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Colonel Jonathan O. Seaman served in the South Pacific Theater as a field artillery battalion commander, and in the European Theater as an assistant G3, Headquarters, 6th Army Group. After the war, he served in Headquarters, Army Ground Forces, until 1947. He graduated from the Armed Forces Staff College in January 1948 and was assigned as an instructor at the Command and General Staff College. In 1950, he was transferred to the faculty of the Army War College. At present, he is assigned to Headquarters, Seventh Army.

Colonel Carl T. Schmidt, recently graduated from the Army War College, has been assigned as an instructor at that institution. The author of several articles which appeared in previous issues of the *MILITARY REVIEW*, he is also a graduate of the University of California (B.S. in 1928—Ph.D. in 1931), the Strategic Intelligence School, the Command and General Staff College, and the Industrial College of the Armed Forces. During World War II, he served with the 91st Infantry Division and with Headquarters, 12th Army Group.

H-HOUR TO BE ANNOUNCED

Lieutenant Colonel William R. Shanahan, *Artillery*
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"5TH Inf Div atks 7 Jun in the direction Hill 220—CR 176, seizes obj 1 and 2, to protect the concentration of the corps. H-hour to be announced." The only element missing in the mission quoted is the exact time of the attack. It is the purpose of this article to examine those factors which assist a commander in determining *when* he should commit his forces to combat.

German generals, interrogated after VE-day, stated that almost always we attacked at dawn. A Chinese combat bulletin, captured in Korea, indicated that we follow a stereotyped pattern of attack, with an H-hour usually between 0800 and 0900 and a set sequence in employing air, artillery, tanks, and infantry. It is obvious that despite the most careful preparation, the adoption of such definite patterns will do much to blunt our offensive capabilities.

Of all the elements of the commander's decision—*who, what, when, where, how,* and *why*—those that normally require the most consideration by the commander and his staff are *when, where, and how*. In arriving at the *where*, the unit's mission is analyzed thoroughly; a detailed study is made of the weather and terrain; enemy dispositions and capabilities are considered carefully; and our own troops, as regards their dispositions and condition, are taken into account. The same care usually is

given before the *how* is decided upon. For example, if the enemy position is strong and definitely determined, the possibility of employing three regiments to place maximum power forward is examined. If, on the other hand, the enemy situation is relatively unknown, a good-size reserve will be held out to provide more flexibility so as to cope with unforeseen circumstances. In selecting the *when*, however, the same careful consideration is not always given.

To pick the proper time to attack under the conditions that exist, not only must the factors mentioned above under *where* and *how* be considered, but also several others such as visibility, the time necessary for adequate reconnaissance, and the degree to which the unit is dependent on air and artillery support. In this discussion, let us focus our attention on visibility, relative combat power, and enemy capabilities. The other factors, of course, will enter the discussion since they cannot be disregarded in selecting a proper time to launch an attack.

Visibility

Conditions of visibility are affected primarily by the time of day, modified by existing weather. Normally, these conditions change most rapidly in the twilight periods just before sunrise and just after sunset.

In evolving a commander's decision, the 'when' normally is given least consideration. In determining the time for an attack, it is important to analyze the visibility, relative combat power, and enemy capabilities

Twilights are divided into three periods (see Figure 1): *astronomical twilight*, which affords such meager light that, for military purposes, it may be considered a period of darkness; *nautical twilight*, which, in the morning, begins when the sun is 12° below the horizon and ends when it is 6° below the horizon, and is the transition period between darkness and light; and *civil twilight*, which begins when the sun is 6° below the horizon and ends at sunrise, affording sufficient light, under favorable weather conditions, to carry on normal daylight activities. These twilights, of course, are reversed in the evening. Their exact daily times are furnished by the Air Weather Service and also are contained in tables published by the United States Naval Observatory, which are available to all headquarters.

In planning an early morning attack, the period of nautical twilight should be explored. Its duration depends on the latitude and the season of the year. At latitude 40°N , for example, it varies from 32 minutes at the spring or fall equinox to 42 minutes at the summer solstice in June. At latitude 50°N , the variation is from 39 minutes at equinox to 55 minutes at the summer solstice. At latitude 60°N , it ranges from 46 minutes at equinox to zero at or near the summer solstice. At this latitude, there is no nautical twilight near the summer solstice because the sun never gets as far as 6° below the horizon, thus, at that time of the year, there is continuous daylight.

