somewhat differently. And had the United States XXIV Corps been possessed of the same knowledge, it undoubtedly would have executed, much sooner, the maneuver that resulted ulti-

Flexibility in planning implies timeliness. The commander in the field must recognize changes in the situation and modify his basic plan quickly to take advantage of opportunities presented by those changes

mately in the Japanese evacuation of their strongest position.

The historical sources of the Archives Section of the Library, Command and General Staff College, are ample, and they have been exploited to the utmost. Nevertheless, there are gaps in the coverage of Operation *Iceberg*—the battle for Okinawa—due, partly, to missing documents, to the nonexistence of such documents as the records of oral estimates of the situation, and to the lack of records of conversations between commanders or of verbally authorized variations in the plans for the execution of written orders. Sources will be cited as they are employed, for, in analyzing a tactical operation, it is well to let the record come to one's aid. But first, the story of the battle as it occurred must be told.

Initial Assault

Storming ashore on Easter Sunday, 1 April 1945, over the Hagushi beaches on the west coast of Okinawa, fully prepared for an immediate and violent reaction from the Japanese garrison, the troops of the Tenth Army's XXIV Corps and the Marine III Amphibious Corps were pleasantly surprised by the relatively light resistance encountered. Rapidly carrying out the army's scheme of maneuver, both corps drove straight across the island to the east coast then turned, the III Amphibious Corps sweeping north, the XXIV Corps swiping south. The Japanese army commander, profiting by the bitter experiences of the Japanese forces on Tarawa, Kwajalein, and Iwo Jima, did not try to meet the United States units on the beaches, but disposed his troops to defend the southern end of the island. He had estimated correctly the site of our landing, and was but 3 days early on the date. However—and this was to plague him until mid-May—he considered that eventually we would land over the Minatoga beaches on the southern

tip of the island and had prepared for that assault. (Figure 1.)

Against stiffening but still moderate resistance, the XXIV Corps, with the 96th Division on the right and 7th Division on the left, reached the L plus 10 phase line on L plus 4 (5 April).

Here, the Japanese made their first determined stand. Along a strong and well-organized outpost line extending the width of the island, the Japanese 62d Division exhibited, for the first time, the tenacious and fanatical defense that was to characterize the entire campaign. Foot by bloody foot, the United States troops slogged ahead, and, by nightfall on 8 April, had driven in or annihilated the outpost garrisons. Then, they were up against the outer ring of the Shuri defenses.

Japanese Counterattack

From 8 April to 12 April, attacks by the 7th and 96th Divisions ground themselves to bits against the formidable Japanese positions. Such bastions as Kakazu, Nishibaru and Tombstone Ridges, Hill 178, and Ouki had broken the momentum of the American drive and brought the advance to a halt. Both American divisions had suffered an average of 375 casualties a day for the period.

Feeling that the loss of momentum by the Americans presented an excellent opportunity for a punishing counterattack, the Japanese army commander hurled an infantry regiment and an independent infantry battalion against the 96th Division on the night of 12-13 April. Although it had artillery and mortar support, in quantity and quality previously unknown in Pacific warfare, the counterattack was repulsed with heavy losses to the Nipponese. The fight raged relentlessly until the morning of 14 April, but the United States troops stood firm.

Once the Japanese counterattack had been destroyed, the XXIV Corps made

plans to crack the outer ring. On the right, the battle-tested 27th Division, initially in floating reserve, had taken over part of the zone of the 96th, which, in turn, had displaced to the east so that each of the three divisions had a relatively narrow zone. Following a tremendous preparation by artillery, navy, and air, the corps attacked: and was stopped.

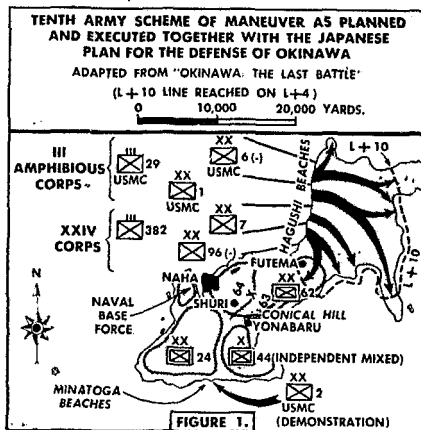
From skillfully prepared, strongly dug-in positions, the Japanese laid down a withering wall of integrated fire that chewed United States units to shreds. Only on the right, where the 27th Division had made a night attack, was there any appreciable advance. In pounding, brutal, frontal assaults against the Japanese lines, the American troops inched ahead, pinching out a strong point here, reducing a key position there, and all the while exacting such a terrific toll of the Nipponese defender that, on the night of 23-24 April, the commander of the Japanese Thirty-second Army ordered a withdrawal to the second ring of the Shuri defenses.

Some readjustments in the American lines were necessary. Accordingly, the 77th Division, which had completed the capture of the Kerama Retto and Ie Shima, relieved the battered 96th Division now depleted by the heavy casualties of that first 30 days. The 27th Division reverted to the control of the Island Command, its place in the line being taken by the 1st Marine Division which had been engaged in the relatively easy conquest of the northern part of the island.

Continued pressure against the Shuri defenses resulted in but meager gains, while a Japanese counterattack, launched during the night of 28-29 April, was no more successful than their first such attempt. The ensuing stalemate was broken by a great counteroffensive designed to hurl the American forces into the sea.

Counteroffensive

Undismayed by the failure of earlier abortive counterattacks, the Commanding General, Japanese Thirty-second Army, gathered his troops for a full-scale counteroffensive that he felt would destroy the Tenth Army. On the morning of 4 May, he flung his fanatic forces at the XXIV Corps' lines. Supported by *Kami-*



kaze attacks on American shipping, and by the greatest volume of fire yet unleashed by Japanese artillery, the 32d and 89th Regiments of the Japanese 24th Division attacked under cover of darkness on 4 May. The 89th attempted to drive through the 7th Division's lines, east of Kuhazu, and the 32d tried to penetrate the positions of the 77th Division in the vicinity of the Maeda Escarpment. Simultaneously, the Japanese 26th Shipping Engineer Regiment and the 23d Engineer Regiment launched amphibious envelopments on the west and east coasts respectively. Despite the sinking or damaging of 17 American ships, and making minor penetrations of the ground battle lines, this major Japanese effort was a complete fiasco from a large-scale, tactical point of view. In its attacks on 4 and 5 May, the Thirty-second Army lost

more than 5,000 first-line troops, all but a few of its tanks, much of its equipment and supplies, and many of its artillery pieces. The waterborne envelopments resulted in the annihilation of both engineer regiments, and the attacks on United States shipping cost 131 planes. Although the counteroffensive was not a *Banzai* attack but a carefully planned, skillfully executed maneuver, the net result was a fruitless expenditure of resources which ultimately hastened the fall of the Shuri defenses.

Tenth Army Attacks

At 070600 May, the Tenth Army assumed direct command of the operations in southern Okinawa and placed the III Amphibious Corps on the right of the line. The 1st Marine Division was relieved from attachment to the XXIV Corps and reverted to the III Corps. The Tenth Army plan of attack was to envelop Shuri on both the east and the west beginning on 11 May. Meanwhile, both corps, the XXIV Corps on the left (east) and the III Amphibious Corps on the right (west), were to continue their advances in preparation for the major attack. By 10 May, all divisions had pushed forward another 1,000 yards, and the 96th Division had relieved the 7th Division on the extreme left flank. The attack, which jumped off at 0700 on 11 May, after an intensive preparation, was, in effect, a continuation of the previous efforts to advance. No preponderance of support was given to any one division, nor were boundaries assigned that would permit the concentration of combat power in any selected zone. So it was the same slow, grinding, frontal attack, with daily progress being measured in yards. Japanese positions along the inner Shuri defense ring could not be overrun individually, since each strong point was so intricately interlaced with the others that parts of several had to be reduced before any specific one would fall. As a consequence, gains were made

but slowly, and it was not until 21 May, when the ridge extending south from Conical Hill was captured, that any major advance could be made.

When Conical Hill fell, and the 7th Division swung down the coastal plain to strike south of Shuri, the Japanese realized that they had to withdraw or die. They chose the former course, and, beginning the night of 22-23 May, evacuated the Shuri position. Unsuspected, initially, by the United States forces, the withdrawal was nearly complete before the Americans awoke to a lost opportunity and realized that the formerly powerful Shuri defenses were held by but a shell of some 5,000 troops. At that time, 30 May, the Japanese, holding open an escape corridor extending south from Shuri to the Yaeju-Dake and Yuza-Dake hill masses, had succeeded in extracting the bulk of their forces from the untenable position. When the 96th Division and 1st Marine Division effected a juncture just south of Shuri, on 31 May, the encirclement was complete; but, like a piece of wet soap, the Thirty-second Army had slipped out of the Tenth Army's grasp.

The remaining 21 days of the battle consisted, first, of a drive southward in heavy rain and mud, against the ineffectual resistance by the Japanese and, then, of a bitter attack against the Thirty-second Army's final defense line. This last assault culminated in the shattering of these defenses and the mopping up of the remnants of the once powerful Japanese forces.

The Key

The really crucial period of the battle for Okinawa occurred when the 7th Division attempted to drive west from Yonabaru to complete the envelopment of Shuri. There were two reasons why this drive, initiated before dawn on 22 May, was not successful until 31 May. One, was that 10 days of torrential rain had washed out the supply roads almost com-

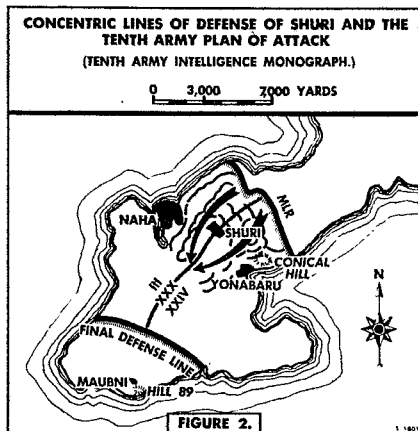
pletely, had prevented the employment of tanks, and had restricted observation to the extent that the use of naval gunfire, artillery, and air support was all but impossible. The other, was that the Japanese had established a line of flanking positions to guard their escape route to the south, and manned them with fanatics who had been ordered to die in their positions, if necessary, to hold off the United States forces. Had the envelopment commenced 8 days earlier, favorable weather would have permitted the full use of the crushing weight of American combined arms, and the attack would have reached the rear of the Japanese defenses before blocking positions could have been prepared and manned.

It appears that during the period 7-30 May, much of what should have been apparent was not seen—particularly the initial rapid progress on the left flank. Part of it was not seen because of an improper perspective caused chiefly by a focusing of attention on an original scheme of maneuver. In effect, the reactions of the commanders to changes in the situation were similar to those of a spectator at a boxing match who devotes his attention to only one of the fighters. He sees his man block and deliver punches, but fails to appreciate the effectiveness of the opponent's blows. In this case, the army plan to envelop Shuri had been developed by the XXIV Corps into a scheme of maneuver which actually was a penetration of the right center of the Shuri line. Hence, the slow progress of the attempted penetration was foremost in the higher commanders' consideration, and the significance of the relatively rapid advances on the coastal flank was not appreciated fully, or, in any event, was not exploited soon enough.

Plans and Orders

It is extremely difficult to reconstruct the scheme of maneuver of the Tenth Army. Apparently, it was a double en-

velopment of the town of Shuri itself, rather than of the positions defending Shuri, and was considered as more likely to be successful on the right (west) flank than the left owing to better terrain



and weaker Japanese positions. Based on the text on page 312 of the official history, *Okinawa, The Last Battle*, and in a footnote to that page, it appears that the Commanding General, Tenth Army, conceived of the attack as a continuation of previous tactics, that is, uniform pressure across the front with a pinching out of strong points. However, the Tenth Army's orders for this attack did not indicate this concept. The footnote referred to above is quoted because of its bearing on the matter.

3. Tenth Army Operation Order 8-45, 7 May 1945; interview with the ACOFS, G3, Tenth Army, 9 July 1945. There is still some question as to the precise scheme of maneuver. The Tenth Army operation plan overlay, which, according to the text of the plan, was to show the scheme of maneuver more precisely than the order itself, indicated a very close envelopment of Shuri by the two divisions immediately north of the Japanese headquarters city. The XXIV Corps field order indicated pressure across the line by both its divisions, rather than a major effort near the center of the army line. Despite the scheme of maneuver outlined on the Tenth Army overlay, it seems that the actual plan was for uniform pressure across the line which would crack the Japanese defenses at some point and be immediately exploited wherever the particular break might come.

Considering the scheme of maneuver and the distribution of forces of the Tenth Army and XXIV Corps, and comparing them with current doctrine, shows that something was amiss. The Tenth Army order is precise, but the XXIV Corps order for carrying it out apparently is not a direct development of the army plan.

Operation Order 8-45 of Tenth Army, dated 7 May 1945, states, in paragraph 2a:

Tenth Army will attack south with corps abreast, III Phib Corps on the right, to destroy the enemy forces in southern Okinawa. Initially, it will envelop and reduce the Shuri position and divide the enemy forces by seizing the hill masses in the area Karara (7767)—Kamizato (8066). Thereafter, it will be prepared for further advances.

This statement of the mission is further amplified in paragraph 3 of the operation order and in an operation overlay attached to it as Annex 1, both indicating that the prescribed envelopments would be made by main efforts on the boundary between the corps.

Operation Order 50, Headquarters, XXIV Corps, dated 9 May 1945, sets forth the corps' mission in paragraph 2, and states specifically that the corps will:

b. Seize initially the Shuri hill mass in its zone of action, assisting the III Phib Corps in the capture of that portion of this hill mass in the latter's zone of action.

c. Capture the hill masses in the Kamizato—Yonabaru area (See Annex 1, Opn Overlay), and prepare to continue the attack farther to the south.

The order further directs the right division, the 77th, to make its main effort on its left, and the left division, the 96th, to make its main effort on its right to capture the high ground east of Shuri, and then, moving southeast and east, capture Conical Hill. This scheme of maneuver is shown in Figure 3, which is an adaptation of the corps operation overlay to a sketch of the area. Note the lack of precise objectives and, in particular, the direction-of-attack arrow leading to Conical Hill.

Dispositions and Support

From the foregoing, it is apparent that the planned envelopment of Shuri was, in effect, a multiple penetration and should have been executed as such. The disposition of forces and allocation of support should have been those required for a penetration. They were not.

The Tenth Army was disposed for this attack as follows: On the right (west) was the III Amphibious Corps, consisting of the 1st and 6th Marine Divisions; on the left (east) was the XXIV Corps, composed of the 7th, 77th, and 96th Infantry Divisions. The divisions in line, from right to left, were the 6th Marine Division, 1st Marine Division, 77th Infantry Division, and 96th Infantry Division. The 7th Infantry Division—minus one regiment—was in XXIV Corps reserve while the army reserve was to be a regiment of the 7th Infantry Division. The status of this regiment, the 32d Infantry, was somewhat anomalous; by army order it was to be available as the army reserve on 12 hours' notice. The XXIV Corps, however, while stating this in its order, attached the regiment to the 77th Division as the division reserve not to be committed except on orders of the corps commander.

Frontages gave little clue as to the locations of the two main efforts. The III Amphibious Corps had a 4,000-yard front, and the XXIV Corps, one of approximately 6,000 yards. Within the respective corps zones, the 6th and 1st Marine Divisions each had a frontage of about 2,000 yards; the 77th Division was assigned a 2,500-yard frontage; and the 96th Division, one of some 3,500 yards. In view of the nature of the terrain, the strength of the Japanese positions, and the depleted strength of the divisions, these frontages hardly could be considered as narrow.

In respect to the battalions of artillery assigned to the two corps, the support was

about equal. However, reinforcing missions gave a preponderance to the III Amphibious Corps. Of the total of 35 battalions available, none remained under army control. The III Amphibious Corps artillery consisted of five 155-mm howitzer battalions, three 155-mm gun battalions, and two 105-mm howitzer battalions. The XXIV Corps artillery was composed of four 155-mm howitzer battalions, two 155-mm gun battalions, three 105-mm howitzer battalions, and one 8-inch howitzer battalion. The Tenth Army ordered the XXIV Corps to give priority reinforcement to the III Amphibious Corps throughout the latter's zone with two 155-mm howitzer battalions and two 8-inch howitzer batteries, receiving, in turn, from the III Amphibious Corps the reinforcing fires of one 155-mm howitzer battery and one 155-mm gun battery. No reason for such switching of fires was given, nor is one apparent at this date.

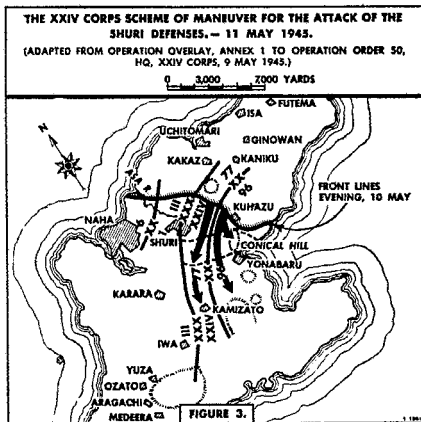
The XXIV Corps' plan of artillery support carried out the army order which, in effect, left it with two less 155-mm howitzer battalions and two less 8-inch howitzer batteries. The remainder of the corps artillery, including the four battalions of the reserve 7th Division, was so assigned that the 77th Division received the reinforcing fires of one 155-mm howitzer battalion and two 105-mm howitzer battalions, and the 96th Division the reinforcing fires of one 155-mm howitzer battalion and one 105-mm howitzer battalion. In addition, during the 30-minute preparation preceding the attack, one 155-mm howitzer battalion was to reinforce the fires of the 96th Division, and thereafter reinforce the fires of the 77th Division; another 155-mm howitzer battalion was to reinforce the fires of the 77th Division, thereafter reinforcing the fires of both the 77th and 96th Divisions. The two 155-mm gun battalions were to provide counterbattery, long-range interdiction, and harassing fires. For the attack proper,

the tabulation of reinforcing fires for the two divisions would be:

77th Division—two plus 155-mm howitzer battalions and two 105-mm howitzer battalions.

96th Division—one plus 155-mm howitzer battalions and one 105-mm howitzer battalion.

There was, thus, on the part of the Tenth Army, no specific disposition of



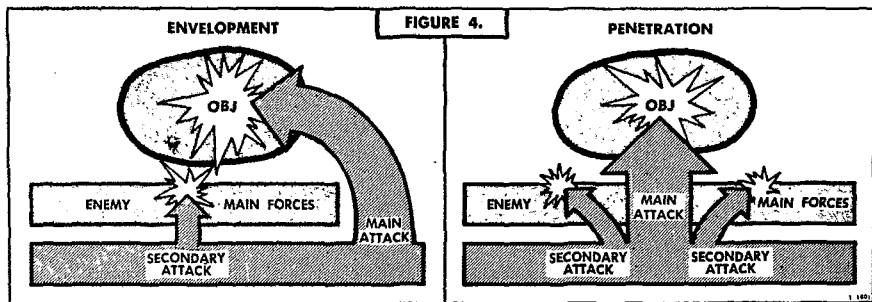
forces or allocation of support to carry out its planned envelopment. Indeed, by prescribing the axes of the main effort that it did, the army, in effect, limited each of the corps to the conduct of a penetration. We have, then, the strange situation of an army planning a *double envelopment* but disposed for a *frontal attack*, with its two corps ordered to direct their enveloping efforts along axes that required a *penetration* of the Japanese main defenses.

Current Doctrine

Consider for the moment our present and past doctrine on envelopments and penetrations. Field Manual 100-5, *Field Service Regulations—Operations*, defines an envelopment as an attack maneuver in which "the main attack is directed against

the flank or rear of the initial disposition of the enemy's main forces and toward an objective in rear of his front lines." As opposed to this, a penetration is an attack maneuver in which "the main attack passes through some portion of the area occupied by the enemy's main forces and is directed against an objective in his rear." The difference between these

of attack of the two divisions, of necessity, had to be divergent. Inasmuch as the Shuri position had to be enveloped, and the direction of that main effort was *through* rather than *around* the main disposition of the Japanese forces, it was essential that the corps protect the left flank of the enveloping force, this being, of course, more an element of the pene-



two maneuvers is shown diagrammatically in Figure 4.