The beginning of morning nautical twilight (BMNT) is very useful for military operations because it provides a specific time in the early morning for purposes of co-ordination, avoiding such indefinite terms as first light, daylight, dawn, and early morning. At BMNT, sufficient light normally is available to effect close co-ordination among individual infantrymen and yet have them approach an enemy position relatively unobserved. At about the middle of nautical twilight, normally there

is sufficient light to adjust close-in mortar and artillery fire. Any specific distance as regards visibility during this period is only a general guide since it is affected by such variables as weather (which includes atmospheric obstructions to visibility such as fog, smoke, haze, dust, rain, and snow): the relative position of the observer with respect to the object he is viewing and the source of light; the movements of object(s) being viewed; and the physical environment.

The term BMNT should be used for planning purposes only and specific times must be given in orders. This specific time must be arrived at by the commander, assisted by his staff, by first determining the conditions of visibility desired at the beginning of and during the various phases of the attack. Then, the times at which the desired conditions of visibility will exist can be predicted by considering the light data furnished by the Air Weather Service or the United States Naval Observatory tables, and by analyzing the variables such as weather mentioned above. Experience, keen judgment, and a knowledge of local conditions greatly increase the accuracy of the predicted time.

Relative Combat Power

In general, a force that is dependent largely for success on superior air and artillery support will favor daylight attacks in order to exploit these means most advantageously. Conversely, a force that lacks this superiority must be expected to close with the enemy under cover of darkness or unfavorable weather. However, there will be many occasions when the force possessing combat superiority can use night attacks or attacks during unfavorable weather.

One such occasion occurs when the enemy has occupied and carefully organized a position of great defensive strength, with excellent fields of fire for his flat trajectory weapons. Here, the commander, in his estimate, must consider whether he can

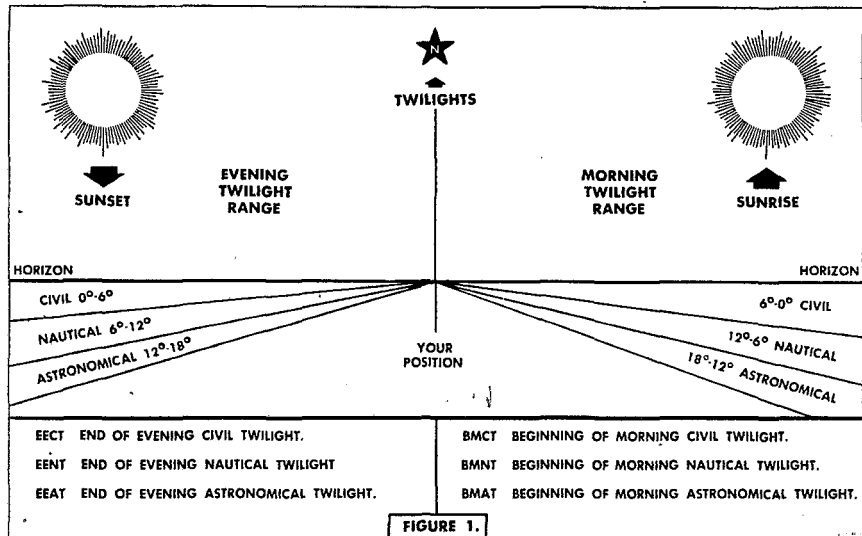
better accomplish his mission by attacking in daylight, using the full effect of his air and artillery to blast his way into the enemy position, or whether he is more apt to obtain success, with fewer casualties, by attempting to capitalize on surprise by attacking at night or during bad weather. The superior force also can use night attacks to vary the pattern of their operations, or to keep continuous pressure on the enemy.

Enemy Capabilities

Enemy capabilities often can be the deciding factor in selecting a time of attack. If the indications point to the adoption by

necessary preparations and the selection of an H-hour that will be most advantageous under the conditions that exist. When the withdrawal capability is believed to be the most likely of adoption, the commander should attempt to time his attack so as to catch the enemy as he initiates his retrograde movement, thus disrupting him and achieving considerable success at small cost.

A capability of early, major reinforcement by the enemy often will force a commander to attack as soon as possible so that he can accomplish a mission that would be doubtful or impossible of accom-



the enemy of an attack capability, the commander must decide whether the ultimate accomplishment of his mission will be aided more by defending and attempting to inflict heavy casualties on the opposing forces, or by assuming the offensive prior to the hostile attack with the possibility of delaying the enemy's plans or even causing him to cancel them.

If it is believed that the enemy will defend, more time is available for any

plishment, if the forces opposing him were reinforced. However, if he has planned an envelopment that will annihilate the enemy, and feels that he can be successful despite the enemy reinforcements, he may decide to wait until the reinforcement is made and thus destroy a larger force.

Having examined the influence of some of the major factors, let us now consider how various periods of the day affect the selection of the time of attack.

Early Morning Attacks

The primary advantages of attacks at this time are that there is maximum darkness for their preparation with minimum time prior to the attack for hostile observation of such preparations, and that the entire day is available for continuing the attack. The major disadvantage is that it may partially sacrifice surprise, since the enemy realizes the possibility of an attack at this time, even though he does not know the location of the attack or the scheme of maneuver to be executed.

In selecting the proper H-hour for an early morning attack, the commander particularly must consider the visibility desired during various phases of the attack. If the force is dependent for success largely on air and artillery support, a time sufficiently after the beginning of morning civil twilight (BMCT) to permit the desired air and artillery preparation is designated. Of course, if atmospheric conditions do not permit the normal visibility available on clear days at BMCT, the attack will have to be delayed accordingly.

In open terrain, where the enemy has good fields of fire and when he is well disposed for defense, the period prior to BMCT—nautical twilight—is extremely useful. By attacking at BMNT, sufficient light, as has been mentioned, normally is available for close co-ordination among individuals, and there is the possibility of gaining surprise and closing with the enemy before he discovers your attack. If the attack is discovered before you close, the effectiveness of his fires, except for preplanned defensive fires, is decreased greatly. The danger here is that unless an accurate estimate of the time required to move from the line of departure to the enemy position has been made, daylight may find the assaulting troops short of their objective under heavy observed fire. The principal disadvantage of an attack at this time is that air and observed artillery support are not available initially.

However, if surprise is obtained, the lack of this support is not important.

Attacks Later in the Day

Midmorning attacks, in contrast to those made in the early morning, sometimes are necessary because the strength of the enemy position necessitates an air and artillery preparation several hours long. Attacks at this time sometimes are desirable because of the possibility of gaining initial surprise. If, as a matter of practice, you have been making night or early morning attacks, the enemy may not be as alert at this time. Midmorning attacks provide adequate time for continuing the attack, and afford maximum time for the co-ordination of supporting weapons. A major disadvantage, particularly true if reserves have been brought up under cover of darkness to pass through or reinforce the units in contact, is that the forward units are exposed to enemy observed fire for a considerable time. A long, intense preparation eliminates this disadvantage to a great degree, but also decreases the chance of surprise. A further disadvantage in delaying the jump-off until midmorning is that the enemy may beat you to the punch and attack first, and thus disrupt your attack, or, as a minimum, delay it.

The advantages and disadvantages of midmorning attacks apply to those made later in the day except, of course, that the time remaining for continuing the attack is decreased accordingly. Attacks late in the afternoon, while usually least desirable of all because of the short period of daylight that remains after their initiation, may, at times, be justified for special reasons such as the need for seizing a suitable line of departure for a subsequent night attack.

Night Attacks

Night attacks are made to accomplish any one or more of the following purposes: to complete or exploit a success.

thus maintaining continuous pressure on the enemy; to gain important terrain, usually with a view to continuing operations after daylight; to avoid heavy losses; and to capitalize on surprise. Ideal conditions for a night attack exist when fresh, well-trained troops are available, the terrain is open, the objective is limited and well defined, and one or more of the purposes of a night attack can be achieved. The degree to which these conditions exist must be considered by the commander in making his estimate, since the ideal conditions will seldom, if ever, be present in the field. In many cases, night attacks have proved highly successful where daylight attacks have been unsuccessful or exceedingly costly.

The principal advantages of attacks made under the cover of darkness are the enhancement of the chances of obtaining surprise, and the possibility of accomplishing the mission with minimum casualties because of the decrease in effectiveness of enemy aimed or adjusted fires. The major disadvantage is that the control of the operation is more difficult at night.

In general, we can divide night attacks into two types, early and late. Early attacks are particularly valuable in denying the enemy time to reorganize after you have been pushing him all day. They also are valuable when indications point to an enemy withdrawal under cover of darkness, or to an enemy night attack. In the former case, you may catch him at an extremely vulnerable time, disorganize him, and achieve considerable success. In the latter case, your attack may delay his projected operations or cause him to cancel his plans completely.

Attacks later in the night are useful for seizing limited objectives—important terrain features or well-defended areas—usually as a preliminary to subsequent larger scale attacks at BMNT or later. By attacking at this time, the force may capitalize on surprise, reduce personnel and

matériel losses, and pave the way for a highly successful daylight attack.

The proper use of battlefield illumination, either searchlights or star shells, can be of great assistance to the commander in overcoming the difficulties of control at night. Infrared devices, such as the metascope and infrared beacon, provide other control aids during poor visibility. Conversely, the use by the enemy of illumination, infrared devices, or radar can nullify, to a great extent, the advantages of night attacks.