There is no need to quote extensively from the paragraphs of Field Manual 100-5 that deal with attack maneuvers. It is enough to say that in the attempted double envelopment of Shuri, the Tenth Army should have employed three major tactical groupings: a secondary attack grouping along the center of the line, and a main attack grouping on each flank. These main attack groupings should have had the strongest possible support by the navy, artillery, and air.

Since the whole pattern of maneuver actually was that of a multiple penetration, we can best examine the results of this plan by considering what the XXIV Corps did in planning its role in reducing the Shuri fortress.

Scheme of Maneuver

Apparently the corps recognized the importance of Conical Hill, as well as the potential threat posed by the hill masses south of Yonabaru. Thus, the directions

of attack of the two divisions, of necessity, had to be divergent. Inasmuch as the Shuri position had to be enveloped, and the direction of that main effort was *through* rather than *around* the main disposition of the Japanese forces, it was essential that the corps protect the left flank of the enveloping force, this being, of course, more an element of the pene-

tration than the envelopment. As we know now, the threat of the hill masses south of Yonabaru was negligible, but, at the time, the inclusion of that area as an objective was tactically sound. It is impossible to say that the XXIV Corps would have been more successful if the corps' scheme of maneuver had been a penetration, rather than a combination of the envelopment and penetration. For one thing, it was essential that the 7th Division be rested and rehabilitated. After 40 days of some of the fiercest fighting in United States history, the division was badly battered and at less than 80 percent strength, despite the receipt of many replacements. For another thing, the jumbled coral hill masses in this part of Okinawa provided ideal defensive terrain which had been highly organized by the Japanese. Thus, the resistance might have been just as tenacious, and the operation just as lengthy, whatever the scheme of maneuver. Of all factors in this particular situation, the terrain was pre-eminent.

Terrain

On the east coast lay Conical Hill, sprawled like a giant starfish thrown up by a monstrous Pacific tide. From its peak, towering nearly 500 feet above the bare coastal plain, radiated five main ridges. Two of these ridges extended north and northeast about 1,000 yards; one reached northwestward, to join with the remainder of the hill mass guarding Shuri; a fourth ran eastward, down to the coastal plain and ended about 500 yards short of the water line; and the fifth was a spiny tentacle, reaching 1,000 yards south toward Yonabaru, studded with coral knobs that marked the intersection of four finger ridges stretching toward the sea from the main ridge.

West and northwest of Conical Hill was a nightmare complex of earth-topped coral hills. Each mound contained caves and field works, skillfully integrated by the Japanese into a defensive position as strong as could be found anywhere in the world. The broken terrain, scarred by draws and dried up stream beds, with cuts for poor, narrow roads, and studded with coral outcroppings, was an attacker's inferno and a defender's paradise. Every hill was protected by at least two others and every coverless frontal approach had been turned into a death trap. No one position could be overrun readily; the northern slope of each first had to be pounded to rubble, then seized and mopped up. Bit by bit, the rest of the hill had to be reduced to serve as a springboard for another agonizingly slow advance to the next hill. (See Figure 5.)

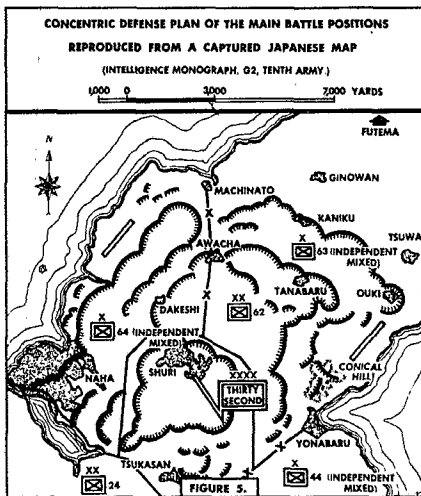
'Monday Morning Quarterback'

A penetration of the Japanese positions in this difficult terrain should have been made on a narrow front, in sufficient strength to breach the main defenses, hold open the gap thus created, and seize the dominant elevations of the Shuri hill mass. This could have been done—as we know now,

One way in which it might have been done is illustrated in Figure 6. This scheme of maneuver and distribution of forces would have provided for:

1. The seizure of Zebra Hill (Objective 2) by the 382d Infantry, 96th Division, and of Hill 138 (Objective 1) by the 306th Infantry, 77th Division, thus opening Kochi Valley as an avenue of approach to Flattop and Dick Hills (Objectives 3 and 4), and, ultimately, to Tom and Oboe Hills (Objective 5).

2. The widening and deepening of this gap by the seizure of Wart and Flattop



Hills by the 307th Infantry, and of Dick Hill by the 381st Infantry.

3. The capture of Tom and Oboe Hills by the 32d Infantry, 7th Division, thus securing the dominant elevations of the Shuri hill mass, and providing a base from which the remainder of the 7th Infantry Division could exploit the successful penetration.

Estimating a minimum time to execute this maneuver, the 7th Division would have had little rest, since it had been relieved by the 96th Division on 10 May. How-

ever, the 32d Infantry had been in division reserve since 1 May, and would have had 11 days for rest, rehabilitation, and the receipt of replacements prior to being committed to seize Oboe and Tom Hills on 13 May.

Actually, the scheme of maneuver of the

of that hill to permit the 7th Division, as it did ultimately, to sweep south along the coastal plain and turn west in the Naha-Yonabaru Valley.

In this plan, the initial secondary attack would be executed by the 77th Division along a 3,500-yard front, while

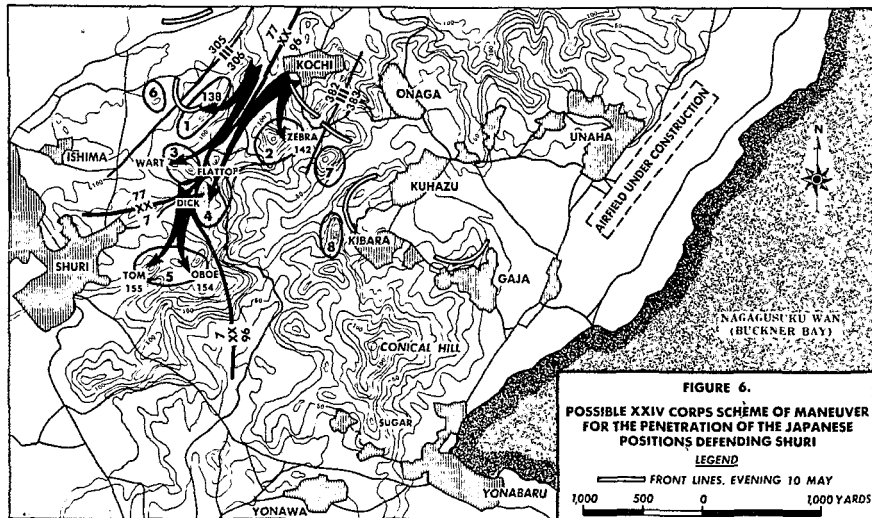


FIGURE 6.

POSSIBLE XXIV CORPS SCHEME OF MANEUVER FOR THE PENETRATION OF THE JAPANESE POSITIONS DEFENDING SHURI

LEGEND

FRONT LINES, EVENING 10 MAY
1,000 500 0 1,000 YARDS

corps, as carried out, was quite similar to this except that there was no massing of effort and support, with the specific purpose of achieving a break-through of the Japanese positions in a selected spot. Moreover, there was no convergence of the efforts of the assault divisions, and no secondary objectives selected to contain and deceive the enemy.

Figure 6 shows a scheme of maneuver for implementing the army order, as given, and for massing the main effort in the prescribed zone. Figure 7 shows the envelopment of the Shuri position as it might better have been conceived by the army, and executed by the XXIV Corps. It envisages a delayed end run, since the restricted maneuver room between Conical Hill and the sea necessitated the seizure

the 96th Division launched the initial main effort on a 1,500-yard front. The objectives of the 96th Division would be the seizure of Conical Hill (Objective 4), and the ridge running south to Sugar Hill (Objective 5). Once these objectives had been seized, the secondary effort would consist of strong pressure along the periphery of the Shuri line by the 77th and 96th Divisions, while the main effort would be a drive to the south and then west by the 7th Division, to the high ground in the vicinity of Chan (3,500 yards southwest of Yonawa).

The seizure of the initial objective, Conical Hill, by the 96th Division, could have been effected in this manner: strongly supported by artillery, naval gunfire, and air, the 383d Infantry could have

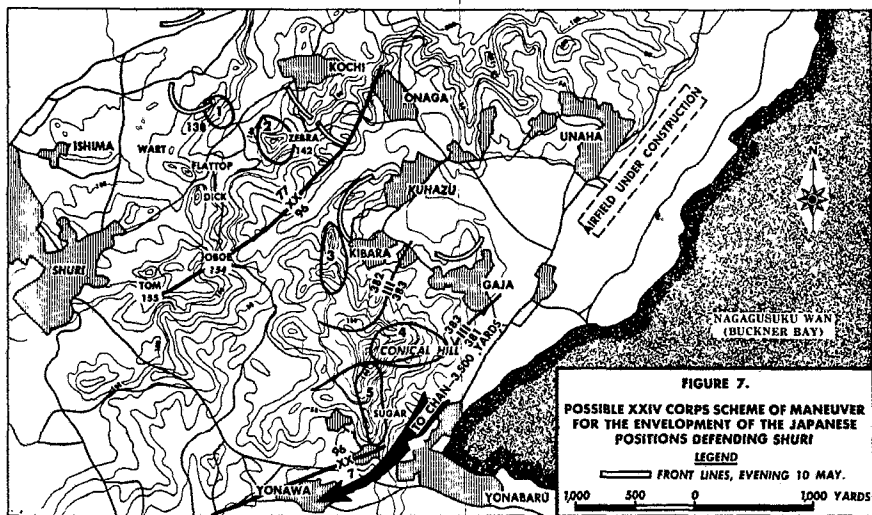
driven to the northern slopes of Conical Hill by the night of 11 May (as it practically did). During the night, or, at the latest, during daylight on the 12th, the 381st Infantry could have been committed to "peel off" down to the hogback running south, seizing, at least, the military crest, and permitting the 7th Division, led by the 32d Infantry, to swing down the coastal corridor to begin the envelopment proper on the 13th.

The action, suggested above, actually took place, but it required 10 days instead of 3. The corps commander was alert to the opportunity that presented itself when Conical Hill appeared to be susceptible of capture from the north, and planned to commit the 7th Division around the eastern flank when that critical terrain feature, and the hogback running south from it, were under our control. This was not possible until 21 May. On 22 May, a

rounded and destroyed. General Ushijima, ably abetted by "General Weather," was able to withdraw the remnants of his Japanese Thirty-second Army, some 15,000 in all, to a final defensive line in the Yuza Dake-Yaeju Dake area.

Lessons and Conclusions

In studying this campaign now, we have the tremendous advantage of hindsight. It is easy to say, as does *Okinawa: The Last Battle*, that "the wide flanking maneuver around Shuri that later developed was not projected in the original plans," and "after the battle for Okinawa, the Commanding General, XXIV Corps, stated that he had planned to use the 7th Division in such a maneuver even before the division had been relieved, and before the attack of 11 May." In the *Okinawa Diary, XXIV Corps*, under the date of 13-20 May 1945, data are found which indicated that the



10-day period of rain began that averaged 1.11 inches a day. The envelopment failed.

It failed, although the tactical maneuver was accomplished eventually, because the enemy troops were not sur-

rounded and destroyed. General Ushijima, ably abetted by "General Weather," was able to withdraw the remnants of his Japanese Thirty-second Army, some 15,000 in all, to a final defensive line in the Yuza Dake-Yaeju Dake area.

We have the further advantage of knowing now something of the Japanese estimates, dispositions, and actual maneuvers.

Specifically, we know (and the source is given):

1. The Japanese estimated that the main effort of the United States attack would consist of an attempted break-through along the Futema-Shuri highway—800 yards west of the axis of the XXIV Corps' main effort. (XXIV Corps Translation Batch No 385: Night Attack Plans for 10 May.)

2. The bulk of the Japanese Thirty-second Army had been gathered into the Shuri position after the failure of the counter-offensive of 4-5 May. (Thirty-second Army Orders Nos 198, 23, and 37: from a translation in the Tenth Army Intelligence Monograph.)

3. The Thirty-second Army did not intend to defend to the last in the Shuri position. (*Okinawa: The Last Battle*, pages 387-388.)

4. The Japanese expected our thrust toward Conical Hill to come as it did originally along the ridge leading in from the northwest, and were prepared for it. (Various maps of enemy dispositions, prisoner of war interrogations, and Thirty-second Army Orders No 23, translated in the Tenth Army Intelligence Monograph.)

5. The Japanese withdrew from Shuri during the period 22-29 May. (*Okinawa: The Last Battle*, pages 392-394, and the G2 Weekly Summary, Tenth Army, 262400 May-022400 June 1945.)

6. There was no real offensive threat from the high ground south of Yonabaru strong enough to necessitate the protection of the left flank of the enveloping force by an entire regiment. (G2 Report No 58, Tenth Army, 220001-222400 May 1945.)

Knowledge such as this usually is not vouchsafed to commanders at the time when decisions must be made. Often, however, it is there—vague, concealed, and un-integrated—but still there for those who can see and use it, as in this case. Our military history, outstandingly successful

as it has been, is filled with instances in which a preconceived tactical plan was executed as initiated originally, regardless of those developments in a situation which indicated the value of a change in the plan. We preach flexibility and we decry rigidity, but often we are guilty of being flexible too late.

Conjectures as to what might have or should have been done are valueless in themselves. The real worth of a historical study, such as this, lies in pointing out the existence of positive indications of more profitable courses of action that were there if one looked for them. The intent is not to criticize, but to analyze critically, so as to increase our knowledge. Therefore, let us consider the major factors which pointed toward the early adoption of an envelopment. We must rule out the prior planning of the envelopment, because of the Tenth Army's specific order that the main effort of the XXIV Corps be made along the boundary between divisions.

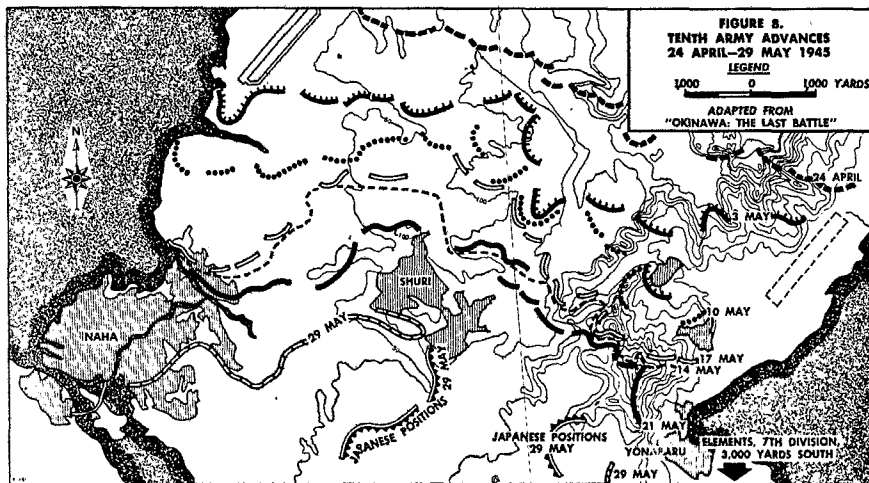
First, was the tactical importance of Conical Hill appreciated? Yes, it was! Note the direction-of-attack arrow pointing to the hill in the XXIV Corps' Operation Overlay (Figure 3). Also, on the night of 12 May, upon noting the position of the units of the 96th Division (2d Battalion, 383d Infantry), on the northern approaches to Conical Hill, the XXIV Corps commander remarked to his chief of staff that the corps would have the key to the Shuri line if that infantry unit could capture the hill. Moreover, early in June 1945, General Buckner, in a letter to Major General James L. Bradley, commanding the 96th Division, stated, in part:

While all divisions in the line have contributed to this end, I regard the capture of Conical Hill by the 96th Division as the most important single factor in the collapse of the Shuri position, since it opened the way for an envelopment of the hostile right and forced the enemy's immediate withdrawal.

Second, was there any difference in the average daily length of advances between

the left (east) elements of the XXIV Corps and the right units (assaulting the center of the Shuri position), that should have pointed toward the opportunity to exploit a success on the left? Yes, there was!

the overlays showing front-line positions (Figure 8). Nevertheless, a quick glance at the table shows that during the period 11-15 May, the steady advance on the left exceeded advances on the right by some



From the G3 Reports, XXIV Corps, for the period 7-19 May, a table of average gains can be made. It reveals a considerable difference, especially since, on the evening of 7 May, the units on the left flank were about 2,000 yards in advance of those on the right.

DATE	LEFT (Main Effort) (In Yards)	RIGHT (Second- ary Effort) (In Yards)	RELATIVE DIFFERENCE (In Yards)
7 May	200	500	2,000
8 May	No Gain	No Gain	2,000
9 May	No Gain	No Gain	2,000
10 May	No Gain	100	1,900
11 May	400	300	2,000
12 May	250	125	2,125
13 May	700	No Gain	2,825
14 May	300	No Gain	3,125
15 May	250	250	3,125
16 May	No Gain	225	2,900
17 May	200	500	2,600
18 May	400	No Gain	3,000
19 May	200	No Gain	3,200

The table does not give as graphic a picture as does a comparative study of

1,300 yards, a considerable difference in an operation in which daily progress is measured in yards.

Third, could Conical Hill and the hog-back running south therefrom have been secured prior to 21 May? Yes! When the 383d Infantry seized the northern slopes of Conical Hill on 13 May, the time was ripe for the 96th Division "to shoot the works." Weather generally was good during the ensuing week, except for the morning of the 15th and all day on the 19th. Naval gunfire and air support were more than ample; the XXIV Corps was supported by a daily average of one battleship, two heavy cruisers, one light cruiser, and three destroyers. Seventy tons of aircraft bombs, rockets, and napalm were dropped daily, and strafing took place each day during the period 11-17 May. Gunfire support ships were operating in Buckner Bay, and rocket ships were available for use. Mov-

ing under the cover of darkness to positions just east of Conical Hill, the division reserve, the 1381st Infantry, could have attacked on the morning of 14 May supported by tanks, naval gunfire, and air and seized the eastern slopes of Conical Hill and the hogback. True, there would have been casualties. Without doubt, there would have been tanks lost in the mine fields in the coastal flats, and to antitank fire. However, on 15 May, a corridor would have been secured for the launching of the 7th Division in the envelopment of Shuri; eight good, clear, dry days prior to the time it actually occurred, and was stalemated by 10 days of rain and mud.

What was there to be seen was not seen.

The hustle and tension of combat, the strain of making decisions upon which depended the lives of thousands, the numbing fear of daring too much and losing all, the amorphous picture of the enemy, all are too easy to forget when battles are viewed in retrospect. But if we study the campaigns of the last war with an eye to finding events and incidents on which the course of the battle turned—or might have turned—we will train ourselves most effectively to spot them when they actually occur in the turmoil of combat, and take advantage of the opportunities they present. He that hath eyes to see—LET HIM SEE!

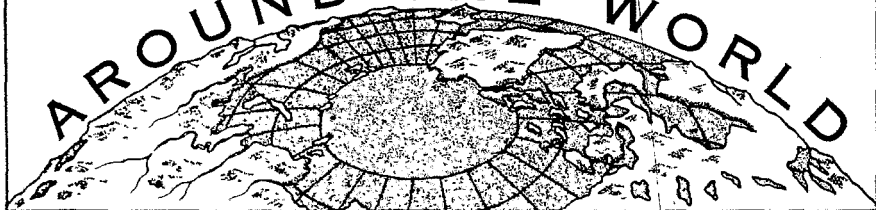
Arms-race security alone would be a fragile security at best—at worst it could presage economic disaster.

We must not permit ourselves to be stampeded into abandoning all of our long-range plans to prevent war. Instead we must maintain a balance, employing our resources wisely, and directing our efforts in such manner that neither by weakness do we invite military disaster, nor by inordinate military preparedness invite economic disaster.

General J. Lawton Collins

MILITARY NOTES

AROUND THE WORLD



UNITED STATES

Point Four Technicians

The United States now has 359 technicians at work in 28 countries under the Point Four program of technical assistance to underdeveloped areas.

In addition, 255 persons from 35 countries are receiving specialized training in the United States, training which they are expected to use upon their return home. United States technicians are giving assistance on such projects as agricultural collaboration, health and sanitation, transportation, development of mineral resources, geologic investigation, fisheries, and statistical reporting.—News release.

Record Load

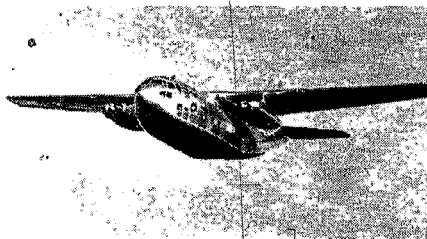
The Air Force's *C-124 Globemaster II* has flown with a maximum weight of 210,000 pounds, including a pay load of more than 70,000 pounds—the heaviest load ever lifted by a production transport airplane.

The test, in which design take-off gross weight was exceeded by 35,000 pounds, was made under standard aircraft characteristic conditions to determine maximum load carrying capabilities of the Air Force's largest operational cargo and troop carrier.—*Army Navy Air Force Journal*.

Jet Transport

A jet powered version of the Air Force's *XC-123*—the *XC-123A*—recently completed its first test flight.

Both the *XC-123* and the *XC-123A* were developed from the *CG-120* all-metal cargo



The Air Force's new *XC-123A* jet transport. The new *XC-123A* is powered by four J-47 turbojet engines rated at 5,200 pounds of thrust each.—Department of Defense release and photo.

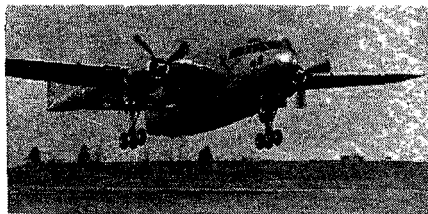
New Penicillin Available

A new penicillin has become available for the public. It has about the same range of activity against germs as the old drug, but it causes no allergic or side reactions that have made some penicillin cures almost as bad as the diseases for which they were taken.—News release.

New Tandem Gear

A tandem-type gear installation has been developed to provide *C-119 Packets* with a wider landing "footprint."

The new gear will increase the utilization of *Packets* for landing on unprepared fields with rough sod or soft surfaces. The



C-119 equipped with experimental gear.

experimental gear resembles the one currently used on production models of the *C-119* in that it consists of the same essential strut arrangement. However, in place of the axle carrying two side-by-side wheels, a truck has been mounted on a pivotal fitting on the main oleo strut which carries four wheels, slightly smaller than those used on the present production version of the *Packet*.

Nacelle doors have been modified to accommodate the bulk of the extra wheels. A larger nose wheel has been installed on the experimental ships.

An added feature of the gear is a cable and air cylinder which combine to keep the two front wheels slightly higher with respect to the runway or other landing surface than the rear wheels, when the gear is fully extended. On landing, the rear wheels strike first, and as the oleo strut is compressed by the weight of the plane settling to the runway, slack in the cable permits the front wheels to rock forward on their pivotal hinge and settle down on the runway. This feature provides a softer landing, since weight is dispersed gradually on all landing surfaces.—News release.

Engine Containers

The Air Force is using large steel containers in which huge jet engines can be shock-mounted and sealed against humidity. The special containers protect jet engines both from damaging vibrations in transit and from the harmful effects of moisture during storage over indefinite periods.

During an amphibious operation, engines in these containers could be lowered overboard and floated ashore without damage.—*Army Navy Air Force Register*.

Hot Flame

A torch as hot as the sun's surface was demonstrated recently by the Temple University Research Institute.

A tiny blue flame with a temperature of between 9,000 and 9,500 degrees Fahrenheit—believed to be among the highest sustained laboratory temperatures obtained by man—quickly burned a hole through the most fire-resistant material known.

The demonstration included burning through a 3-inch concrete wall in 2 minutes with a torch which burned powdered aluminum in oxygen.

Researchers said the torch would be invaluable in rescue work to remove trapped persons quickly, especially in enemy air attacks.—News release.

Medical Research

Ten universities and medical schools have received funds from the Navy to carry out a new program of research on "flash" burns—injuries which might result from exposure to an atom blast.

The new program will encompass the chemical, physiological, and biophysical aspects of burns. From the research, it is hoped, will emerge new means of protecting military and civilian personnel from injuries and new methods of treating flash burn casualties.—*Army Navy Air Force Register*.

Ammunition Boosters

The Army has ordered a quantity of ammunition boosters to be used in caliber .50 machine guns mounted on vehicles. This device, which has been used heretofore only on aircraft, is designed to feed the ammunition to the machine guns at a fast, even rate, eliminating "drag" of the ammunition belt. It is powered by a small high-speed electrical motor.—*Combat Forces Journal*.

TV Recordings

Military personnel at 57 overseas points soon will be able to see kinescope film recordings of television programs from the United States, according to a plan formulated by the four video networks and the Department of Defense. Initiation of the plan awaits the reaction of the sponsors, who have been asked to share the cost of the operation with the networks.

Each week, 4½ hours of programs would be recorded on 16-mm film for shipment to foreign bases, where the films would be projected on movie screens for military personnel. The programs are to be selected from among the combined features of all the networks by a special board of military authorities.—*The New York Times*.

Automatic Air Brake

An automatic air brake has been developed for use in high-speed aircraft. This device, similar to a governor on an automobile, restricts the speed of the plane to the limits for which the framework and wings are designed.

Latest jet engines and rocket engine developments make it possible to drive planes so fast that there is danger that the engine platforms, airframe, and wings might fail.

The new brake works automatically from a speed-measuring device.—*Science News Letter*.

Stretcher Lift

Loading and unloading patients in military transports will be facilitated greatly through the use of an electrically operated stretcher lift developed by the Douglas Aircraft Company.

Weighing less than 140 pounds, the lift is stowed easily in the airplane and may be put into operation within a minute. It has a capacity of two patients, or a total



Nurses adjust straps on patients while crew chief stands by at the lift controls. of 500 pounds when used to load or unload general cargo.

Use of the lift, which has been ordered by the Military Air Transport Service (MATS) for its air evacuation operations, ensures a fast, safe, and comfortable means of transferring stretcher patients between the ground and the plane.

Patients remain in a level, prone position while the single arm of the lift swings through an arc which ends 30 inches from the ground and 30 inches from the cabin floor. Time required to complete the arc is less than 15 seconds.—*News release*.

Water Tunnel

The Navy has announced that its civil engineers are completing the largest water tunnel in the Hawaiian Islands to assure an adequate water supply for Pearl Harbor and nearby Honolulu.

The job of digging the tunnel started almost 2 years ago. When completed, it will be capable of supplying 45 million gallons of fresh water a day.—*Army Navy Air Force Journal*.

Artificial Limbs

A new electronic arm, powered by a small motor, and a prosthetic leg, equipped with an efficient hydraulic mechanism, are two of the latest developments in artificial limbs.

The arm, still in its development stage, operates when the body muscles trip switches of the small 4-ounce motor, which is equipped with small batteries. One switch opens and closes the hand, another twists the wrist, and the third flexes it.

The new artificial leg has great promise for crippled veterans. Unlike the conventional limb, it does not collapse suddenly when a patient trips. It allows a resistance to falls, which often permits recovery of balance.—*The New York Times*.

Communist Tactics

A compulsory course aimed at acquainting students "with the operation, strategy, and tactics of Soviet power in the United States" is to be included this fall in the curriculum of the University of San Francisco.

Students not only will be required to attend lectures and consult the institution's library on communism, but they will have to make personal investigations of Communist activity in San Francisco and submit reports and term papers based on these inquiries.—*The New York Times*.

Operation 'Coldfoot'

A coast and geodetic field survey team has gone to work at Point Barrow, Alaska.

Known as Operation *Coldfoot*, the survey calls for a detailed study of the coastal and inshore water areas of the entire Arctic coast line of Alaska. The survey field party's job includes photogrammetric compilations of the land areas, hydrographic surveys, and triangulation—a highly accurate and rapid method of ascertaining positions on the earth's surface by measuring angles on previously determined positions.

Logistic support for the party's headquarters at Point Barrow and base camps at Pitt Point and Milne Point will be provided by the Air Force.—*All Hands*.

Industrial Use of Atoms

More industrial uses for fission products from atomic piles are being searched out on a nation-wide scale by the Stanford Research Institute in a study for the Atomic Energy Commission.

The plan is to let industries know how fission products can help them and to get some idea of all possible uses for these products.

Among the uses suggested for fission products are the sterilization of foods and drugs in containers without heat, production of fluorescent lights and of new types of luminescent paints and tiles, and the tracing of pipe-line flow.

Fission products are highly radioactive elements produced by the splitting of uranium in nuclear reactors. They are of no use for power, but their energetic radiations can kill certain organisms, cause chemical reactions, and penetrate solids.

Although these fission products are being used to a certain extent now by many industrial concerns, there are many unexplored possibilities.—*Science News Letter*

National Guard Organization

The 5,000th Army National Guard unit recently received Federal recognition, thereby reaching a major goal of the National Guard Bureau.

This goal was set in 1946 when the Department of the Army allotted the Army National Guard a total unit strength based on the round figure of 5,000 units.

Of the 5,000 units, approximately 25 percent already have been called to active duty, and some have been committed to combat in Korea.—News release.

'Exposure Suit'

The Air Force, having developed a new electrically heated flying suit, has designed a garment to protect airmen forced down at sea.

A double-duty "exposure suit," the new coverall is intended for continuous wear during flight, fitting over conventional wool clothing. It is made from rip-stop nylon, coated with a double layer of chloroprene that makes it impervious to water and protects the nylon from abrasion.

Valves on the 7½-pound suit permit plug-in for electrically heating clothing. Production models will be dyed a bright yellow to aid search and rescue operations.—*Armed Force*.

Standardization Progress

Canada, Great Britain, and the United States have agreed to standardize more than 400 army items, including the new American *Walker Bulldog* light tank.

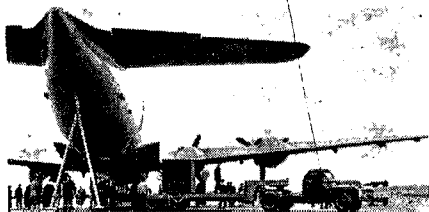
Other weapons accepted as standard include 8-inch, 75-mm, and 240-mm howitzers. Equipment items include fuels, lubricants, and electric system voltages.

Department of Defense officials say that the standardization progress so far fore-shows the eventual acceptance of most of the weapons by the other North Atlantic Treaty nations.—*The New York Times*.

'Flying Printing Press'

A new mobile "flying printing press" that provides printing facilities for on-the-spot reproduction of aerial charts, maps, and reconnaissance photographs has been developed for the armed forces.

The unit is an 8,000-pound package containing a Harris offset printing press and all the tools, auxiliary equipment, and



Above, a packaged printing press being unloaded from a C-124. Below, pressmen disassembling the container which doubles as a completely equipped press room.



printing supplies ordinarily found in a well-equipped press room. The shipping container is made of cabinets and panels which break down to form all the press room facilities needed for immediate operation.

It has a maximum capacity of 6,500 22½ x 30 inch sheets an hour, and can be powered to operate on either AC or DC current.

The press is designed for use at advance airstrips and bases. It can deliver printed material within 2 hours after it is unloaded from an airplane.—News release.

All-Temperature Grease

A new grease which performs equally as well in tropic heat or Arctic cold has been adopted for use on all Army vehicles and artillery pieces.

The all-temperature lubricant, developed by the Ordnance Corps, is expected to simplify the Army's supply problem by replacing at least six different greases.—*Army Navy Air Force Journal*.

Plastic Locker

Army Quartermaster Corps technologists are experimenting with a glass reinforced, plastic molded trunk locker and a similarly constructed typewriter case. If the experimental locker and typewriter case prove successful, they will provide advantages in lighter weight, greater durability, and be considerably more waterproof. The material used in the locker and case is a glass mat reinforced with a polyester type plastic.

Especially important in air transport, or drops by parachute, is the greatly increased impact strength, coupled with a reduction from 40 pounds to 25 pounds for the locker and from 28 to 14 pounds for the typewriter case. Since the olive drab color is mixed with the plastic, no paint or coating is required.—*Army Navy Air Force Register*.

Jet Trainers

The Air Force and the Navy have ordered an undisclosed number of *T-33* and *TO-2* trainers, the 600 mph plane in which military pilots graduate from propeller to jet propulsion.

Added to the quantities already in production, the orders just received will extend manufacture of jet trainers into the summer of 1953.

The trainer, a two-seat version of the *F-80*, is used for pilot checkout, navigation instruction, instrument training, and night flying indoctrination.—News release.

New Flexible Plastic

Battle suits now being made for the Navy contain a vest and watertight face seal constructed of a new flexible plastic.

This material, honeycombed with air cells to give it buoyancy, has excellent shock-absorbing qualities. For that reason, it also may be utilized as a protective wrapping for air-dropped instruments, as eyepiece padding for gunners, and headrests for aerial photographers.

It is available in densities ranging from 4 to 15 pounds a cubic foot, and is made in flat sheets or molded into contoured shapes.—*Armed Force*.

Liquefied Gas

The automotive industry is interested in liquefied petroleum gas (LPG), which it used to burn as waste.

Economy is LPG's outstanding advantage. It can be produced in quantity and sold at half the price of premium gasolines.

It has an octane rating of 108, which is 25 percent greater than other motor fuels, making for quicker starting, faster pick-up, and smoother, noiseless performance.—*The New York Times*.

Medical Camera

The Air Force School of Medicine has constructed a compact camera for use in photographing interior parts of such body cavities as the eye, ear, nose, mouth, and throat.

Believed to be the only one of its kind, the camera will operate at any speed from 12 seconds to one-thousandth of a second, and, by use of an adapter lens, can record both plus and minus magnification. Its shutter and film transport mechanism were extracted from a standard 35-mm camera in order to eliminate extensive research and added expense in producing precision camera parts.—*Armed Force*.

FRANCE

Military Assistance

France has announced that deliveries of military matériel from the United States have enabled the French forces in Indo-China to repel attacks of the rebel Vietminh army and to win important offensive actions.—*The New York Times*.

WESTERN EUROPE

Raw Materials Agency

The European Consultative Assembly has proposed the establishment of an agency to allocate scarce raw materials among the nations of the free world. The agency would handle the purchasing of the raw materials, as well as their allotment.—News release.

Easier Travel Regulations

Ministers of the 15 nations in the Council of Europe are attempting to work out a plan abolishing all visas and standardizing Western Europe's passports.

Such a plan would allow more than 200 million Western Europeans to travel freely on most of the Continent simply by buying a railway ticket.—*The Kansas City Star*.

DENMARK

Study Service Increase

The Danish Government is studying the possibility of increasing compulsory military service from 10 to 18 months. Lengthening of the term of service would add 7,500 to the present figure of 16,000 called to the service each year.—*The New York Times*.

ITALY

New Commander

The Italian Government has announced the appointment of General Maurizio Lazzaro de Castiglioni as commander-designate of ground troops of the integrated European Army for Southern Europe.—*The New York Times*.

INDIA

Penicillin Factory

The Indian Government will start construction soon on a penicillin factory near Bombay at a cost of \$4,200,000. The Government has accepted a joint offer of the World Health Organization to provide technical aid and training facilities worth about \$3,360,000, and of the United Nations International Children's Emergency Fund to supply machinery worth \$840,000.—News release.

YUGOSLAVIA

Power Projects

Yugoslavia is engaged in a program to construct a network of dams and hydroelectric plants designed ultimately to produce 50 million kilowatt hours of electrical energy each year.

Plans call for the construction of hydroelectric plants at the Danube's iron gates and along the Drina, Sava, Krka, Vardar, Treska, Una, Certina, and Ibar Rivers.

It is estimated that the planned power stations along the Drina alone will produce as much electricity as all of Czechoslovakia before the war and three times as much as in neighboring Rumania.—News release.

MALAYA

Road Construction

About 2,000 miles of new or improved roads for Malaya are planned under a 42 million dollar construction project. Work already has been started on the project.—*The Christian Science Monitor*.

New Airport

The British Government has approved plans for a new airport for Singapore which is to cost 6 million dollars.

The airport will have a 7,500-foot runway, long enough to take the De Havilland Comet, the world's first jet airliner.—News release.

BRAZIL

Naval Bases

Brazil's Navy Minister has announced that that country is hastening the construction of naval bases in the northeast, and is purchasing destroyers and aircraft to provide sufficient sea power to defend the country and the continent in case of war.—*The New York Times*.

GREAT BRITAIN

Commonwealth Force

Forces of the British Commonwealth nations fighting in Korea will be welded into a single unit to be known as the 1st Commonwealth Division.

The strength of the division probably will run to 21,000 men, with Canada supplying 7,000, and the others coming from the United Kingdom, Australia, and New Zealand.—News release.

Aircraft Engines

Great Britain is sending Canada 100 aircraft engines urgently needed for the Dominion's training scheme.

The engines were delivered to Britain by the United States under the wartime lend-lease arrangements. However, they are of little use to the Royal Air Force now because the training planes for which they were intended are no longer being used in Britain.—*The Christian Science Monitor*.

CANADA

Controlled Materials Plan

Canada and the United States are participating in a controlled materials plan, whereby the defense projects of both countries will be assured their share of critical defense products.

Items such as steel, copper, and aluminum will be allotted according to the defense needs of both countries, with the remainder going toward meeting the need for consumer goods.—News release.

JAPAN

Police Reorganized

Japan's 75,000-man national police reserve has been reorganized into a four-division army. Each division has four 3,000-man regiments.—News release.

SOUTH KOREA

Military Equipment

South Korea has asked the United States to equip 10 new South Korean divisions for action against the Communists.

South Korea has a pool of 500,000 draftees who have completed basic training, and another 2,200,000 could be called for military service under present laws.—News release.

Allied Air Observers

Observers from nine Allied air forces in Europe will go to Korea for a month's study of large-scale use of jet air power.

Two expert observers will be sent from the air forces of Belgium, Denmark, France, Italy, The Netherlands, Norway, Portugal, Greece, and Turkey.—News release.

AUSTRALIA

Rear-Facing Seats

The Royal Australian Air Force has adopted rear-facing seats for use in its transport aircraft.

This type of seating arrangement provides greater safety in case of an accident or forced landing, because the passenger is forced deeper into his seat instead of being thrown forward.—*The Aeroplane*, Great Britain.

Geological Party

A party of Australian geologists selected to work in Pakistan under the British Commonwealth Aid Program has left for Karachi. The party will be in Pakistan for 6 months, and will spend most of the time working in the Himalayan region.—*Australian Weekly Review*.

WESTERN GERMANY

Troop Shift

Moroccan and French troopers of the 5th Moroccan Infantry Regiment recently arrived in Wetzlar, Germany, from stations in the French zone.

This is the first regular French unit to arrive in the US zone under an Allied agreement calling for the interchange of troops in Germany.—*Army Times*.

Atomic Research

The Allied High Commission has announced that German research into some phases of atomic energy will be facilitated by a new definition of restrictions. However, applied nuclear physics remains prohibited.

The relaxation measure concerns certain specific phases of electronics, chemicals, and metals related to atomic energy. The separation of uranium isotopes will be permitted under license, but only on a scale too small to permit commercial—or military—use. In effect, small prototype plants suitable for research purposes will be authorized.—*The New York Times*.

Rolling Mill Project

United States funds have launched construction of a new German rolling mill that will help the Ruhr produce more steel for Western defense.

The mill is the biggest project to date in the new Economic Co-operation Administration program to rehabilitate the German steel industry.—News release.

Gliding

The West Germans are going to be permitted to revive the forbidden sport of gliding. However, resumption of the sport, banned since the surrender of Germany nearly 6 years ago, still must await the formal revision of Allied legislation and the introduction of a new code of regulations governing the use of sailplanes.—*The New York Times*.

GREECE

Oil Project

The Greek Government is locating and charting oil-bearing deposits in that country with the help of ECA assistance.

After this work has been completed, foreign firms will be invited to conclude agreements with the Government for exploitation.—*The New York Times*.

Naval Maneuvers

United States, British, and Greek naval units have been holding combined maneuvers in Greek waters this summer. This is the first time the Greek Navy has participated with the United States and British naval forces; and it has raised hopes for Greece's inclusion in a Mediterranean defense arrangement.—*The New York Times*.