Examples

At this point, let us apply what we have discussed and select H-hour in some specific instances.

Example 1

1. *Situation.*—a. Blue Infantry Division attacked north at 260500 May with the mission of seizing "Z" against an estimated six Red infantry battalions. The enemy was cleared from Hill 93 and the town of "A," and, by 262000 May, the situation is as shown on Figure 2. Blue forces have stopped because of darkness. Casualties for the day were light. No enemy reserves are known to be in the area. This is the Blue Division's second day in combat.

b. The weather forecast is "continued overcast and warm weather." The end of evening nautical twilight (EENT) tonight is 2015. BMNT tomorrow is 0500. BMCT is 0540. Moon phase for tonight is the last quarter.

c. The terrain is broken. Cover and concealment for advancing infantry is excellent.

2. *Requirement.*—When do you continue the attack?

3. *Solution.*—At 270500 May.

4. *Discussion.*—Although the logical objective, Hill 102, is only 1,500 yards distant, and a night attack, if successful, will place your division in a more advantageous position for continuing the attack on 27

May to seize "Z," you order an attack at BMNT because conditions are not favorable for a night attack. The facts to consider are:

- a. The troops have been attacking since 0500.
- b. The troops are not experienced.
- c. Adequate time for the detailed day-

c. Blue's attack was stopped by 1300 because of heavy casualties.

d. The weather will be clear and warm with a full moon that rises at 2020 and sets at 0445.

2. *Requirement.*—When do you continue the attack?

3. *Solution.*—At 270100 May.

4. *Discussion.*—You elect to make a night attack because the conditions are almost ideal. In selecting the time for a late night attack (one whose purpose is to seize critical terrain or a well-defended area with a view to continuing operations after daylight), H-hour must be selected by deciding where you want the unit to be at BMNT and computing *backward*. In this case, the unit should be on the objective (Hill 102) and consolidated in the event of a Red counterattack to retake this critical terrain. Allowing 1 hour for a consolidation of the objective, 1 hour for overcoming resistance on the objective, and 2 hours to go from the line of departure to the objective (a distance of 1,500 yards at an average rate of advance of 100 yards in 6 to 10 minutes), we get a total of 4 hours. BMNT is 0500. Thus, 0100 is the selected H-hour.

The reserve regiment (the logical unit to make the night attack since it is fresh) is approximately 4 miles away and can be in position to make the attack by leaving its present position at EENT.

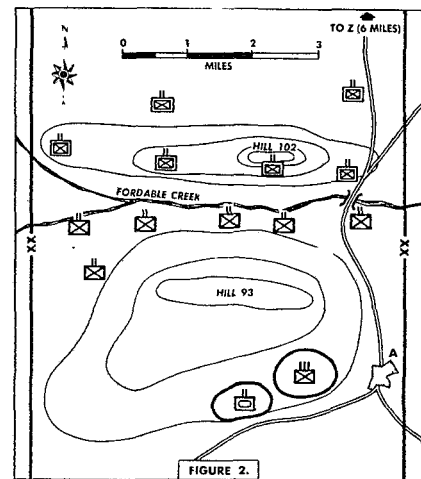
Example 3

1. *Situation.*—The situation is the same as in Example 1 (Figure 2) except that:

- a. Blue's casualties for the day have been moderate.
- b. The weather forecast is "continued clear and warm."

c. The terrain is open, affording little cover and concealment.

d. In order to reduce casualties, the Commanding General, Blue Infantry Division, desires a 20-minute air and artillery preparation.



light reconnaissance necessary for a night attack is not available.

d. The terrain is broken affording cover and concealment.

e. The enemy has not been able to stop the daylight attacks.

f. Blue's casualties, during daylight, have been light.

g. Unless searchlights are used, conditions of visibility will not be good.

Example 2

1. *Situation.*—The situation is the same as in Example 1 (Figure 2) except that:

a. The Blue Infantry Division has had a year's experience in this theater.

b. The terrain is open, and the enemy has excellent fields of fire.

2. *Requirement.*—When do you continue the attack?

3. *Solution.*—At 270600 May.

4. *Discussion.*—Because of clear weather conditions, the air and artillery preparation can begin at 0540 (BMCT). With a 20-minute preparation, the H-hour selected is 0600.

Summary

If the commander and the staff are to pay more than lip service to the selection or recommendation of a proper time of attack, they must give it as much consideration as they do the scheme of maneuver. The cardinal sin is to become stereotyped.

This can lead to a situation such as existed in World War I, when, under conditions of stabilized trench warfare and limited objectives, attacks at dawn became so frequent that both sides held "stand-to" every morning at BMNT. If no attack was forthcoming at that time, they could relax for the rest of the day.