SWEDEN

Information Ministry

Sweden has taken preliminary steps to establish a Ministry of War Information in the event of World War III or the immediate danger of a war.—*The New York Times*.

Air Raid Shelters

Eight bombproof air raid shelters, which are under construction in Stockholm, are being blasted out of solid granite rock. They will accommodate 50,000 persons. In peacetime, they will be used for garages, schools, restaurants, and theaters.—News release.

NORTH ATLANTIC TREATY NATIONS

Shipping Pact

Representatives of the North Atlantic Treaty nations have agreed on the machinery to control shipping in time of war or emergency. In addition, they have agreed on the details about vessel records that would be required by the defense shipping authority.—News release.

NORTH KOREA

Enemy Jet 'Identified'

Descriptions of the new twin jet fighter that has been intercepting United Nations night bombers over North Korea tally with those of the Soviet *La 8*.

The plane is of conventional design with twin underslung jet engine housings, four cannons in its nose, and a published speed of 600 miles an hour.

Although used by the Communists in Korea for night operations only, the *La 8* was designed by the Soviets for day fighting.—News release.

EASTERN GERMANY

East Zone Police

The Soviet Control Commission has completely reorganized the military units of the East German People's Police into 23 formations, each intended to be a cadre for a Soviet-type infantry division of about 11,000 men.

All trace of German Army organization and tactical and staff techniques has been eliminated from these units, which number about 2,000 men each. Soviet military doctrines prevail completely.

However, it will be many months before these units can be considered prepared to form cadres for divisions of an East German "people's army."—*The New York Times*.

USSR

Trade Agreement

The Soviet Union and Sweden have completed a new trade agreement calling for a \$7,700,000 exchange of goods this year.

Soviet exports will include manganese and chrome ores, asbestos, hard coal, corn, barley, and oil cakes. In exchange, Sweden will export iron, steel, machinery, medical equipment, and equipment for the Soviet Union's paper and wood industries.—*The New York Times*.

FOREIGN MILITARY BRIEFS

The Swiss Government has approved the purchase of 150 De Havilland *Venom* jet fighters for the Swiss Air Force.

The Royal Canadian Air Force has announced that women again will be eligible to join that service.

The defense budgets of the 12 North Atlantic nations now total more than 57 billion dollars.

Japan and The Netherlands have concluded a trade agreement providing for an exchange of \$7,300,000 worth of goods and services.

The Netherlands and Sweden have signed a new 12-month trade agreement.

The Brazilian Government plans to import 120,000 tires for autos, buses, and airplanes during the present year.

Egypt and the United States have signed a general agreement for technical assistance under the Point Four program.

Pakistan recently completed full nationalization of her army.

Syria's population increased by 2.4 percent during 1950, according to official statistics.

The Royal Australian Air Force has taken over from the Royal Air Force the main supply dropping effort to security forces in the Malayan jungles.

The Moscow radio has announced that a 30 billion ruble government loan has been oversubscribed by more than a billion rubles.

According to a recent report, the Chinese Communist Government has been circulating new maps showing Northern Burma, Tibet, and part of Assam in India as Chinese territory.

The President of Uruguay has authorized the purchase of two escort destroyers from the United States.



FOREIGN MILITARY DIGESTS

Airborne Warfare

Translated and digested by the **MILITARY REVIEW** from an article by
Captain E. Lorenzen in "Militaert Tidsskrift" (Denmark) November 1950.

This is the first of a series of two articles on this subject. The second article in this series will appear in the September issue.—The Editor.

THE idea of airborne warfare, or, if you prefer, vertical attack, was not a product of World War II. As in so many fields of modern warfare, original and far-sighted men already had occupied themselves with this idea when war was still being waged in the conventional manner.

However, I shall refrain from presenting any historical exposition of the development of the airplane, the parachute, or the glider, or from going into detail concerning the innumerable experiments which, in the various countries, have led to modern, airborne combat units. Rather, I will attempt to orient the reader on the most important events in the more modern history of this method of warfare.

Some of the events in the early history of airborne warfare include the sketching of a parachute by Leonardo da Vinci in the fifteenth century, the construction of the first practical balloon by Joseph Michel Montgolfier in the eighteenth

century, the first parachute jump made by Francois Blanchard in the eighteenth century, and Benjamin Franklin's proposal, which is gradually becoming woven with tradition, to transport ground forces by balloon.

Airborne Potential

World War I produced no airborne operations. However, what could have happened, if the war had lasted longer, is another matter. According to American sources, an airborne attack on a large scale could have been witnessed in 1919. Some 1,200 bombers, with 12,000 airborne soldiers equipped with parachutes and armed mainly with machine guns, were to undertake this tactical maneuver, with the troops being dropped in rear of the German lines. Supply and resupply was to be handled by the air forces.

During the period between World War I and World War II, it was principally Germany and the Soviet Union who continued to work on the vertical attack. The Soviet Union made use of parachute troops in her 1929 maneuvers, and, in 1936, more than 5,000 paratroopers were dropped during the maneuvers at Kiev. Soviet paratroops were used during the

Russo-Finnish War in 1939. However, their use was limited by a lack of transport facilities, with the troops being used primarily as ground forces.

In 1933, the Hermann Göring Parachute Battalion was organized in Germany, composed of carefully selected soldiers. In 1938, the Germans carried out large-scale airborne exercises, some of them with gliders.

Major Attacks of World War II

The events of World War II are well known, but it may, nevertheless, be well to recall some of the more important airborne operations of the war.

At the time of the outbreak of World War II, both the Soviet Union and Germany had trained many thousands of parachute troops, and the Germans had carried out extensive experiments with gliders. It was also the Germans who surprised the world with their strategic, *blitz* air attacks. Of particular attention, were the attacks against Holland and Belgium in 1940.

The German plan of strategic operations in 1940 aimed at pushing the French and British Armies northward, by means of a rapid invasion of Holland and Belgium. If this plan were successful, the Germans intended to attack from the Ardennes into the flanks of the French and British forces.

Before the attack, in the case of Holland, a quick seizure of strategically important bridges was necessary for the purpose of facilitating the advance of the armored units. Simultaneously with the airborne attacks on the bridges over the Rhine and the Meuse, German ground forces attacked the Grebbe-Peel line to facilitate the advance of the armored units. On 13 May, these forces established contact with the airborne troops, and, during the course of the day, all bridges of importance fell into the hands of the Germans.

In Belgium, the Germans demonstrated the value of the vertical attack, with the use of glider forces. Under the cover of the semidarkness of early dawn, a number of gliders landed on top of the superstructure of the Eben-Emael fortress, and hastily destroyed its guns and ammunition. The adjacent fortresses of Pontisse and Barcho, which began to lay down fire on the silent fortress, were put out of action by *Stuka* bombers. Within 24 hours, the entire garrison of Eben-Emael was under German control.

Even though the Germans made use of airborne troops in other operations on the Western front, they were never used again in an area which had greater strategic and tactical value.

Japanese Airborne Forces

In Japan, parachute forces were organized, to a limited extent, mainly with German co-operation. At the outbreak of the war, the Japanese had two trained parachute battalions, but their operations were not very successful. In February 1942, a Japanese parachute battalion was given the mission of seizing and occupying an airfield and two refineries in Southern Sumatra. Transported in 70 planes bearing Royal Air Force markings, the battalion was dropped in two waves of 350 men each. However, powerful concentrations of antiaircraft artillery fire necessitated their jumping from a high altitude, and, in addition, caused the loss of 16 planes. The parachute force landed in a dispersed manner and did not succeed in reorganizing and concentrating against the attack objectives.

On 6 December 1944, the Japanese conducted their last airborne attack. A parachute battalion was dropped for the purpose of neutralizing several landing strips in the Philippines. Its mission was to destroy as many American planes as possible, in order to ensure a Japanese landing the following day. Only 200 to

300 parachute troops reached the ground alive, and efforts to bring reinforcements to them before they were destroyed were unsuccessful.

Allied Airborne Efforts

On the Allied side, the development of airborne forces proceeded slowly. In 1936, parachute troops were used in maneuvers in England. In the United States, plans were prepared, in 1939, for the organization of parachute forces. However, it was not until 1940, after the German invasion of Holland and Belgium, that an experimental platoon of 2 officers and 48 enlisted men was organized at Fort Benning, Georgia. On 29 August 1940, this platoon carried out the first mass parachute jump in the United States, and, 3 months later, the first infantry parachute battalion was organized with the personnel of the experimental platoon as a cadre. At the end of World War II, the American Army had five airborne divisions and four parachute regiments at its disposal.

Before sketching some of the Allies' more important airborne operations, it will be fitting to cover the first really large airborne operation of World War II, namely, the German operation against Crete, in which airborne forces, for the first time, were engaged *en masse* in a combined air, land, and sea operation. That it occurred as a surprise to the Allies, there is scarcely any doubt, for such an operation was regarded as impossible.

On 20 May 1941, the island was attacked by an airborne force of about 800 bombers and fighters, 500 to 600 transport planes, and about 75 gliders (carrying heavy vehicles and weapons). The Allied air forces were able to offer only little resistance, and, surprised by 30,000 German airborne troops supported by numerically superior air forces, the British and Greek defense forces were soon overrun. Even if the German losses

were high (about 50 percent), the invasion was successful, and showed that even a strongly defended base could be taken in a vertical attack.

The first major airborne operation in which British forces participated took place in November 1942 during the fighting in North Africa. The lessons learned from this operation, together with new methods of training, increased the effectiveness of the vertical attack. British airborne troops were trained, from that time on, with the plane crews, and supply from the air was made more effective by the use of supply containers and the use of special planes.

In July 1943, American airborne forces invaded Sicily. The lessons learned from that operation provided the foundation for subsequent American airborne efforts.

Later, the D-day invasion was spearheaded by airborne troops, and, in September 1944, the newly organized First Allied Airborne Army attempted to seize and hold the important bridges at Grave, Niemegen, and Arnhem. This operation began on 17 September, and all of the airborne forces reached their first attack objectives as planned. However, the operational result was not achieved, primarily, because the British forces which were dropped at Arnhem were surrounded by the Germans. Although they fought bravely, superior German forces nearly had annihilated them all by 25 September.

In December 1944, the Germans attempted, for the last time, to turn the tide of battle, by dropping about a thousand parachute troops, at night, in the Bastogne area. Only about 300 reached their objective, and eventually they were either killed or captured.

The year 1945 brought with it the last great airborne operations of the war, including the operation on Corregidor in January 1945 and the crossing of the

Rhine (Operation *Varsity*) in March 1945.

At the time of the German surrender in 1945, plans were under consideration for the employment of an airborne army for a landing deep inside of Germany.

Factors Limiting Airborne Operations

The circumstances which limited World War II airborne operations may be summarized as follows:

1. The light organization of the airborne units.
2. The limited capacity of the transport aircraft.
3. The numerical limitations of the airborne troops.

The most characteristic and outstanding trait of the airborne force is its strategic mobility, which allows it to carry out operations at great distances and in a minimum of time.

Airborne forces are able to attack day or night. Night operations are less vulnerable to enemy air action, and are more likely to achieve surprise. However, day operations provide a greater degree of orientation in the air and on the ground, and can be carried out with greater precision. In general, the advantages of daytime operations outweigh those of night operations, and, therefore, airborne operations, with present means and methods, normally will be carried out during daylight.

Advantages versus Disadvantages

If we characterize airborne operations by their advantages and disadvantages, we may express ourselves as follows:

1. Advantages:
 - a. Speed.
 - b. Surprise.
 - c. A wide choice of attack objectives.
 - d. The mere presence of airborne forces in a theater is a potential threat

to the enemy, and his plans must consider the possible use of such forces.

e. Training and preparations can be carried on far back of the front.

2. Disadvantages:

a. Air superiority is required, not only for the initial landings, but for supply and resupply missions.

b. Operations are dependent on the weather.

c. Transport aircraft limit the equipment that may be employed in an operation, as well as set the range of operations.

d. Supply and resupply is a difficult problem to solve.

e. Airborne troops are vulnerable, both in the air and during the landing.

f. Forces are dispersed during the landing operations.

g. Airborne troops on the ground are vulnerable to the enemy's armored means.

h. Ground reconnaissance is almost impossible before launching a vertical attack.

Meticulous Planning Required

An airborne operation always will require considerable preparation. It places great demands on co-ordination and training. Painstaking planning, to include air protection, transportation, and co-operation with ground forces, is a prerequisite for successful airborne operations. For example, it has been said that it requires at least 7 days to prepare an airborne operation at the division level.

Missions

What missions can be assigned to an airborne unit from the point of view of its special characteristics and possibilities?

During World War II, it was the airborne forces' principal mission, in conjunction with other forces, to seize pos-

session of, and hold, important areas and terrain features. Usually, the airborne force was landed in close connection with land or sea operations, so that a junction of the forces could be made within a short time.

Future Operations

If one cares to look into the future, the aim appears to be to make the airborne operation as independent and long range as possible, and to liberate it from the necessity for a prompt junction with, and support by, other troops. A junction

of forces may be planned, but the airborne units must be able, independently, to fight and maintain themselves for long periods of time. The more the airborne units are able to depend on themselves, the greater will be their strategic importance and the more deeply into the enemy's territory can they be carried. Airborne corps and armies will, in the future, constitute the real attack force, and, when the bridgehead has been established, air-transported units will give the attack additional force and strength.

The Underground Army Must Become the Army of the Future

Translated and digested by the MILITARY REVIEW from an article by Yves Igot in "Revue Militaire Suisse" (Switzerland) January 1951.

SOME military experts advocate a revolutionary change in the matter of national defense favoring a new strategy based on a secret, well-trained army.

This indicates that it is not just the pessimist who is interested in the aspects of the "War of Tomorrow." While war is not inevitable, the statesmen of all countries are conducting themselves as if it were.

The East and the West already are measuring their strength against one another at various points of the globe. Korea is a testing ground—just as Spain was in 1937.

Among the first measures taken by the Western countries has been the lengthening of the period of military service. This was done to show the United States that the Western nations intended to improve their defenses and thereby provide a basis for the receipt of additional matériel assistance from that country. However, all this constitutes only an expedient, with time the determining factor.

In Case of Immediate War

Whether we wish it or not, war may come next year, or in the months or days just ahead of us. And what can we expect if this happens?

One hundred and seventy-five Soviet divisions, flanked by a hundred divisions from the satellite countries, will swarm across Western Europe with the outbreak of hostilities. Within a few weeks, the Soviet Union and her satellites would be able to add another 500 divisions to support the first shock elements.

Facing the Communist elements, we would find some 40 incompletely equipped divisions.

In case the Soviet Union unleashed a *blitz* offensive, Europe would be overrun in a matter of days, and the organized defenses on the Elbe, the Rhine, and at the Pyrenees would be swept away like straw.

The Soviet Union knows this—and so does the United States and the Western nations. It is also known in France that

it would require at least 6 weeks to effect total mobilization. However, the Soviets would not need 6 weeks to occupy Germany, Italy, and France. Experience has proved this before. The French, British, Belgian, and Dutch Armies did not succeed in stopping the tidal wave unleashed by the Germans in 1940.

The Soviet Threat

What could we do at the present time to oppose a Soviet airborne invasion of the Atlantic ports? What could we do to halt the tide of Rumanian, Hungarian, Czech, and Bulgarian armored units supporting the birth of communistic governments wherever the Red Army planted its flag? As a matter of fact, the total means of the anticommunistic countries would not weigh very heavily in the face of the Red Army.

That is why there are other measures which the Allied governments are contemplating or preparing, and which would be more effective than the lengthening of military service or the establishing of a few poor divisions. And it is from the recent past that these governments are drawing their lessons.

A Soviet occupation, facilitated by surprise, would not be able to crush the moral resistance of the countries under its heel. We can no longer think of beating the Soviet Army with our divisions, or of avoiding a brutal invasion. Rather, we should plan for an underground European war, and be ready to put it into effect at any time.

The War of the Future

The Western nations must realize that they will be called upon to fight effectively with regular forces *after* their occupation by the enemy, for they would not be able to halt him. Therefore, a plan for waging underground warfare must be anticipated and be prepared effectively.

We are not speaking of guerrilla warfare. Guerrilla warfare is the instinctive fighting of a people against an invader. Rather, underground warfare takes preparation and effective leadership; its forces require special training and adequate matériel assistance for their use.

France provided an illustration of this type of action during the last war, and it is on the basis of this experience that we should plan for the future.

This revolutionary concept of warfare has not been accepted by all general staffs. However, the daily course of events is winning them over.

Generally, it is admitted that the presence of 40 Allied divisions in the line against the Soviet forces would only provoke disaster. However, an underground army, scattered throughout the various countries, would be more effective in fighting an invader.

Victory no longer belongs to the nation which has the most powerful army. As General de Gaulle has stated, the loss of a battle does not bring about the loss of a war. And a country is not truly conquered until it loses faith in its destiny, and national sentiment and individual patriotism have disappeared.

The next war will be a total war, for every individual who is engaged in ideological combat will become an enemy, and his dispersion throughout the various countries will make even the most severe occupation ineffective.

Objectives

Well-trained underground forces, led by efficient officers, will have many types of missions to perform if war should come. They will attack lines of communications, transportation facilities, supply centers, and communications centers, as well as supply intelligence information and conduct sabotage operations.

Such operations will provide excellent

results for small, mobile underground units. Military observers are in agreement on the efficiency of such units, for they exist, at the present time, inside the United Nations' lines in Korea.

The location of secret areas also must be determined for paratroop or amphibious landings, or for possible commando raids from Great Britain, Africa, or even America.

If these conditions are fulfilled, the counterattack of the free nations may be successful.

Armament and Training

What will be the mission of the French Army in a European underground war? In admitting that France should maintain modern ground, air, and naval forces, one also should be convinced that she should furnish new weapons to underground combatants. Machine pistols, hand grenades, and radios will be the weapons of the forces of the future, and it is necessary for these forces to learn how to use them.

Training must be varied and complete, and should include a thorough knowledge of the use of radio equipment, explosives,

and intelligence information, and training in sabotage operations and the marking of landing and drop zones for airborne units.

In addition, large-scale maneuvers bringing into contact a "red" force, representing an occupation force, and a "blue" force, representing the underground fighters, would, without a doubt, be of great value.

Summarizing, we may say that more and more military theoreticians are advocating the use of underground forces in warfare rather than opposing 1,000 enemy tanks in combat with 10 of our own.

As one military historian wrote last year, "Modern war has become a monstrous and complex phenomenon in which victory is won by the most varied of weapons, from the jet plane to the dagger."

His view seems to be shared by many ranking officers who would like to see the American Army used in a directing and strategic role, and the European armies specializing in underground warfare.

We are confident that any war of the future—as never before—will be total and will touch the whole population to a degree hard for us in the US even to imagine. Certainly, we know from the last two world wars that they were not fought solely by people in uniform. And even the greatest proportion of the people who fought it in uniform were civilians a few short months or years before the pay-off. It cannot then be considered as just a responsibility of the regular forces. It is the responsibility of all of us.

General J. Lawton Collins

Air Superiority

Digested by the MILITARY REVIEW from an article by Major D. J. Hunden in the "Canadian Army Journal" (Canada) February 1951.

WITH the increasing attention given to air power by senior military authorities, it behooves each officer to examine carefully his army-air force thinking. This applies particularly to such a confusing term as air superiority.

Air superiority has been defined as that degree of superiority which prevents the enemy from interfering effectively with our own ground and air operations. In relation to the land battle, the objective, frequently called local superiority, is to produce an air situation which gives freedom of movement on the ground to our own forces and denies that freedom to the enemy.

Field Marshal Sir Bernard L. Montgomery has stated that the achievement of a favorable air situation is the primary task of the air forces, and that it is the greatest contribution they can make to the land battle. No responsible authority has yet questioned this statement, although the uninitiated still may request close air support too soon. The degree of support which air forces can provide for armies depends on the degree of air superiority which has been obtained. It is worth remembering that air superiority is a prebattle requirement, and that many of the planes providing air superiority later will provide the desired close support.

Co-ordinated Plan Required

The battle for air superiority is fought according to a co-ordinated plan. It is a popular fallacy that interceptor fighters carry out the task alone. Air superiority is best ensured by offensive operations. Bombers on strategic missions assume the lion's share of the burden by attacking the source of the enemy's air

power. Reconnaissance aircraft supply the intelligence information for an adequate plan. Bombers on intruder missions harass training areas and communications. Fighter aircraft tend to be defensive, and only gradually extend their domination beyond the home base.

The gaining and maintaining of air superiority is entirely an air force problem, but such is the importance of this task that the other services may be called upon to play a part. Armies occupy airfields to provide bases for friendly, short-range aircraft, or to deny such facilities to the enemy. In addition, the army supplies antiaircraft artillery protection. The navy may deny certain airfields to the enemy, and land shore parties to disrupt the enemy air warning system. Finally, the underground forces can supplement intelligence reports and confound enemy communications.

Prerequisite

Field Marshal Montgomery has stated that air superiority is a prerequisite to military success. Obviously, his statement merits careful study.

Many people doubt if we will ever again enjoy the overwhelming degree of air superiority that we enjoyed in 1944-45. In fact, one writer recently warned that there is no assurance that a future air war eventually would not reach a stalemate, with air superiority long in doubt. Certainly, air superiority is becoming increasingly expensive to achieve.

Without Air Superiority

While it may be obvious that future ground operations in flagrant defiance of enemy air power are improbable, it is not obvious that ground operations with-

out air superiority must cease. One of the outstanding features of Rommel's victories is that they were achieved with an inferiority of force, and without any command of the air. In addition, with the collapse of Italian resistance in Sicily, two German divisions, though lacking air support, succeeded in delaying from 7 to 12 Allied divisions for more than a month. Moreover, the German Army, from August 1944 to April 1945, with an inferiority in equipment and manpower on the ground as well as in the air, staged a withdrawal which merits detailed study. Even in 1950, after losing all control of the air within a few hours after the arrival of the United States Air Force, the North Koreans maintained the offensive for more than 2 months.

Lessons

What then of the future?

First, we should resist the insidious tendency to judge the shape of operations early in a future world war by typical operational conditions in the last war. With the air forces busy preventing the enemy from using the air as a channel to convey weapons to destroy our bases and forces, there will be little air effort left for the direct support of field forces.

Second, even without air superiority, the army should seek, by every means within its power, to maintain the offensive spirit. This can be pursued by developing all those arts which tend to neutralize the effects of enemy air power. Battlefield targets are not particularly fruitful. In all our training, studies, and exercises, we should pay meticulous attention to methods of evading the worst consequences of air attack. To resist hysteria, we should consider that there is never a desperate situation—only desperate men. The heart of the army, the infantryman, always will be dependent on fire power, and, regardless of how necessary and how vital efficient air

support might be, it is not considered likely that air power will ever replace entirely the infantry's normal heavy support weapons.

Third, to prevent despair at the lack of air support, every effort should be made to indoctrinate all troops with the principles behind the correct employment of air power. We must teach that the services work as a team pursuing the national aim, even when that integration is not readily apparent.

Finally, our study of land-air warfare, in peacetime, should be realistic. Every use should be made of highly qualified schools like the Canadian Joint Air Training Centre. At the same time, we should remember that the air support organization, now considered the ideal, was the result of 5 years of air experience and 2 years of air superiority. The circumstances which are likely to pertain early in a future world war always should be considered by future commanders and staff officers.

Conclusions

The disadvantages of an adverse air situation are formidable. However, we must not deduce that the army need not expect to fight until the air battle has reached a satisfactory stage. All services should be prepared to fight against any odds.

The side inferior in the air, by stressing other factors such as leadership, can win temporary victories on the ground and can make aggression expensive. Good troops, properly deployed, cannot be destroyed by air power alone. World War II showed, and Korea is confirming it, that battles can be won without the direct aid of air power.

Air superiority, however overwhelming, will never compensate for bad generalship. Officers must be prepared for operations when there is no favorable air superiority.

The Transport of Casualties by Air

Digested by the MILITARY REVIEW from an article by Lieutenant Colonel A. N. T. Menece in the "Journal of the Royal Medical Corps" (Great Britain) January 1951.

THE efficient and speedy transport of wounded, sick, and injured is a major factor affecting the mobility and morale of an army in the field.

The history of warfare witnesses a continuous evolution in the technique of transporting casualties by human portage, animal or animal-drawn vehicles, motor vehicles, boats, trains, and hospital ships.

Prior to 1792, humanitarian, rather than therapeutic, motives regulated the speed of collection and evacuation of casualties.

Napoleon's great surgeon, Baron Larrey, initiated research into the surgical aspects of transportation. His introduction of light, fast-moving, two-wheeled ambulances effected a more rapid evacuation of the wounded and sick. This, combined with his surgical skill, saved many lives, particularly after the sanguinary battles of Aboukir and Borodino.

With the conquest of the air, all nations began building aircraft with one eye on transport and the other on their potential military value.

The recognition of the value of air transportation of casualties has evolved slowly. During the siege of Paris, in 1870, more than 160 patients were evacuated over the Prussian lines by balloon. Until 1912, all military aviation in the British Army was carried out by the Royal Engineers. However, in that year the Royal Flying Club was formed, and, at the Aldershot Army Exercises, medical officers of the Royal Army Medical Corps drew attention to the possibility of military patients being transported by aircraft.

World War I

Except for a few minor incidents, com-

paratively little use was made of aircraft for transporting casualties during World War I. The French Air Force claims that, in 1915, one of its pilots successfully flew a wounded Serbian airman during the retreat through Albania. In 1916, the Royal Flying Club carried out the first recorded air evacuation of a military patient from Palestine. In 1918 (the year in which the Royal Air Force was formed), the French Air Force made progressive use of aircraft for transporting wounded and sick over lengthy desert communications during operations in Morocco.

1918-38

The period between the two world wars saw the progressive development of civil aviation all over the world, particularly in the United States, Canada, and Australia.

In Great Britain, air ambulances were developed and used. From 1919 to 1937, the Royal Air Force, using both land based aircraft and flying boats, evacuated a total of approximately 3,000 casualties from operations in Somaliland, Iraq, Palestine, and Waziristan; as well as from the Quetta earthquake in 1935.

1939-41

In spite of more than 20 years of military and civilian experience in transporting casualties by air, World War II began without any organized system of air transport of casualties available for use by the British Army. Nor was the provision of air ambulances hastened; on the contrary, in nearly all theaters of operations, medical staff officers encountered resistance (if not blank refusal) to their repeated requests for air ambulances.

By contrast, in 1939, the German Army, during its invasion of Poland, was equipped with medium-size aircraft which flew casualties directly to base hospitals in Germany.

The Western Desert Campaign

In the Western Desert campaign, the earliest record of air evacuation of casualties was the flying of malaria cases from Siwa to Cairo in 1941. Subsequently, shuttle flights were evolved for collecting casualties from forward air strips in the desert.

During the successive advances of Field Marshals Wavell, Auchinleck, and Montgomery, a total of 50,000 patients was evacuated or transported by air. The Allied advances in Italy also were served by evacuation aircraft.

Operations in Europe

From the time of the Normandy invasion until VE-day, a total of 118,000 casualties were transported by air: 40,000 within the theater itself and 78,000 from the theater to the United Kingdom.

During the initial assault, air evacuation began on D plus 6 from an airfield near Bayeux. The journey to the United Kingdom required 2 hours by air, as opposed to the 16 hours required for the land and sea journey. Subsequently, during the phase of the build-up, returning aircraft evacuated as many as 800 casualties a day.

The break-through and pursuit resulted in the capture of airfields at Amiens and St. Omer and, from there, flights evacuated casualties back to the hospitals in the Bayeux area.

During this phase, two important lessons were learned, namely:

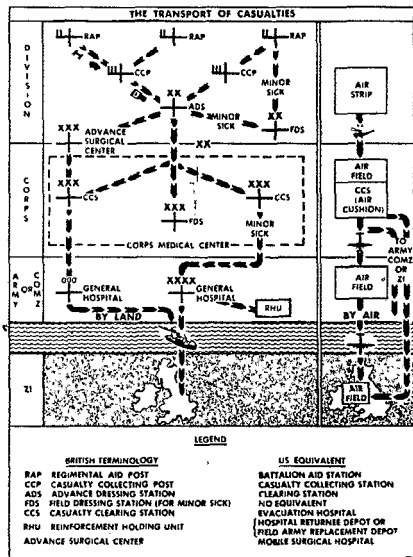
- 1 The necessity for providing suitable medical units (say a 200-bed hospital or a casualty clearing station) in the vicinity of the airfields where casualties are engaged and deplaned. Such units should

be capable of providing full preflight treatment and nursing.

2. The advisability of having casualties readily available to take advantage of empty transport planes returning to their bases.

The capture of Brussels with its airfield greatly facilitated the transportation of casualties. Thereafter, 700 to 900 patients were flown daily from that city to the United Kingdom.

The subsequent seizure of airfields at Luneburg and Celle permitted the transporting of some 900 patients daily back to the Brussels area. During this campaign, the Royal Air Force developed its



Casualty Air Evacuation Squadrons—medical units capable of receiving, holding, and enplaning patients from airfields.

Southeast Asia Operations

Most theaters of war produced difficulties in moving and transporting casu-

alties, but none more so than in Southeast Asia. The mountainous jungles, with their precarious paths and roads, provided limitations to supply as well as casualty evacuation.

The reduction in pain, discomfort, time, and loss of life can be appreciated by comparing the plight of a casualty, in 1942, whose journey from the front to a hospital involved up to 16 changes in transport and required 7 days of travel. In 1944-45, the same journey by air involved only 3 changes and required only 3 hours of travel time.

During the Burma campaign, the gross total weight of supplies and equipment (including medical) flown by air was more than 1,180,000 tons. During the same period, approximately 180,000 casualties were evacuated by air.

Limitations of Air Transportation

Apart from the medical factors, the principal factors which may limit the transport of casualties by air include:

1. *Availability of suitable aircraft and crews.*—Now that it has been agreed that the Army will operate light aircraft in the forward areas for casualty evacuation, light aircraft and helicopters should be readily available for the air evacuation of casualties. Securing medium and heavy aircraft from the RAF for casualty evacuation always will be difficult, owing to prior claims of fighter and bomber commands, and other operational requirements.

2. *Availability of suitable airstrips and airfields.*—Under satisfactory weather conditions, forward medical units can easily improvise airstrips for use by helicopters or light aircraft. Because the use of medium and heavy aircraft will depend on the availability of large airfields, medical units may have to be sited near the airfields, although such sites may not be ideal locations for hospitals.

3. *Air superiority.*—Pending international recognition of ambulance aircraft under the Geneva Convention, an essential prerequisite of the systematic flying of casualties will be the attainment of air parity or air superiority. Transport aircraft, being unarmed and relatively slow, are vulnerable to enemy air attack.

4. *Weather.*—In spite of radar aids to navigation, bad weather may restrict seriously the flying of casualties. Fog, mist, low cloud base, rain, or snow may interfere with flying. This emphasizes the necessity of maintaining, at all times, a dual organization capable of transporting casualties by either land or air. The latter means always should be regarded as a bonus.

5. *Intercommunications.*—To prevent patients making unnecessary journeys to the airstrip, or to prevent delays in getting patients to the airstrip, efficient means of intercommunication between medical units and the Casualty Air Evacuation Squadrons, or other enplaning units, are essential. In addition, ground-to-air communications between the airfield and the transport aircraft are required. Poor intercommunications may cause serious delays in evacuating urgent cases.

Developments Since 1945

The experience gained by the Allies between 1939 and 1945, when more than 500,000 casualties were transported by air, have been the subject of critical reflection and planning for future policy.

Technical developments of jet propulsion, refueling while in flight, as well as new designs of aircraft enlarge the scope of possible air transport of casualties.

At the present time, the Royal Air Force is continuing to transport limited numbers of patients by helicopter and light aircraft in Malaya and Korea, and by medium and long-range aircraft from overseas theaters to the United Kingdom.

The United States Air Force has

evolved a scheme by which hospital ships have been eliminated and all casualties from Europe, Alaska, the Caribbean, and Far Eastern Theaters are flown direct to hospitals in the United States. Within that country, the Military Air Transport Service (MATS) provides a twice-weekly service by which patients can be flown to any service hospital from Boston to San Francisco.

The Allied experiences from 1939 to 1945, as well as during the Berlin Airlift, and the operations in Malaya and Korea, have shown that the use of air forces solely for offensive fighting,

bombing, and tactical support is not sufficient.

The Burma campaign (in which one plane was able to replace six trucks) showed that, as soon as air superiority is gained, a large number of aircraft can be used for logistical purposes. This gives the ground forces greater flexibility, reduces the lines of communications commitments, and enables them to outmaneuver their opponents.

The medical services must be prepared, at short notice, to make the fullest use of aircraft returning to their bases after delivering supplies.

Progress in Antiaircraft Defense

Digested by the MILITARY REVIEW from an article by Captain P. Martel in the "Canadian Army Journal" (Canada) November 1950.

HAD we at our disposal projectiles of infinite velocity, like the death rays and the cosmic disintegrators of the comic strips, then the antiaircraft problem would be reduced to the location of the enemy and the aiming of our weapon at him. We would be like the searchlight operator sweeping the skies with his narrow beam and illuminating the enemy aircraft for a fraction of a second.

At the root of the difficulties facing the antiaircraft defenses today is the relatively long time of flight of the shell, which, by introducing delays of many seconds between the instant the gun is fired and that at which the shell explodes, makes the odds more than 10 to 1 in favor of the airplane. The importance of a short time of flight can be emphasized by stating that the chances of a kill are approximately inversely proportional to its square. For instance, if a weapon has, for a given range, a time of flight half that of another, its chances of a hit are four times greater.

On account of the time of flight, we are, literally speaking, glorified duck shooters, aiming ahead of the target after assessing its velocity and direction. We must point the gun at some point in the sky where we hope that both the shell and the aircraft will meet.

The antiaircraft problem is three dimensional. It consists of the detection of a target in the skies under all conditions of visibility, of its identification, and, naturally, of its destruction. To solve it, we must be able to pick, at any instant, from all aircraft overhead, those of interest, locate them with great accuracy, compute continuously where they will be a few seconds later, aim a gun at that point, and finally detonate a shell where it will do maximum damage. We must take into account such imponderables as the wind velocity, the temperature of the air and of the propellant, variations in the weight of the shell, and, last but not least, the tre-

mendous capacity of human beings for errors.

The best brains of the world have been engaged for many years in the task of searching for solutions to the problem. They have produced numerous answers which, as time goes on, will involve larger and more complicated instruments, the size and weight of their products growing with some power of the increase in accuracy achieved rather than proportionally to it. The present solution to the anti-aircraft problem rests on five basic steps, and it is my intention, in the present article, to review the trends in the development of the instruments which enable us to direct our anti-aircraft fire.

Fire Control Principles

The basic principles underlying anti-aircraft fire control can be listed as follows, and the development of the instruments can be traced chronologically in the same order:

1. Early warning.
2. Local warning.
3. Accurate location.
4. Computation.
5. Control of the weapon.

Without the amazing scientific discoveries made during the study of the basic steps of *warning* and *location*, no new weapon would be possible today. Since the science of ballistics is much older than the airplane, the hostilities ended in 1919 with the various armies in possession of fairly powerful guns. However, they lacked adequate means to control them accurately when firing at an aerial target.

At such an early stage, light and sound were the only features which made the detection of airplanes possible. These physical phenomena were utilized to the utmost, but the instruments designed produced too poor a quality of data to permit prediction of a future position of the target except under ideal condi-

tions. Computers also were in their infancy, and no one today would dare to compare the Brocque Predictor with a modern electronic instrument.

Radar was, literally, the break in the clouds which, within its limits of accuracy, solved the problems of early and local warnings and of accurate location. Subsequently, the two first principles of anti-aircraft defense attained such a peak of technical development that they have passed from the research into the engineering stage. It is certain that the new weapons which will result from the investigations of the fifth principle will require an extensive net of early and local warnings. It also is certain that radar will be the basic instrument of that net.

Early and Local Warnings

Early warning is that phase of the defense which involves the knowledge of all aircraft flying over friendly territory, and their identification. It is ably performed by the air force, as they have at their disposal the sources of information from their control of friendly air traffic and from their long-range radar sets. It is mostly a problem of assessment and rapid communications, and does not require the split-second accuracy of gun control.

Of greater interest to the anti-aircraft gunners is the local warning, as it is their first contact with the enemy. Based on the local warning information is the decision as to which target will be engaged first, and which gun will engage the target. It also is the source of information which will enable the correct pointing of the position finder instruments in the minimum of time.

The doctrines of early and local warnings have seen many changes and, even today, the importance attached to them varies with the countries. When, before the advent of radar, early and local warnings were usually the same, and

taken care of by visual look-outs, very crude information was passed down to the batteries as to the rough position and nature of incoming raids. With long-range radar, the situation has changed considerably. It is now possible for each battery to search its own area, and to combine this information with that available from adjoining sites and from the air force warning net.

The long-range radar sets have introduced new factors in the problems of centralization *versus* decentralization of the control of the defenses. The tendency toward more centralization can be followed throughout the last war, during which every time a new instrument was introduced a period of greater centralization was attempted, followed usually by a reversion to some form of local control as the limitations of the new instrument became known. This tendency to control the anti-aircraft defenses from a centralized control center always has existed, and any return to local control has never been conceded willingly, but rather tolerated pending the development of more accurate and more complex instruments. This, in the years to come, may make possible a control center entirely automatic, where all information will be collected and assessed in a matter of seconds.

Accurate Location

Although essential to early and local warnings, it is in the third phase of the anti-aircraft defenses that radar permitted the major advance. For warning, the primary requirement is not so much accuracy as range, so that the maximum length of engagement time can be obtained. For accurate location, the great accuracy in range measurement permissible by radar was ideal.

The means at our disposal to track an enemy target can be described as passive and active. The first instruments devised for anti-aircraft position finding used the

passive approach: they utilized some feature of the aircraft to detect it and follow its course. However, passive means suffer from the disadvantage that the source of the information is in the hands of the enemy, or at least out of our control, and that continuous and accurate range measurement is almost impossible. On the other hand, they are less susceptible to jamming and result in much simpler instruments. Active means consist of any method in which the source of the target illumination is in our hands, where it can best be controlled. These types of instruments necessarily are more elaborate and more susceptible of being jammed by the enemy, but they usually make up in accuracy what they lose otherwise.

Sound locators were the first of the passive instruments and gave a fair indication of the direction of an airplane, but they suffered from the basic defect of passive devices: range could not be measured except by triangulation, using two or more locators. Even with such an elaborate setup, the quality of data was not sufficient to warrant the prediction of the future position of the target. On account of the relatively slow speed of sound, the data always was stale by 10 to 20 seconds, which meant, in the days of the sound locator, an error of some 500 yards. The most that could be achieved was a rough prediction at which a barrage of shells was fired.

Visual means were by far superior to sound. Radar, even today, cannot compete with a good operator tracking a target through a telescope for accuracy in bearing and angle of sight. However, visual means fell down also when they were used to measure range. The data produced were irregular and the accuracy low. Fortunately, it was in this respect that radar showed much superiority. Radar's chief contribution resides in the improvements achieved in continuous

range measurements from which accurate rates can be determined. Radar is the first active integrated instrument to be designed, and it is also the best position finder so far. Searchlights can be expected, as they are not, properly speaking, an instrument, but merely a help for visual tracking.

Will we ever see a reversion to passive means of observation? It is an open question which will be solved only by deeper studies. It is possible, for instance, in the new realm of guided missiles, that some other feature of the target than sound and light may prove suitable, like the heat of the jets, the magnetic and electrostatic fields surrounding the airplane, or, maybe, the radiation of some atomic particle. Mentioning all these possibilities may be only daydreaming, but there is still a large field of science yet to be explored.

Computation

It is well known that an important part of the over-all error of present antiaircraft systems results from the necessity of predicting the future position of the target. We meet here the major obstacle to accuracy: time, both as time of flight and as "smoothing" time in computation. The longer the time of flight, the greater the total error introduced by velocity measurements, and the greater the time available to the target to maneuver out of range.

The simplest way of computing the future position of the target is a piece of paper on which its course can be plotted. Obviously, this process is slow. Time is wasted in plotting, and finding out from the range table the time of flight of the shell. The process can be speeded up considerably by using an automatic computer. Many types of computers have been designed, some with the origin of the co-ordinate system at the target, others with the origin at the gun. Some

use polar co-ordinates, others cartesian.