Surprise, one of the principles of war, has become increasingly difficult of attainment because of modern reconnaissance and observation techniques. The direction and strength of an attack contribute to the attainment of surprise, but they are not any more important than the selection of the proper H-hour.

The tempo of all training has been accelerated to turn out a combat soldier in the shortest period of time consistent with military effectiveness. We want to save training time but not at the expense of fully preparing the soldier to give a good account of himself on the battlefield.

General Mark W. Clark

How Crete Was Lost—Yet With Profit

Captain B. H. Liddell Hart

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.

TEN years ago saw the most astonishing and audacious feat of the war. It was, also, the most striking of all airborne operations that had yet taken place. It was performed at Britain's expense—and should remain a warning to us not to discount the risk of similar surprise strokes "out of the blue" in the future.

The Attack

At 0800 on the morning of 20 May 1941, some 3,000 German parachute troops dropped out of the sky upon Crete. The island was held by 28,600 British, Australian, and New Zealand troops, along with 2 Greek divisions amounting in numbers to almost as many.

The attack had been expected, as a follow-up to the German conquest of the Balkans, and good information about the preparations had been provided by our agents in Greece. But the airborne threat was not regarded as seriously as it should have been. Mr. Churchill has revealed that General Freyberg, who had been appointed to command in Crete on his suggestion, reported on 5 May: "Cannot understand nervousness; am not in the least anxious about airborne attack." He showed more concern about a sea-borne invasion—a danger which was, in the event, dispelled by the Royal Navy.

Mr. Churchill felt anxious about the threat, "especially from the air." He urged that "at least another dozen I tanks" should be sent to reinforce the mere half dozen that were there. An even more fundamental weakness was the complete lack of air support—to combat the German dive bombers and intercept the airborne troops. Even the provision of antiaircraft guns was scanty.

By the first evening, the number of Germans on the island had been more than doubled, and was progressively reinforced—by parachute drop, by glider, and, from the second evening onward, by troop carriers. These began landing on the captured Maleme airfield while it was still swept by the defenders' artillery and mortar fire. The ultimate total of German troops brought by air was about 22,000. Many were killed and injured by crashes on landing, but those that survived were the toughest of fighters, whereas their numerically superior opponents were not so highly trained and still suffered from the shock of being driven out of Greece. Nevertheless, many of these troops fought hard, and their stiff resistance had important effects that have only become known later.

Optimism continued to prevail for a time in British high quarters. In the light of reports received, Mr. Churchill told the House of Commons on the second day that "the greater part" of the airborne invaders had been wiped out. Middle East Headquarters went on for two more

days talking about the Germans being "mopped up."

Evacuation

But on the seventh day, 26 May, the British commander in Crete reported: "... in my opinion the limit of endurance has been reached by the troops under my command ... our position here is hopeless." Coming from such a stout-hearted soldier as General Freyberg, holder of the Victoria Cross, this verdict was not questioned. Evacuation began on the night of the 28th, and ended on the night of the 31st—the Navy, in its persistent efforts to bring away as many troops as possible, suffered heavy losses from the enemy's dominant air force. A total of 16,500 was rescued, including about 2,000 Greeks, but the rest were left dead or prisoner in German hands. The Navy had well over 2,000 dead. Three cruisers and six destroyers were sunk. Thirteen other ships were badly damaged, including two battleships and the only aircraft carrier then in the Mediterranean Fleet.

The Germans had some 4,000 men killed, and about twice as many wounded. Thus, their permanent loss was less than a third of what the British had suffered, apart from the Greeks and local Cretan levies. But, as the loss fell mostly on the picked troops of Germany's one existing parachute division, it had an unforeseen effect on Hitler that turned out to our benefit.

At the moment, however, the collapse

10 days, and out of Greece within 3 weeks from the start of the German invasion. General Wavell's winter success in capturing Cyrenaica from the Italians appeared no more than a delusory break in the clouds. With this fresh run of defeats at German hands, and the spring renewal of the air blitz on England, the prospect was darker even than in 1940.

German Reaction

But Hitler did not follow-up his third Mediterranean victory in any of the ways expected on our side—a pounce onto Cyprus, Syria, Suez, or Malta. A month later, he launched the invasion of Russia, and, from that time on, neglected the opportunities that lay open for driving the British out of the Mediterranean and the Middle East. If his forfeit was due mainly to his absorption in the Russian venture, it also was due to his reaction after the victory in Crete. The cost depressed him more than the conquest exhilarated him. It was such a contrast to the cheapness of his previous successes and far larger captures.