In the American, British, and Canadian services, the latter types now seem to be favored, although they involve the transformation of the range, bearing, and angle of sight to the target, as measured by the radar, into east-west and north-south directions and altitude, and, after prediction, a reconversion to quadrant elevation, bearing, and fuze. The advantages of such a system are constant and smoother rates, and ease of correction for wind and displacement. The adoption of this type of computer followed, by many years, the design of the first instrument which was of the polar co-ordinate type. In light antiaircraft predictors and computing sights, where the time of flight is short and simplicity is paramount, polar co-ordinates still are used.

Computation today, like radar, does not offer any major problem of design. The basic scientific principles are well known and it is now possible to build computers capable of solving, instantaneously, the most difficult equations. There is still, however, great opportunity for improvement in the field of better and more rugged components.

The main difficulty in the development of computers is the measurement of target velocity, or, to speak technically, of rates, in the minimum of time. For greater accuracy, the rates must be smooth, and smoothness means averages and weighing functions. These operations take time. The longer the time, the smoother the rates, but, also, the more stale the data and the shorter the time of engagement.

All types of computers make one major assumption, namely, that the target will continue to fly, during the time of flight of the shell, the same course as it did during the measurement of the rates, whether it be on a straight line or on a curve. Prediction of future position can be done as well in either case. All that is involved for curve course prediction is the ad-

dition of second and third derivative terms to the basic equation of the target linear trajectory. The value of any prediction other than that based on a straight line course has not been proved fully yet, and there is no value to any prediction when the pilot flies a random course. Any hits, then, are due merely to chance.

Control of the Weapon

This final step of the defenses involves not only the correct pointing of the weapon, but also the explosion of the warhead at the optimum distance from the target.

Emphasis, at the present time, is on complete automatic control. It has been found that, through no fault of his, the human operator is slow, and that a human link is an important source of error when dealing with targets flying at speeds of 400 to 600 miles an hour.

The operator, therefore, has been replaced in all modern instruments by automatic controls with the instantaneous electrical transmission of data. At the gun, it is called remote control. Remote control is just a glorified name for an ordinary servo-motor. At the end of a transmission cable we receive electrically from the computer the required position of the gun, and with it we compare its actual position. If these positions are different, an error signal is passed through an amplifier and operates a motor which turns the gun in such a direction as to minimize the difference. This operation is done almost instantaneously and repeated continuously so that the gun follows exactly the output of the computer. The motor merely does what the operator did before, but much faster. The mere fact that fitting a gun with remote power control certainly doubles and, in many instances, triples its chances of hitting.

We could go one step further and control the shell instead of the gun. We would, in effect, reduce the time of flight to almost zero as we would continue to

control the projectile until it practically hits the target. The possibilities of this system are such that most countries today are spending millions of dollars for research and development in the field of guided missiles.

As soon as a guided missile becomes operational, or, even more, concurrently with its development, we complete the cycle of antiaircraft development. However, the solution is far from being final. The onus will be switched back to warning and computation, which will become the major sources of trouble and require major redesign to be able to compete with the advances made in the projectile efficacy.

The last problem in the control of the weapon is the detonation of the warhead at the optimum distance. Until the introduction of reliable fuzes, there were few advantages in increasing the muzzle velocity of antiaircraft guns. The old mechanical and powder time fuzes were the sources of errors as great as 200 feet at the target when the shell was fired with a velocity of some 2,500 feet a second. As the error of time fuze is measured in terms of fractions of a second, it is obvious that for a given fuze and a given error the higher the velocity of the shell, the greater will be the miss distance. The situation was changed completely with the introduction of proximity fuzes, which are rightly considered as the second major discovery of the last war, the first one being the atom bomb. By bursting consistently at the right distance from the target, the proximity fuze quadruples the effectiveness of antiaircraft fire.

Conclusion

One of the most significant developments in the technique of warfare today has been the employment of a larger number of aircraft, both of the piloted and the pilotless types. Consequently, any protective system of the future must be flexible enough to cope with a large variety of targets at the same time. Increased speed of

targets requires rapid and accurate decision at a central control point, and a reduction of the time of preparation before opening fire. All essential data, therefore, should be assembled in convenient form for observation. Search coverage should be complete and rapid so that no target can come over the defense area without detection in time to be engaged. A corollary of this statement is that search should be independent of the tracking phase, thereby requiring at least two radar sets.

Due to the increased speed of the targets, data smoothing circuits should permit the computer to furnish to the guns accurate firing data in the shortest possible time. The computer also should be

capable of providing curvi-linear prediction. However, in the light of massive formations and of the high speeds foreseeable in the future, the maneuverability of the airplanes will be reduced considerably and provision for large radii of curvature only should be sufficient.

Finally, to reduce the number of weapons deployed, their range should be increased considerably, together with their accuracy. We have been told of the wide possibilities offered to us by guided missiles in increased accuracy. Fortunately, they also are susceptible of very long ranges compared with guns. Let us hope that they will be the answer to the supersonic, high-altitude bomber.

Does Mountainous Terrain Favor Offensive or Defensive Operations?

Translated and digested by the MILITARY REVIEW from an article by Lieutenant Colonel E. M. Joaquin Calvo Escanero in "Ejército" (Spain) November 1950.

ALL of us know that mountainous terrain exercises a great influence upon the conduct of military operations. However, it is important to determine which it favors more—the defense or the offense; or whether it makes the task of the defense greater than that of the offense.

Clausewitz, in his book *On War*, devotes three long chapters to "Defense of Mountains," and, while upholding the defensive throughout the entire book, justifies the treatment that he gives this portion of the subject by stating:

The influence of mountain ranges on the conduct of war is very great; the subject, therefore, is very important for theory. As this influence introduces into action a retarding principle, it belongs first of all to the defensive. We shall, therefore, treat it here without confining ourselves to the narrower conception as defense of mountains. As we shall discover in our consideration of the subject results which run counter to general opinion in many points, we shall be obliged to enter into a rather elaborate analysis of it.

Further on, in his second chapter on the subject, he states:

We have shown in the preceding chapter how little favorable *mountainous ground* is to the defensive in a *decisive battle*, and, consequently, how much it favors the assault. This runs exactly counter to common opinion: but then, how many things there are which common opinion confuses, how little does it draw distinctions between things which are of the most opposite nature! From the extraordinary resistance which small subordinate bodies of troops may offer in a mountainous country, common opinion gets the impression that all defense is extremely strong, and is astonished when any one denies this great strength in the case of the greatest act of all defense, the defensive battle. . . .

For a more up-to-date opinion, we can quote from the *Instructions of the Soviet Army*, based on World War II experiences, which state: "Mountainous terrain gives the attacker the definite superiority over the defender."

Even during our War of Liberation have we not said, or at least heard our com-

panions say, that it was preferable to advance over mountainous terrain instead of doing so through valleys or open terrain?

As differentiated by Clausewitz, the problem has two aspects: the local—fight-

military operations conducted therein, individual characteristics.

Offensive Action in Mountains

In discussing the supposed difficulties



Infantrymen of the 24th Division moving forward up a mountain trail prior to taking up a new position overlooking the Han River in Korea.—Department of Defense photo.

ing in mountains—and the over-all—defensive battle. However, we will deal only with the first (or local) aspect—fighting in mountains.

Although clarification may not be necessary, we must admit that the mountains which we are discussing are the type mountains with which we are familiar, namely, the Pyrenees. As one writer states, "One must not confuse a mountain with a mountain." While it is true that all mountainous regions have the same general characteristics, such characteristics vary, thereby giving each region, and the

presented by offensive operations in mountains, Clausewitz states:

When a column, winding like a serpent, toils its way through narrow ravines up to the top of a mountain, and passes over it at a snail's pace, when artillery- and transport-drivers, with oaths and shouts, flog their overdriven horses through the rugged narrow roads, when each broken wagon has to be gotten out of the way with indescribable trouble, while all those behind are detained, cursing and blaspheming, everyone then thinks to himself: "Now, if the enemy came up with but a few hundred men he might scatter the whole lot." From this has originated the expression used by historical writers when they describe a narrow pass as a place where "a handful of men could keep a whole army in check." At the same time, everyone who has had any experience in war knows, or ought to know, that such a march through

mountains has little or nothing in common with the attack on them, and that, therefore, to infer from this difficulty that the difficulty of attacking them must be much greater still is a false conclusion.

Difficulties to Overcome

An attack in the mountains must overcome many difficulties:

1. The problem of ammunition supply, which requires good handling of the existing supply.

2. The decrease in the tempo of the operations, which requires an increase in the volume and time of supporting fires.

3. The problem of physical endurance, which is presented by the steep slopes which the attacking forces must climb.

4. The necessity of bringing heavy weapons along with the attacking forces, in order to repulse counterattacks.

5. The problem of disorder among the forces, in the event that the attack is unsuccessful and the troops are forced to flee down the sides of the mountains.

Advantages to Attacking Forces

Nevertheless, the attack also enjoys many advantages. Aside from the overall and very important one that includes having the initiative and superior morale which accompanies an attack, we can list some of the more outstanding ones, namely:

1. The large sheltering masses permit the concentration of strength with the necessary secrecy for achieving tactical surprise.

2. The irregular distribution of the forces in the defensive deployment in the mountains permits the attacking force to choose an unprotected point for the attack and the subsequent maneuver on the enemy's supply lines.

3. The great irregularities permit the flat trajectory supporting weapons to fire above the advancing troops.

4. The general numerical inferiority of defense forces, and the great number of obstacles which limit the field of fire for

flat trajectory weapons, prevent an organized continuous barrage.

It is true that the sheltering masses limit the observation and permit troop movements during daylight without detection, with the possible exception of aerial observation. However, because of the vegetation and the shadows cast by the obstacles, aerial observation will have a difficult task detecting troops if they are moving off the roads.

The second advantage is a definite asset in exploiting the battle. By cutting the enemy's supply lines, the other objectives fall like ripened fruit. The *Instructions of the Soviet Army*, referred to before, state that the fundamental form for mountain attacks is to "outline and surround deeply the defensive positions taking advantage of the least defended points for advancing and progressing rapidly toward the communications and the enemy rearguard." Normally, when an offensive operation in the mountain succeeds, it brings about far greater results than in any other terrain. The action upon the lines of communications is so decisive that it brings about surrenders difficult to accomplish in ordinary terrain where there are numerous roads along which to withdraw.

As to the advantages listed above, the last is the one which has influenced many in the advantages offered attacking forces in mountainous terrain. In the mountains, rarely will we find the same density of defense forces as in flat terrain. In all armies, when dealing with operations in mountains, the regulations assign to the units defensive fronts many times wider than in flat terrain. If, to this scarce density of forces, we add the large number of obstacles which limit the fields of fire, we will understand the difficulty of the defense in organizing its firing plans.

Defensive Action in Mountains

In listing some of the disadvantages of attacking in mountains, we have cited

some of the advantages of the defense. The problem of ammunition supply will not be as difficult for the defense forces to overcome provided they have sufficient time to organize ammunition dumps in the positions. In addition, the possibility of launching a successful counterattack on the exhausted troops climbing up to the defense positions is a valuable advantage. However, this is not all. It is true that the enemy can pour forces, under cover, into a sector on the front and launch an attack at a time unexpected by the defense. However, what results can this surprise have? While a surprise of this type can achieve a break-through so as to exploit with armored forces on flat terrain, in the mountains it can achieve very little. If the defense is organized in depth, such surprise can have no more effect than a successful enemy raid.

In discussing the factor of surprise, it might be well to mention that exploitation never was reserved solely for the attacker. Defense forces also can employ the factor of surprise in exploiting a battle, because, generally, they know the terrain better than the attacking forces.

The attacking forces can surprise the defense forces as to the time and place of an attack, but, once the attack has been set in motion, the factor of surprise favors the defense forces. The defense forces can surprise the attacking forces through the positioning of their weapons, with false activities to confuse the situation, with ambushes and counterattacks, and other tricks which belong to the force which knows the terrain over which it is fighting. We see, therefore, how the advantage of surprise, which was credited to the attacking force, is transferred to the defending force. We can state that the surprise factor, in all of its importance, frankly favors the defense force in the mountains.

With all that we have said in favor of defensive action in the mountains, we have not mentioned yet the two advantages

which, in our opinion, appear most important, namely:

1. The influence exerted by the mountains on the equipment to be employed.
2. The influence of mountainous terrain on the number of troops employed.

Mountainous terrain tends to break formations and determine the equipment to be



United Nations' troops in Korea advancing up a mountain during a recent operation.

employed. Actually, mountainous terrain is like a screen of fine mesh, which permits only certain equipment to be used. Truck formations and mechanized equipment, in general, play only a minor role. Because of the lack of roads in this type of terrain, the use of artillery and other supporting weapons, especially in any large numbers, is limited. For this same reason, supply lines are extended, and supply and resupply become a serious problem.

Conclusion

After discussing the advantages and disadvantages of both offensive and defensive operations in mountainous terrain,

I believe that we can state definitely that mountainous terrain favors the defense from the local aspect. Clausewitz recognized the value of mountainous terrain in defensive operations. And, today, the partial elimination of the tank from operations in mountainous terrain would have strengthened his opinion. By comparing the advantages offered to defensive and offensive forces in mountainous terrain, the defense is able to maintain the advantage because:

1. The initial tactical surprise available

to the attacking force is transferred quickly to the defending force.

2. The defending force is able to exploit the situation, using the factor of surprise, because it has a better knowledge of the terrain.

3. The defending force is more than able to compensate for its difficulties in organizing fire plans by having the advantage of movement.

4. The defense is better able to achieve its principal objective: the destruction of the attacking force.

The Raid on Bruneval

Digested by the MILITARY REVIEW from an article by
Rear Admiral H. E. Horan in "The Navy" (Great Britain) March 1951.

WHEN war broke out in September 1939, the Germans were by no means as far advanced as we were in the arts of radio location and direction. However, they soon learned the value of these and, with their usual thoroughness, began inventing and perfecting them. In Volume II of *The Second World War*, Mr. Winston Churchill has devoted a chapter to what he calls "The Wizard War," which traces the developments in the location and direction of aircraft. It makes most interesting and, in places, amusing reading.

As the result of most daring and careful reconnaissance toward the end of 1941, it was established that one of the most modern of the German installations was situated on a cliff close to the village of Bruneval, about 12 miles north of Le Havre.

It was decided not only to put this station out of action, but also to bring away the gear contained therein so that it could be studied by our experts engaged in the design and production of the apparatus on our side of the Channel.

This entailed a neat and intricate operation in which all three services would have to take part. In consequence, the matter was turned over to Combined Operations Headquarters. Here, under Commodore Lord Louis Mountbatten, was a small staff composed of members of all three services. Their business was not only to develop the technique and material required for this hitherto neglected form of warfare, but also to plan small operations or raids on the enemy coast involving all the services.

Intelligence

The situation as it appeared to the planners was as follows:

The installation was sited in a small hut at the top of a steep cliff about 50 yards west of an isolated house. In the latter, the guard for the hut was quartered.

About 300 yards to the east of the house was a large building known as La Presbytère which housed the troops which manned the defenses.

The latter consisted of about 15 ma-

chine-gun posts and pillboxes, some of which faced to seaward, which commanded a small beach some 500 yards to the southwest of the radio station.

In addition, a regiment of infantry was located in the vicinity of the installation and, a few miles farther inland, there was a battalion equipped with armored cars.

The entire district also was under the protection of the day and night fighters of the *Luftwaffe*.

To use the words of one of the staff, "It appeared to be a veritable hornet's nest."

Objective

The objective of the operation was to get the entire installation to England intact as quickly as possible. This was, of course, much more difficult than merely to destroy it.

The Plan

The plan eventually decided on was to take the position from the landward side using parachute troops, and then to embark the entire force from the small bit of beach already referred to in this article.

The reason for this is obvious. In an assault from the sea, surprise would have been lost, and, even if the attackers overcame the defenses, the enemy would have had time to destroy the installation. Also, the German reinforcements might arrive in time to put the entire landing party "in the bag."

To assist in the element of surprise, a bombing raid was arranged farther up the coast which it was hoped would draw off the *Luftwaffe* and allow our troop-carrying planes a clean run in.

To make the "get away," a number of landing craft were to be transported across the Channel in an infantry assault ship which then was to return to England leaving the landing craft to make their own way back.

As most of the return journey would, of necessity, have to be in daylight, the

Royal Air Force provided fighters for their protection.

Factors To Consider

As described above, the plan seems the essence of simplicity, but there were other important factors which take a hand in any form of combined operation.

First, there is the weather. To make sure of the correct dropping of the paratroops and, at the same time, enable them to be embarked, the weather had to be fine and calm.

Next, there came the question of light. The job obviously had to be done at night, so the moon had to be used for illuminating the dropping area. This, of course, was not what those who operated the assault ship or the landing craft wanted. As in all these combined affairs, a compromise had to be accepted. This, of course, tied down the date of the operation within a very limited time. To limit this time further, the embarkation had to take place on a rising tide. This concentration of circumstances was expected to occur during the last week in February.

Preparation

Toward the end of January, the operation was approved and scheduled. First and foremost, from most careful air reconnaissance, models and large-scale maps were made which were used to acquaint the participating personnel with the layout of the operation area.

Then followed detailed training of the troops with "mock-ups." This was to ensure that those taking part would be able to feel their way in the dark.

Finally, as it was most important that the installation be brought away intact, or, if this were impossible, everything about it be known, some of the scientific "back-room boys" had to be in the raiding party. These latter were duly trained in parachute jumping and joined the force.

All through February, rehearsals took

place and everything was ready by the last week of the month.

Execution

After a delay of a few days on account of the weather, the forecast for the night of 27-28 February seemed to fulfill all requirements.

At dusk that evening, the *Prince Albert*, the infantry assault ship, sailed with her landing craft embarked. Escorting her was the 14th Flotilla of motor gunboats with a small detachment of soldiers to cover the embarkation of the paratroops.

After an uneventful passage, the landing craft were dropped at their appointed place and made their way in to shore. The weather conditions were perfect.

The paratroops started much later, and found no opposition from the *Luftwaffe* on their passage due to the diversion which had been quite successful. Thus, at midnight, right on time, the paratroops "jumped" and found themselves in exactly the right place.

They assembled and moved off, on the double, to their objectives.

The isolated house was disposed of quickly. Only one man was found inside. On the way to the hut with the installation in it, the raiders had to dispose of the guard. This was done with grenades

and was a noisy business. The commotion awakened the garrison in La Presbytère who opened fire.

The raiders assembled to defend the demolition party which was working in the hut. It did not take them long to complete their work. But now the alarm had been given and our party found itself under fire from machine guns.

Now the withdrawal to the beach had to be undertaken. The party detailed to capture the beach was a little late, but soon it reported that it was safe for the troops with their precious burden to embark. This was done without further incident, and the landing craft, with the gunboats in support, set off for England.

The return voyage was uneventful, although at daylight the flotilla was only 15 miles from the French coast. During the forenoon, the entire installation was delivered safely to the Air Ministry.

The objective had been achieved.

An interesting side-light on the whole performance was that while the landing craft were waiting off the beach to embark the returning troops, two German destroyers with a couple of "R" boats passed within a mile and were seen by many anxious eyes. Luckily, they took no action. Had they done so, the entire "show" would have been spoiled.

The Artillery Attack and the German Defeat on the Eastern Front

Translated and digested by the MILITARY REVIEW from an article by Colonel Pietro Mellano in "Rivista Militare" (Italy) January 1951.

We are bringing this article to the attention of our readers, not only because of its interest, but also because of its relationship to a previous digest, "The Artillery Attack," which appeared on page 80 of the May 1951 issue of the MILITARY REVIEW.—The Editor.

THE author of "The Artillery Attack," after emphasizing the importance given by the Soviets to the employment of powerful masses of artillery (an employment designated as the "artillery attack"), concludes: "The Soviets attribute the German defeat, which began with the Battle of Moscow and the retaking of Stalingrad, to the indisputable superiority of the Soviet artillery."

The author tries to show that in the early phases of the last war, the predominant roles were played by armor and air forces, and that in the succeeding phase, the traditional predominance of the infantry and artillery was restored, with an opportune adaptation of the methods and means of the two arms.