In Yugoslavia and Greece, his new armored forces had been as irresistible as in the plains of Poland and France, despite the mountain obstacles they met. They had swept through both countries like a whirlwind and knocked over the opponent armies like ninepins.

Field Marshal List's army captured 90,000 Yugoslavs, 270,000 Greeks, and

Hitler's conclusion that 'the day of parachute troops is over,' and his failure to follow up the victory in Crete by invading Malta, now is considered as compensating profits of the defeat suffered by our Allies

in Crete looked disastrous. It hit the British people all the harder because it followed quickly on the heels of two other disasters—in April, the British forces had been swept out of Cyrenaica by Rommel in

13,000 British—at a cost to itself of barely 5,000 men killed and wounded, as later records showed. (At the time, British newspapers estimated the German losses as more than a quarter of a million, and

even a British official statement put them as "probably 75,000.")

The blemish on Hitler's Cretan victory was not only the higher loss, but the fact that it weakened temporarily the one new kind of land-fighting force he had which could reach out and seize places over the sea without risking interception by the British Navy—which still dominated the seascape, despite its heavy losses. In effect, Hitler had sprained his wrist in Crete.

German Viewpoint

The story of the dramatic campaign often has been related from the British side, but now can be given from the attacker's side. After the war, I had an opportunity to interrogate General Student, the Commander in Chief of the German Airborne Forces, when he was a prisoner of war here, and subsequently have received further details from him.

He revealed, surprisingly, that Hitler was a reluctant convert to the scheme of attacking Crete. "He wanted to break off the Balkan campaign after reaching the south of Greece. When I heard this, I flew to see Göring and proposed the plan of capturing Crete by airborne forces alone. Göring—who always was easy to enthruse—was quick to see the possibilities of the idea and sent me on to Hitler. I saw him on 21 April. When I first explained the project, Hitler said: 'It sounds all right, but I don't think it's practicable.' But I managed to convince him in the end.

"In the operation, we used our one parachute division, our one glider regiment, and the 5th Mountain Division which had no previous experience of being transported by air."

The air support was provided by the dive bombers and fighters of Richtofen's Eighth Air Corps, which had been a decisive instrument in forcing the gate into Belgium and France, successively, in 1940.

"No troops came by sea. Such a reinforcement had been intended originally, but the only sea transport available was

a number of Greek caiques. It then was arranged that a convoy of these small vessels was to carry the heavier arms for the expedition—antiaircraft and antitank guns, the artillery, and some tanks—together with two battalions of the 5th Mountain Division.

"They were told that the British fleet was still at Alexandria—whereas it was actually on the way to Crete. The convoy sailed for Crete, ran into the fleet, and was scattered. The *Luftwaffe* avenged this setback by 'pulling a lot of hair' out of the British Navy's scalp. But our operations on land, in Crete, were much handicapped by the absence of the heavier weapons on which we had reckoned."

Describing the airborne attack to me, General Student said: "At no point, on 20 May, did we succeed completely in occupying an airfield. The greatest degree of progress was achieved on the Maleme airfield, where the valuable assault regiment fought against picked New Zealand troops. The night of 20-21 May was critical for the German Command. I had to make a momentous decision. I decided to use the mass of the parachute reserves, still at my disposal, for the final capture of the Maleme airfield. If the enemy had made an organized counterattack during this night or the morning of 21 May, he probably would have succeeded in routing the much battered and exhausted remnants of the assault regiment—especially as they were handicapped badly by a shortage of ammunition.

"But the New Zealanders made only isolated counterattacks. I heard later that the British Command expected, besides the airborne venture, the arrival of the main German forces by sea on the coast between Maleme and Canea, and, consequently, maintained their forces in occupation of the coast. At this decisive period, the British Command did not take the risk of sending these forces to Maleme. On 21 May, the German reserves succeeded

in capturing the airfield and village of Maléme. In the evening, the 1st Mountain Battalion could be landed, as the first air-transported troops—and so the battle for Crete was won by Germany."

Price of Victory

But the price of the victory was much heavier than had been reckoned by the advocates of the plan, partly because the British forces on the island were three times as large as had been assumed, but also from other causes. General Student said: "Much of the loss was due to bad landings—there were very few suitable spots in Crete, and the prevailing wind blew from the interior toward the sea. For fear of dropping the troops in the sea, the pilots tended to drop them too far inland—some of them actually in the British lines. The weapon containers often fell wide of the troops, which was another handicap that contributed to our excessive casualties. The few British tanks that were there shook us badly at the start—it was lucky there were not more than two dozen. The infantry, mostly New Zealanders, put up a stiff fight, though taken by surprise.