Such statements no doubt caused the reader to wonder about the accuracy of the author's observations and conclusions.

Many Factors Contributed

It will not be difficult, I believe, to show that the German defeat on the Eastern front was due to a combination of factors much more complex than the superiority of the Soviet artillery. To state that the Soviet artillery was responsible for the German defeat would be analogous with the assertion that the Japanese defeat and surrender were due solely to the atom bombs dropped on Hiroshima and Nagasaki, a statement

which would be equally unfounded. Such statements tend to underestimate the form of modern warfare based on masses of armored vehicles with the support of aviation, which we witnessed not only in the first phase of the last war, but also to its very end.

The Soviets are unanimous in attributing the brilliant victory of their Army to the definite superiority of its artillery. However, such an assertion is too simple.

There were many factors which contributed to the defeat of the German Army, and the part played by the Soviet artillery, though great, cannot, I insist, be evaluated more highly than that played by the mass employment of the powerful T-34 tanks, the modern fighter planes, or, perhaps even more important, the part played by the traditional "General Winter," that valuable ally of the Soviet soldier in the defense of his native soil.

Barbarossa Plan Faulty

For the sake of brevity, I shall pass over the errors of strategic conception of the German attack on the Eastern front, confining myself to illustrating that the *Barbarossa* plan of war against the Soviet Union contained, in itself, the germs of defeat for the following reasons:

1. An underestimation of the efficiency and capacity of the Soviet Army, as well as the solidity and stability of the Soviet Government.

2. The unfounded optimism regarding the possibility of renewing the victorious *blitzkrieg* of Poland, Belgium, and France in the vast Russian expanses. The Germans apparently did not take into consideration the immense Russian steppe

with its scarcity of communications, as well as the reaction of the enemy, which would operate as a brake on the tempo of the advance of the armored divisions until winter came as an insurmountable antitank obstacle.

3. The initial delay of the operation due to the erroneous general ideas relative to the strength of the Soviets and the time necessary to bring about their defeat. Operation *Barbarossa* was started at least a month late; the date of the attack being made to correspond to the anniversary of the entrance of the Napoleonic Army into Russia in 1812.

Errors in Conception and Execution

However, if the errors of conception were great, those of execution had, in their turn, a decisive part in creating the seeds of defeat. The conduct of this operation teemed with errors and uncertainties. Hitler's meddling, opposition, and fanaticism exerted their influence and negated the initiative and faculty for decision on the part of the responsible commanders and their staffs.

The great offensive of the summer of 1941, which had the capture of Moscow as its objective, allowed itself to be diverted, by successes in the Ukraine. This shifted its center of gravity and caused a fatal delay in taking the Soviet capital, a delay which provided the Soviets with ample time to organize the defenses of the city and to bring large forces from the Far East.

The battle of Moscow, in November and December 1941, marked the first important set-back for the powerful German war machine, and resulted in the failure to take the most important strategic objective of the campaign. In the preceding disastrous defeats at Bialystok, Smolensk, Uman, Gomel, Kiev, and Wisma, the Soviet losses had been great, and included the loss of at least 15,000 artillery pieces.

The battle of Moscow, which had its conclusion in the great Soviet counter-offensive of December, was decided essentially:

1. By the arrival of the severe Russian winter, which exhausted the offensive impetus of the pincer movement to encircle the Soviet capital.

2. By the flood of reinforcements added to General Zhukov's forces defending Moscow. Most of these reinforcements came from Siberia and were particularly fitted and equipped for fighting on the winter steppe. On the other hand, the tanks of General Guderian's armored army remained immobilized in the ice and snow, and the German troops were not equipped for winter warfare.

3. By the tenacity and the resistance of the defenders of Moscow.

A year later, Stalingrad saw the decisive turn in the development of the war on the Eastern front. However, it is not possible, in my opinion, to attribute this success to the part played by the Soviet artillery. The victory at Stalingrad may be defined as the result of an erroneous strategic maneuver and of an equally erroneous tactical conduct on the part of the Germans. On the other hand, it is a classical example of a brilliant Soviet countermovement based primarily on the mass action of armored and motorized units.

The German strategic error resulted through divergent action toward the Caucasus, where their forces encountered the Soviets concentrating at the Don, the Volga, and Stalingrad, awaiting the arrival of their ally "General Winter" to unleash their counteroffensive.

The tactical error is represented in the launching of a frontal attack to capture Stalingrad, particularly when the primary role was assigned to armored and motorized formations. Thus, they encountered an uninterrupted succession of houses and buildings which constituted

a formidable antitank obstacle, with another powerful obstacle—the Volga—directly behind the city.

Hitler, in his incompetence and presumption, refused to admit the erroneous conduct of the battle. Thus, the Germans continued the operation until their troops were exhausted and the Soviets were able to encircle and destroy them.

This example of the "Cannae" type of maneuver, conducted by the Soviets with *blitzkrieg* means and at *blitzkrieg* speed, eliminated the myth of German invincibility. After Stalingrad, the initiative of operations on the Eastern front passed into the hands of the Soviets.

In the two great battles of Kursk and Orel, the employment of Soviet artillery was imposing, but the principal factors of success were the Soviet tanks and close-support aviation.

At the beginning of 1944, the Soviet forces were strung out from Leningrad to the lower Dnieper. By the end of the same year, they had invaded Rumania, Hungary, and Poland, and their advance guard was treading the soil of East Prussia. This advance, during 1944, reached a depth of more than 680 miles.

How is this collapse of the German Army to be explained?

Certainly, it was not the superiority of the Soviet artillery alone that brought about the defeat of the German Army. It was an important factor, but its employment was designed primarily to open the way for armored and motorized formations.

This procedure was true in the battle of Leningrad; in the drive into the Crimea and in the attack of Sevastopol; in the offensive against the Finns on the Karelian Isthmus; in the breakthrough of the Jassi-Kichenev salient (gateway to Rumania); and in the offensive against the tundra launched in the direction of Petsamo.

Soviets Used *Blitzkrieg* Tactics

However, the one idea that needs to be emphasized is that the general Soviet offensive of 1944 had all the characteristics of the German *blitzkrieg* of 1941, and was facilitated by the following conditions:

1. The grave error of the German High Command (or, better, of Hitler) in not falling back from the Crimea and the entire southern sector in order to obtain a shorter front and achieve economy of force.

2. The rapid decline of the *Luftwaffe* on the Eastern front, due to the necessity for meeting the requirements of the second front in the West and of the defense of Germany which was being subjected to powerful Anglo-American attacks.

3. The enormous increase of manpower and matériel in the Soviet Army, as well as in the close-support air forces.

All these conditions provided the Soviets with the maximum possibilities for success.

The Soviets had learned the art of *blitz* warfare from the Germans, and had put it into effect with continuity and precision from the summer of 1943 (Kursk and Orel) until the final victory in the heart of Germany.

The tactical procedures were still the same: artillery and close-support aviation preparations, followed by infantry-tank attacks, and exploited by armored and motorized forces.

Only with speed and this type of warfare was it possible for the Soviet Army to effect the spectacular advances of 1944 and the annihilation of the major German forces on the Eastern front.

Artillery Employed Effectively

A principal merit of the Soviets, in my opinion, was the employment of artillery in such a way as to ensure, together with the effective and simultaneous sup-

port of their air forces, the continuity of the action of the infantry and armored forces during the advance into the depths of the enemy positions.

This was effected by means of:

1. Infantry control over the artillery during the attack phase.
2. The employment of special "support groupings" within the framework of the divisions to reinforce the actions of the artillery weapons operating with the infantry.
3. The employment of other groupings within the framework of the army corps to provide mobile barrages on the secondary objectives of the attacking forces.
4. The employment of other groupings within the framework of the field army to provide counterbattery and long-range interdiction fires.

Procedures of this type naturally required an abundance of matériel, which could only be assured after 1943 when

the enormous flow of Allied supplies was added to ever increasing Soviet war production.

At the beginning of 1945, the German war machine was broken and the Soviet tide was uncontainable.

It is unnecessary, therefore, in my opinion, to speak of the "Battle of Berlin" with its formidable "artillery attack" finale, based on the action of 22,000 Soviet guns. It was merely the fire, indicative of final joy, which sealed the triumph of the Soviet Army over the already defeated German Army.

I believe, therefore, that I have succeeded in proving that the credit bestowed on the Soviet artillery in the defeat of Germany is not supported by history. There is no doubt, however, that the skillful and massed employment of the Soviet artillery was one of the important factors contributing to the success of the Red Army.

Tactics in Malaya

Digested by the MILITARY REVIEW from an article by Major
J. L. Hillard in "The Army Quarterly" (Great Britain) April 1951.

THE emergency in Malaya now has lasted for more than 2½ years, and, according to various authorities, it is not likely to end in the near future. In view of this situation, it seems appropriate to re-examine some of the basic strategy and tactics of the campaign in relation to the general principles of war. Such a re-examination is difficult for authorities on the spot. They become immersed in detail, which tends to confuse the essentials of the problem. Owing to the nature of human psychology, they tend to think within a certain framework of assumptions—assumptions which

may have a bearing on the lack of success in the campaign.

New Analysis Required

A distinguished linguist once said that the best way to learn a new language is to forget all the previous ones that have been learned. It is equally true that the re-examination of a problem calls for the most searching qualities of mind if it is not to be merely a reiteration of a problem. In practice, such a re-examination often is best achieved by ensuring that it is done by a fresh mind, new to the problem. The purpose of this article,

therefore, is to attempt such a fresh and unprejudiced review of the problem in its simplest and most essential terms.

The first action in any military problem is to tabulate the factors affecting the attainment of the objective. In guerrilla operations, such as those taking place in Malaya, two of the most important factors always are the nature of the country and the attitude of the local population.

Nature of the Country

Malaya is approximately the size of England and Wales. For the most part, it is covered with dense jungle and has considerable areas of swamp. It has very limited communications—road, rail, and signal—so that many parts of the country normally are never visited except possibly by aborigines. Much of the country is uninhabited and unadministered.

Attitude of the Population

The attitude of the local population must be considered under two categories—Chinese and non-Chinese. That of the non-Chinese is generally and basically pro-Government. Willingness to give support to the Government alone, however, is not sufficient. The flesh also must be strong, and, in Malaya, the ability of the pro-Government section of the population to give support is limited largely by the inability of the Government to give adequate support and protection to its well-wishers.

The attitude of the Chinese section of the population is harder to explain. Nearly all, whatever their real wishes, naturally want to be on the winning side, and, in the present situation, are, therefore, reluctant to show their hand. Force of circumstances compels many to compromise their idealism, whatever its type, with practical realism. The net result of this attitude may be summed up as follows: The attitude of the Chinese

section of the population varies between support to the guerrillas (forced or voluntary), apathy, and support to the Government. As regards the proportions of these three attitudes, there is little doubt that the guerrillas receive much more support from the population than the Government. Moreover, that received by the guerrillas is more than adequate for the conduct of their operations.

Summing up the combined effect of the conditions of the country and population, Malaya might be regarded as almost a guerrillas' paradise. In contrast to the Government forces, the guerrillas receive more support from the local population, have better information, know the terrain better, and are better able to live off, and move in, the country.

Strength of the Forces

Relative strength always is an integral part of any military appreciation, and the relative disparity of strength between the Government and guerrilla forces might appear, at first sight, to be the next outstanding fact in the present situation in Malaya.

The guerrillas have to use few, if any, of their forces on protective duties, and so can employ almost their entire strength in an offensive role. On the other hand, the Government forces have to protect the entire population of Malaya—less the guerrillas and their supporters—a population of approximately 5 million people, whose distribution is not concentrated in a few large towns, but spread out in numerous small towns, villages, squatter areas, and estates. This is a task which is essential if the Government is to secure the help and support of the masses of the population, without which no power can remain in an alien country. The consequences of this are twofold. First, the Government forces available for a fully offensive role probably are only two or three times greater than the forces available to the guerrillas. Second, it is

impossible to be strong everywhere, so that the Government forces are, of necessity, split up into numerous small parties against which the guerrillas, having, as the aggressors, the local initiative, can concentrate superior strength.

Organization, Equipment, and Resources

There now remains to consider the fourth outstanding factor in any appreciation of the present situation in Malaya, namely, the great superiority in organization, equipment, and resources of the Government forces. The problem, therefore, resolves into a consideration of how these advantages may be utilized to overcome the advantages of the guerrillas, which have been noted above. The advantages of the Government forces are of no benefit unless they can be put to practical use, and the primary contention of this article is that these advantages are not being exploited. The Government forces are using tactics which bring them down to the level of the guerrillas, which results in their fighting guerrilla-type operations. For instance, a typical operation in Malaya is something along these lines. A report is received at the local headquarters that there is a base of bandits in the jungle near Y, approximately 50 miles from the nearest road. Immediately, a party is sent to contact the guerrillas and destroy them. The normal sequel is a long and exhausting march through the jungle lasting possibly a week, and, on arrival at Y, the occupation of a small deserted clearing in the jungle. In more fortunate and unusual circumstances, contact with the guerrillas may be achieved, in which case probably a short small-arms engagement takes place between a few personnel of each side, resulting in one or two casualties before the guerrillas retire. The superiority of organization, equipment, and resources which the Government forces are able to bring against the guerrillas is almost negligible, and, due to the necessity

of dispersion of the Government forces for protective purposes to sustain civilian morale, it is more than likely that the numerical superiority in such engagements is with the guerrillas rather than the Government forces—although the overall numerical superiority of the latter is possibly twentyfold.

Lack of Tactical Mobility

In the preceding paragraph, it has been suggested that the basic problem in Malaya at the present time is that of finding a means whereby the Government superiority of organization, equipment, and resources may be exercised. What, up to the present time, has prevented the employment of this superiority? The answer is the lack of tactical mobility of the Government forces. Mobility is a very abstract concept and can, therefore, be achieved in numerous ways, but, here, mobility is considered solely in terms of the physical means of movement and their application to the problem of bringing the Government's superiority into play in Malaya against the guerrillas.

The physical means of movement which now will be considered are the human being, air transportation, and mechanical transport. In considering the first means—the human being or, to be more specific, the mobility of the individual—it has been stated before that this will put the Government forces on the same level with the guerrillas, and it has been agreed that this is the wrong approach. Air transport is being used, and has been used, in Malaya with great success in dropping supplies. This enhances the administrative mobility, hence the tactical mobility, of the Government forces. However, the characteristics of air transport are such that it cannot be used to enhance short-range, tactical mobility—especially in the case of Malaya where airfields are few and far between, and the employment of parachutists is difficult.

There remains the alternative of me-

chanical transport. However, mechanical transport, like air transport, also requires a correlative condition for its effective utilization, namely, a well-developed road system, and Malaya does not have such a system.

Summary

The development of this article now has reached its climax, namely, the assertion that the primary solution to the problem in Malaya is the construction of roads. It is not maintained that the construction of roads alone will solve all the difficulties in Malaya, any more than anyone would maintain that the ignition of a spark is the only factor necessary to cause an explosion. The battle must be fought on the social, political, and economic fronts, as well as on the military front. However, it is maintained that a policy of road construction is an essential component of any solution of the present Malayan problem. Only in this way will the Government forces be enabled to enhance their present numerical superiority over the guerrillas sufficiently to allow them to carry out their protective responsibilities, and, at the same time, have a large numerical superiority over them for offensive operations. Similarly, only in this way will the Government forces be enabled to employ their superior technical

resources against the guerrillas, to penetrate their bases and hiding places, to concentrate quickly and with surprise and in superior numbers from all directions, and, finally, to bring the guerrillas to battle—the primary tactical problem in any antiguerrilla campaign. In short, this author recommends a policy of opening up the country to free access, rather than attempting to collect the population into certain selected areas already opened up.

A Lesson From History

This solution is not novel. It was a cornerstone of the method employed by the Romans for the security of their empire. It had to be adopted on the northwest and northeast frontiers of India, and it is the writer's contention that it is not only an essential component of the short-term solution to the present problem in Malaya, but also the most important factor in any long-term solution of the internal security problem in that country.

It is agreed that it is a very expensive answer, but recent reports from Malaya have stressed the need of opening up more of the country for political and economic reasons. It may, therefore, be possible to dovetail military requirements with these political and economic requirements, and so render this solution easier of acceptance.

If history has taught us anything, it is that aggression anywhere in the world is a threat to peace everywhere in the world.

President Harry S. Truman

Combat Forces of the East Bloc

Translated and digested by the MILITARY REVIEW from an article in "Allgemeine Schweizerische Militarzeitschrift" (Switzerland) January 1951.

THE Soviet Union possesses a peace-time army of 2,500,000 men, an air force of 550,000, and a navy of 250,000 men. To this combat force can be added the troops of the MWD (Ministry of the Interior), the MGB (Ministry of National Security), and the extensive militia organizations.

The 3-year period of military training begins at 19 years of age, with about 750,000 men receiving training each year.

The ground forces are organized into army groups, armies, and divisions. Approximately 208 divisions have been identified to date; 160 within the Soviet Union, and 48 outside of that country. (The geographic locations of these divisions are shown on the accompanying chart.)

Manpower Potential

The Soviet Union's mobilization program is prepared to provide 300 combat divisions within 60 days after mobilization is started. With full mobilization, she can have 500 divisions (100 of which would be armored) in service. Altogether, 25 million men can be armed and equipped with the matériel which the Soviet Union possesses at the present time.

Division Strengths

Combat strengths differ in the various types of Soviet divisions. The motorized infantry division comprises 12,000 men; the armored division 13,000; the artillery division 9,000; the antiaircraft artillery division 6,000; and the airborne division 5,000 to 7,000 men.

Motorization is being increased steadily, but the Army is, in the main, still equipped with World War II type weapons. However, great strides have been made in improving signal communications and radar equipment.

The Air Force, which is subordinate to the Army and the Navy, is divided into air armies, divisions, regiments, battalions, and squadrons. At the present time, 12 air armies are known to be in operation. A change over to jet equipment currently is being made, with the re-equipping almost completed in Eastern Germany, but not yet started in many other areas.

Satellite Forces

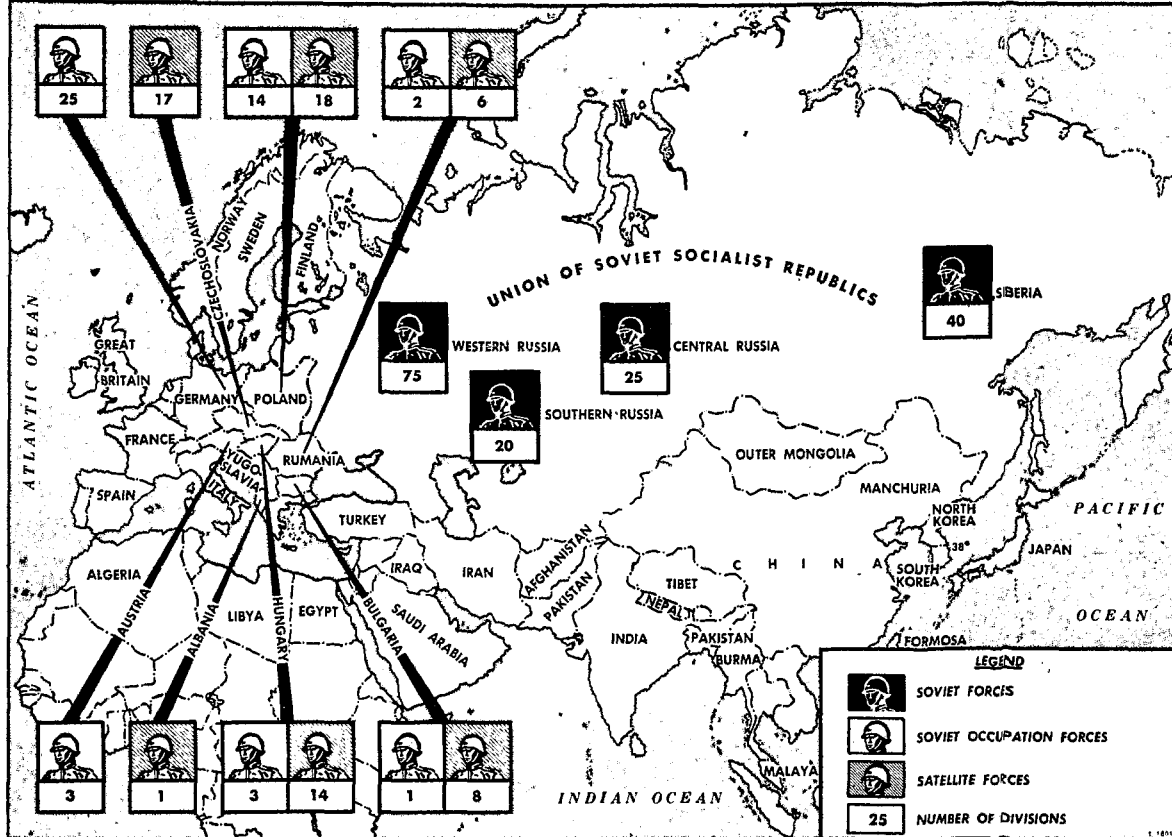
In addition to her own forces, the Soviet Union controls the armed forces of her satellite states, which could be committed in the event of a war. A glance at the accompanying chart will illustrate the vast manpower potential available to the Soviet Union.