"The *Führer* was very upset by the heavy losses suffered by the parachute units, and came to the conclusion that their

surprise value had passed. After that, he often said to me: 'The day of parachute troops is over.'

"When I got Hitler to accept the Crete plan, I also proposed that we should follow it up by capturing Cyprus from the air, and then a further jump from Cyprus to capture the Suez Canal. Hitler did not seem averse to the idea, but would not commit himself definitely to the project—his mind was so occupied with the coming invasion of Russia. After the shock of the heavy losses in Crete, he refused to attempt another big airborne effort. I pressed the idea on him repeatedly, but without avail."

Summary

So the British, Australian, and New Zealand losses in Crete were not without compensating profit. General Student's project of capturing the Suez may have been beyond attainment, unless Rommel's panzer forces in Africa had also been strongly reinforced, but the capture of Malta would have been an easier task. Hitler was persuaded to undertake it a year later, but then changed his mind and cancelled it. "He felt that if the British fleet appeared on the scene, all the Italian ships would bolt for their home ports and leave the German airborne forces stranded."

We have no doubt about the outcome of this free-world effort. But we must be strong, and we must have strong partners if we are to discourage new acts of violence by the power-hungry and to win the opportunity to carry on our work of peaceful progress.

President Harry S. Truman

Effects of New Developments In Warfare on Logistics

Colonel William S. Bodner, *Infantry*
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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.

A GREAT deal has been said and written, since the end of World War II, about new weapons and new developments in warfare. It is appropriate that serious consideration be given to the effect of these new developments on logistics as applied in the three services, the Army, Navy, and Air Force.

It might be well, at this time, to look ahead a few years to see what is in store. It is reasonable to expect that guided missiles with accurate ranges of up to 1,000 miles, atomic weapons, new aircraft in great numbers capable of carrying tremendous tonnages and traveling at supersonic speeds, and chemical and biological agents of great deadliness will be used in the conduct of the next major war. All of the weapons of warfare enumerated above presently exist in a more or less perfected state, and it is reasonable to assume that they will be improved as time goes on.

The weapons, tactics, and techniques which are available and known today for the conduct of war will not be cast aside; they will be supplemented by these new weapons.

The development of these new weapons—some of which are very expensive—should cause one to consider the type of targets on which they will be employed, how their

use will affect our present logistical procedures, and if their use even will preclude the furnishing of the required logistical support. Establishments such as staging areas, ports of embarkation and debarkation, air base complexes, large headquarters, railroads and railroad marshalling yards, industrial centers, storage depots, lines of communications, and important population centers will be targets. They are certain to receive the full force of the enemy's bombing efforts, both atomic and conventional. In addition, we also can expect him to employ chemical and biological weapons freely against these targets.

Attacks on targets such as those enumerated above were forecast in World War II, when London and Antwerp were the objectives of German guided missiles, and the Allied air forces bombed both German and Japanese cities and industrial centers, culminating with the dropping of the atom bombs on Hiroshima and Nagasaki.

Present National Policy and the Missions of the Armed Forces

Under our present form of government, national policy precludes the initiation of a war by this country. Whether the future will see a change in this policy remains to be seen.

General of the Army Omar N. Bradley, present Chairman of the Joint Chiefs of Staff, gives a clear picture of the policy of this Nation, the missions of the armed forces, and how the next war will be conducted in his article which appeared in

the October 1950 issue of the *Combat Forces Journal*.

* * * * *

If our country should be subjected to attack, we would need adequate air defense and an air force for an immediate intercontinental retaliatory counterattack; but we would also need other *simultaneous* operations which an air force alone cannot accomplish.

One of these operations would be to keep the sea lanes open and safe. Our imports of essential strategic war materials—such as copper, tin, and manganese—must continue. At the same time, we must supply our forces who are joined in the attack, and supply the bases from which they fight.

In this Navy task the destruction of enemy submarines is crucial. We are giving a high priority to antisubmarine hunter-killer groups, which include Navy airplanes flying from carriers, and special Navy ships equipped with detecting devices and killing weapons. We must have killer submarines—designed to hunt enemy schnorklers.

The Fleet Marine Force is an important part of our Navy strength. These splendid ground units, with their own tactical air support as part of the Marine Corps, perform a Navy mission but can also serve as regular ground troops along with the Army. Their specialty is amphibious operations.

The Army task is next. Across seas made safe by the Navy, the Army must reach out for advanced bases as close as possible to the enemy. From them it would have to proceed—with air support, and with Navy support, if necessary—across the ground to deliver the final all-out land assault. Only an army with the most modern equipment can successfully do this job. Korea has emphasized again that ground troops are essential not only to repel an enemy but also to break his will, and ultimately conquer him.