At the present time, there are, west of the Soviet frontier, some 112 divisions (48 occupation divisions and 64 satellite divisions), equipped primarily with Soviet arms and equipment. In the event of war, the satellite armies, doubtless, can be doubled. Thus, added to the wartime potential of the Soviet Union, Communist forces would total some 628 divisions (exclusive of the forces of Communist China, North Korea, and other Communist-inspired Asiatic countries).

Forces Massing in Asia

At the present time, there is another great massing of forces taking place in Eastern Asia. Its backbone is the Siberian army consisting of 40 divisions, including 10 airborne divisions and 4,500 planes. These troops, trained especially for winter warfare, are the best in the Soviet Union. Red China, another powerful force in Asia, has an army estimated at 200 divisions. In addition, the numerous partisan

GEOGRAPHIC DISTRIBUTION OF SOVIET AND SATELLITE FORCES



armies in Malaya, Indonesia, and Indo-China (as well as the reorganized North Korean Army) should not be forgotten.

As the mere recounting of these facts indicates, another great communistic field of influence is in the making in Eastern Asia. Even though the great distances involved make it unlikely that, for ex-

ample, Chinese forces will be employed in a war in Europe, their inexhaustible human reservoir is an element of great military strength.

The massing together of such great bodies of troops in Europe and Eastern Asia will result in many crises in the times that lie ahead.

The Soviet Union and Maritime Expansion

Digested by the MILITARY REVIEW from an article by
J. W. M. Pullen in "The Navy" (Great Britain) April 1951.

WHATEVER the charges leveled against the Soviet Union, never can it be said that the Russian rulers have been inconstant in their effort to expand by sea. This policy, introduced by Peter the Great, has continued through the generations, until, finally, with Stalin, the Soviet Union seems likely to become a maritime menace.

Stalin Has Drawn From History

Stalin has said, "No wide-scale war could be waged without a navy." He is fortunate in being able to study the failures of other recent dictators and profit accordingly, for they forgot the old adage, "He that commands the sea controls the situation." Hence the buildup of the Soviet Navy, for without command of the sea world domination is impossible.

Bases an Essential Element

Among the principal elements of sea power are bases from which to operate, and it is of interest to note that all the focal points of unrest are connected with the sea and warm water ports. The latter, the Soviet Union does not possess. Therefore, control of the Korean coast line is of major importance to her. All the more so when contemplating the river communications of Siberia and the pattern of the

Trans-Siberian Railway system. Vladivostock is but 750 miles from Tokyo. Prefabrication of submarines and reconstruction in Chinese ports should present no difficulty. Paralysis of Pacific shipping would result.

French Indo-China, Burma, Malaya, Hong Kong, and Formosa are all part of the pattern of Soviet sea strategy in the Pacific.

Oil and Warm Water Ports

Recent Soviet overtures to Iran give cause for grave concern, for it is no secret that the Soviet mind visualizes the Persian Gulf as a fine venture. Not only would our shipping be menaced in that quarter, but also the supply of oil vital to both ourselves and the United States.

Control of one shore of the Gulf by the Soviet Union would be a major disaster for the democracies. It would prove a threat to India, cut our communications in the Indian Ocean, and control the Gulf of Aden. Its effect would be to paralyze the Suez route. It must not be forgotten that Molotov, in 1940, requested from Hitler the Soviet right to expansion in the Persian area. Again, in 1945, at a conference with Western statesmen, the Soviet Union asked for the cession of Eritrea. The Soviet aim is clear.

An Eye on the Mediterranean

In the Mediterranean sphere, both Greece and Turkey are in an unenviable position. Turkey is subjected to a nerve war, for she controls the outlet from the Black Sea to the Mediterranean. Trouble in Greece continues to be fostered and, although it has been temporarily checked, it flares up at intervals. Always the prize is Mediterranean bases.

The latest Soviet move is to the north, for the islands of Dago and Oesel are being fortified. Control of the Baltic is essential to any large-scale operations against Britain, and this is no formidable task. Strategic mining can effectively stop any large movement of shipping there, and the Soviet Union is an expert mine strategist.

Naval Estimates

By all accounts, there are 350 Soviet submarines, plus another 100 under construction. This, however, is not the target number, nor is it all of the Soviet naval craft, for she also is building surface ships. These vessels will need crews—crews of good seamen. The average Soviet citizen hates the sea and, voluntarily, will have none of it. Yet, this should prove a small point to the Soviet rulers, for have

they not the seamen of the Baltic countries, plus the entire coast line of China to call upon? Few Western nations realize the immense seaman potential that China can provide for there are thousands of Chinese who, from childhood, spend their lives handling craft on China's coast line and waterways. It is here that the Kremlin might be expected to look. A country whose national economy is bound up with forced labor would not hesitate to use the nationals of any Soviet-controlled state for service on Soviet ships.

From the political color of the map, the Soviet Union has a clear passage through Europe, from the Baltic to the Aegean, and eastward to the Pacific. With a little effort, Soviet pressure might stabilize the shifting and uncertain politics of some European countries and result in the addition of another Communist state. It would be then no far cry to the full achievement of the Soviet sea expansion policy, for only those countries with a seaboard are still free.

With warm water ports, together with the requisite seamen and shipbuilders, the greatest navy the world has ever known could come about. That is the pattern of Soviet maritime strategy.

Just as the venders of inferior products must eventually withdraw to markets where they have a monopoly, the history of fanatical expansionist movements shows that they have eventually diminished in vigor and have had to retreat. In much the same way, I feel that communism will lose its aggressiveness. This is our great hope. But until we can be assured that this has occurred, we cannot be assured of peace.

General J. Lawton Collins

Reflections on Combat in Wooded Areas

Translated and digested by the MILITARY REVIEW from an article by General Waldemar Erfurth in "Allgemeine Schweizerische Militärzeitschrift" (Switzerland) February 1951.

THE influence of terrain and climate on the conduct of war is great, especially in the vast wooded zones of Eastern Europe. In the past, attempts by invading armies to push far to the East often have resulted in failure, leaving the attacker in a precarious situation. It is not only the vastness of the area that gives strength to the defenses of the Soviet Union, but, above all, the wooded areas, which make movements in these areas almost impossible. For this reason, the military doctrine of the past has advocated avoiding such areas.

Clausewitz, in his book *On War*, stated:

... When, as in Russia and Poland, a very large tract of country is nearly everywhere covered with forest, and the assailant has not the power of getting beyond it, his situation will be a very difficult one. We have only to think of the many difficulties of supply with which he has to contend and how little he can do in the obscurity of the forest to make his ubiquitous adversary feel his superiority in numbers. Certainly this is one of the worst situations in which the offensive can be placed.

Breaking the Barriers

Up to the time of World War I, Clausewitz's statement was recognized universally as being correct. However, at that time, the situation began to change, and now armies no longer attempt to avoid trackless and impassable terrain.

They regard neither terrain nor climate as barriers to military operations.

No general staff of the eighteenth century would have envisaged operations north of the Arctic Circle in the wilderness of Lapland and Karelia, or of undertaking a winter offensive in the interior of Russia, especially on the large scale required by modern warfare. These areas, which formerly were avoided and into which only expeditions with special equipment dared to penetrate, are included, without hesitation, in strategic planning

today. Thus, European armies are fighting in the jungles of Malaya and Indo-China, and even the areas of Eastern Europe are regarded as eventual theaters of war in which invasion armies might have to operate.

Effects of Climate and Terrain

It is the purpose of this article to discuss some of the problems presented by terrain and climate, and the demands that they make on military forces. An army command, which is unacquainted with or which underestimates the difficulties presented by terrain and climate, will be in danger of having its operations bog down or of incurring excessive casualties. This is what happened to the German Army of the East in the winter of 1941-42, when, without suitable winter clothing, with excessive and too heavy vehicles, and with weapons which were sensitive to cold weather, it was exposed to a severe Russian winter without any provisions having been made for such conditions.

Special Tactics Required

The tactical rules which have developed as a result of combat in open terrain, and which are designed to fit the conditions found in those areas, are applicable, only in a limited way, in wooded areas. Tactics which are adapted to combat in woods must take into account the lack of roads and the limited visibility. The forests of Eastern Europe, for example, are often without roads or boundaries. The Western or Central European, who has grown up in an urban community, is overcome by the psychological effects of the forests of the East. They are strange and unearthly to him, and he seeks to escape from their semidarkness.

Combat Problems

Combat in wooded areas presents many problems peculiar to such types of terrain:

1. In some of the vast forest areas of Eastern Europe, major military operations are barely possible, or have only a small chance of succeeding. Such areas are difficult to traverse, and poorly suited for the movements of large military formations equipped with heavy vehicles. They slow down the tempo of offensive operations, consume manpower, and cost a great deal of time.

2. Wooded areas provide a disadvantage for forces engaged in offensive action. However, in the same areas and under the same conditions, forces engaged in defensive action will have an advantage. The correct evaluation, and the skillful exploitation, of the natural terrain features explain, for example, the stubborn resistance which the Finnish Army was able to offer the numerically superior Soviet forces during the winter of 1939-40.

3. The infiltration of hostile partisan forces in forested zones can never be prevented completely. In this respect, the conduct of ground reconnaissance presents many difficult problems.

4. The division, which has proved its value as a tactical unit in all the armies of the world, does not have the mobility nor the flexibility required for operations in wooded areas. Perhaps the mixed brigade is better suited for offensive action over such terrain. For example, during the last war, the Finns reorganized several divisions into brigades and obtained good results with them. It must be remembered that it is important, when fighting in forest areas, to reduce the number of vehicles in the division and unit trains.

5. The most suitable time for offensive

operations in wooded terrain is during the winter, when, due to the freezing of swamps and lakes, the terrain is traversable off the roads. In addition, only during winter weather is it possible to count on the use of roads. During the spring thaws, the few roads found in such areas became unusable.

6. Forest areas present particular difficulties in the employment of air forces. For example, adequate close support and aerial reconnaissance are almost impossible.

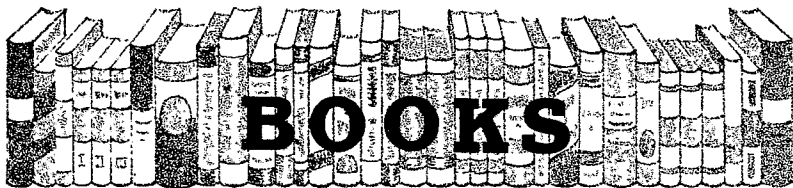
7. Warfare in wooded regions, like fighting in tropical jungle terrain, will, of necessity, sooner or later, assume the characteristics of guerrilla warfare, gradually sinking to the level of individual combat, carried on at close range. Such combat can be supported only in a limited manner by artillery and heavy weapons. It is fought, in the main, with the machine pistol, the hand grenade, and the knife.

Training and Maneuvers Essential

The Western European armies neither favor nor engage in maneuvers in extensive wooded areas during severe winter weather. However, if it is desired to prepare troops for all possibilities and to attain the same degree of efficiency that the East holds in this field, training in combat in woods and in winter warfare cannot be neglected.

Conclusion

Modern techniques have created the means for overcoming natural difficulties of terrain and climate. By evaluating the natural terrain features correctly, and exploiting every advantage, combat under conditions formerly regarded as unfavorable is possible, and can be successful.



FOR THE MILITARY READER

TITO AND GOLIATH. By Hamilton Fish Armstrong. 312 Pages. The Macmillan Company, New York. \$3.50.

By COL GEORGE C. REINHARDT, *CE*

Tito *versus* Stalin; patriotism *versus* unquestioning obedience to Moscow; industrial proletariat *versus* agrarian peasants; all these as well as many less sharply delineated conflicts explain the defection of Yugoslavia from the Cominform. This fortunate event for the West is fascinatingly described by the editor of FOREIGN AFFAIRS, Hamilton Fish Armstrong, in his recent book *Tito and Goliath*. A close student of Yugoslav affairs since he was military attache, in Belgrade, at the close of World War I, Mr. Armstrong's optimism regarding Tito's success in escaping the vengeance of "Goliath" cannot be written off as a mere hope.

The career, from boyhood, of Josip Broz (Tito) is interestingly presented. In the development of that career are traced the causes of the present tense situation; an acceptable hypothesis for this case history because of Tito's absolute mastery over his countrymen. Yet a larger lesson may well be inferred: dictators cannot afford the luxury of friends and partners; they must insist upon sycophants. The Kremlin's break with Tito was less an "error" than its failure to liquidate him. That break was no less inevitable than the dissolving of its partnership, in 1941, with Hitler.

Precise readers might deem contradictory the statement that Tito objected to the Soviet policy of withholding technical

aid and equipment in order to keep Yugoslavia purely agrarian, and the author's insistence that the Marxist "line," glorifying the factory worker over the farmer, offended Tito as head of a predominantly peasant nation. No one, however, can deny the contrast between Tito's "No matter how much each of us loves the land of Socialism, the USSR, he can in no case love his country less," and the Cominform blast: "The attitude toward the Soviet Union is now the test of devotion to the cause of proletarian internationalism." It accents the fact that today no country, save China, professes devotion to Moscow except those where the bayonets of the Soviet Army gleam brightly.

With Mr. Armstrong's recommendation that we befriend Tito in his present struggle, there can be no sound argument. Any defection in the hostile camp should be abetted with the same impartiality that the Kremlin receives dissidents among the West. But the author's contention, in cautious terms, that "different social systems can live side by side," runs into the rocks of communism's basic dogma: "Conquer the world or lose everything." That dogma is implicit from Marx to Stalin.

INDUSTRIAL REVOLUTION IN MEXICO. By Sanford A. Mosk. 331 Pages. University of California Press, Berkeley. \$3.75.

THIS IS GERMANY. Edited by Arthur Settler. 429 Pages. William Sloane Associates, New York. \$4.00.

MR. LINCOLN'S ARMY. By Bruce Catton. 372 Pages. Doubleday and Co., Inc., New York. \$3.75.

By IVAN J. BIRNER, *Ph.D.*

This volume puts together in one readable package three related but, at the same time, rather discrete themes. First, it is a story of the Army of the Potomac, from the start of the Civil War to the end of the Battle of Antietam. As such, it gives a good picture of that army, the kind of men that made up its units, and what kind of officers commanded it.

Second, the book is a psychological-biographical sketch of McClellan. The author tries to answer the questions: What kind of man was this general? What were his motivations, inhibitions, and goals? The answers are suggested through the source material quoted—especially the excerpts of McClellan's letters, most of which were written to his wife.

Third, there is a brilliantly told, detailed account of the Battle of Antietam. The whole story of the battle is here. All echelons from the general commanding down to the individual foot soldier are included. Timewise, the reader is carried from the opening roar of Jackson's artillery until darkness engulfed the bloody field. The entire area of the battle is pictured—Sharpsburg to Westwood to Pry House to the line of departure from which A.P. Hill's counterattack broke up the Connecticut regiment. Despite the detail, the reader sees the whole battle.

This book again brings out the tremendous influence of personality upon military actions; in this case, primarily McClellan's personality. It is challenging reading for the modern soldier and citizen. In fairness, its weaknesses should be noted. The author has an "axe to grind." The axe is—beware of the regular military for despite its demonstrated inaptness, it schemes to take over the country.

WAR IN KOREA. The Report of a Woman Combat Correspondent. By Marguerite Higgins. 223 Pages. Doubleday and Co., Inc., New York. \$3.75.

By COL ROY W. MUTH, *CmlC*

The vivid portrayal of incidents in this book is sure to provoke the military reader into some deep thinking.

Lack of military intelligence is described early and continuously throughout the account of the early American actions in Korea. This lack, combined with the acceptance of faulty information as fact, precipitated hasty and impulsive actions on the part of individuals. Decisions were made on hunches founded on rumor. Strict local security was tempered by ignorance of the forces immediately opposed. Under the pressure of time, limited capabilities, and danger, what must be done to ensure that the action taken is based on a sound knowledge of the situation?

Miss Higgins' description of the conduct of green troops in their early actions makes one wonder what can be done to get the soldier through the transition from peacetime training to war experience without the toll of unnecessary casualties. Does the fault lie, as she claims, in the stressing of Troop Information and Education instead of training in weapons and tactics? Or, is there a failure in the control which the organization of combat units is supposed to provide?

Many other problems are implied in the observation of this correspondent. Supply, transportation, and supporting troops are subjects of the author's comments. The situations have a down-to-earth realism which stimulates the reader's thinking on basic military subjects.

INDIA, PAKISTAN, CEYLON. Edited by W. Norman Brown. 234 Pages. Cornell University Press, Ithaca, New York. \$3.00.

THE U.S. MARINES AND AMPHIBIOUS WAR: Its Theory and Its Practice in the Pacific. By Jeter A. Isely and Philip A. Crowl. 636 Pages. Princeton University Press, Princeton, New Jersey. \$7.50.

By LT COL DAVID W. SILVEY, USMC

To a great extent, the winning of World War II depended upon securing heavily defended beachheads, and it is because the US Marines foresaw such an eventuality that the Allied forces were prepared for this type of combat.

The U.S. Marines and Amphibious War is an impartial and accurate analysis and evaluation of the role of the Marines in the development and establishment of amphibious doctrine and techniques.

The authors point out that it was not until the end of the Spanish-American War that naval planners realized the great need for a permanent force to seize and defend advance naval bases. From 1902 until the 1920s, the emphasis was placed upon defense. The Marines were the obvious choice for the job, being trained ground troops but familiar with naval procedures and under naval authority.

The tragic failure of the British at Gallipoli seemed to preclude the assault and capture of an energetically defended beachhead. But, when others abandoned interest in amphibious warfare, a group of Marines took hold of a neglected and maligned theory, reduced it to a practical science in the face of a lack of funds and doubting military orthodoxy, and perfected it so that the basic doctrine established between 1922 and 1935 underwent no major change throughout the acid test of World War II. Technological developments and refinements in techniques did change the face of amphibious operations. Important examples of better techniques included the improved co-ordination of supporting arms, the evolution of close air support, the increased effectiveness of naval gunfire sup-

port, the improved method and means of controlling the ship-to-shore movement, and improved methods in planning for and controlling logistics.

With few historical examples upon which to draw, the Marines were forced to use the trial and error method. The year 1933 marked a crucial turning point in Marine Corps history with the establishment of the Fleet Marine Force. The Marine Corps Schools at Quantico had turned to a study of landing procedures which culminated in the first landing manual published in 1934, covering the peculiar features of this type of combat: (a) command relations, (b) naval gunfire, (c) aerial support, (d) the ship-to-shore movement, (e) securing the beachhead, and (f) logistics. The Fleet Marine Force was the logical agency to make the service tests of the Schools' theories. By 1940, most of the major problems had been solved in theory, but in actual practice many "bugs" remained. It was not until 1942 that the techniques were smooth enough to warrant their employment at Guadalcanal.

The Guadalcanal campaign presented many difficulties, particularly in command relations and logistics, but these were overcome in subsequent operations. The amphibious assault of Okinawa, the final amphibious operation of World War II resulting in the seizure of a relatively large piece of real estate, found amphibious techniques, in general, approaching near perfection.

The authors present, with exhaustive treatment, an analysis of each of the amphibious battles of World War II which involved Marines. They constructively point out defects in execution and scientifically evaluate and interpret the vast amount of material written about the Marines in the amphibious field, to the end that past errors will not be repeated, and that future developments in tactics and techniques will be stimulated.