* * * * *

With this definition of the missions of the armed forces and how the next war will be conducted, as given by General Bradley, it might be well to list some assumptions, and then to consider how logistical support will be effected under conditions of future warfare.

Assumptions

In trying to visualize the affect of new developments in warfare on logistics, it might be well to keep in mind those points

than before, and it will be characterized by rapid movement. Second, new weapons will make necessary a greater dispersion of all elements, both combat and service, in order to minimize excessive losses. The antithesis to this concept is that forces must be concentrated rapidly, both for combat and the support of combat troops. Third, the trend is toward lighter weapons with greater fire power, resulting in an increase in the amount of ammunition required. Fourth, the trend is toward greater mechanization and speed in air, sea, and ground means of transportation in order to obtain greater mobility, even though the maintenance effort will increase.

Based on the foregoing, the following assumptions are presumed:

1. That World War III will be total war in its truest concept, and that the opposing forces will have and will use, both strategically and tactically, atom bombs and guided missiles with ranges of up to 1,000 or more miles, and will conduct both chemical and biological warfare in its most unrestricted sense.

2. That World War III will be fought in some area of the world other than the continental United States, will be global in nature, and will involve the movement of forces and supplies over great distances.

3. That the basic logistical tasks of the armed services—the Army, Navy, and Air Force—will remain essentially the same, but will be more complicated and difficult because of new developments.

Despite new developments in warfare, the basic logistical problems essentially are the same. What will change is the complexity of the problems, and the logistician must be alert and flexible in his planning

which stand out in discussing trends in future warfare. First, the power of the offense has been increased greatly and the trend is to increase it still further. This will cause warfare to be more open

4. That a modern war cannot be brought to a successful conclusion unless the forces involved have adequate and timely logistical support.

Considering these assumptions, the ques-

tion then arises, "Can adequate logistic support be accomplished, if these new weapons and means of conducting warfare are available to the opposing forces?"

Effects of New Developments in Warfare on Logistics

In order to evaluate the effects of these new developments on logistics, it will help to consider separately how supply, evacuation and hospitalization, transportation, service, and management are affected, since these are the principal logistical tasks which must be accomplished, whether the forces involved are Army, Navy, or Air Force.

Supply

First, let us consider the effect of these trends on supply. The weight of supplies required, for one man for one day, in a theater of operations probably will change. In the European Theater, in World War II, the weight of supplies, for one man for one day, was 66.8 pounds; while in the Pacific Theater, it was 67.4 pounds. A study of the total tonnage of supplies sent to Europe, in World War II, shows that it was roughly six times the tonnage shipped in World War I. Breaking down the data still further, the tonnage of motor vehicles, sent to Europe in World War II, increased 58 times over that used in World War I. Petroleum products increased in tonnage 43 times, and the weight of explosives delivered by the artillery, in World War II, was 4 times that of World War I. While it is true that there was considerable waste—much of which could have been avoided—and that these two wars are not comparable in many ways, a definite trend is shown. This tendency to increase the quantity of equipment and supplies required to wage war has existed throughout the ages. While it is doubtful that it will increase in the ratio of approximately 6 to 1 as it did between World Wars I and II, the trend is still upward. One thing is certain: the number and complexity of

items to be supplied undoubtedly will increase. In the last war, considerably more than 1,000,000 different supply items were furnished our combat forces. When one considers the new developments in the means to wage war which have come into being since the end of the last conflict, there is no doubt that past trends will continue. Not only will there be an increase in the total number of items of supply required, but there will be an increase in the complexity of the individual items.

Procurement

The increase in the number and the complexity of items increases the problems of the logisticians, since many of the new weapons, because of their very nature, will be regulated or critical items—complicated, highly technical, and very expensive. A good example of this trend is illustrated by the weapons firing systems which now are used in modern aircraft, combatant naval vessels, and anti-aircraft gun or guided missile units.

This trend also will increase the procurement lead time required before these new weapons can be delivered to the ultimate users in the combat zone. In World War II, the procurement lead time varied from 2 to 24 months. Local procurement of these new weapons will be out of the question. This illustrates another trend which has been present in all wars to date, and which, undoubtedly, will continue in the future. Combat forces will not be able to live off the land as was once the custom. In each war, the combatants have become increasingly dependent on their lines of communications for supplies.

This complicates still further the problems for the logistician, since his basic task remains the same. This task is to get the correct item to the ultimate user at the right time and in the proper quantities required, in order that the user can accomplish his given task within the time limitations imposed by the situation. The

bare essentials for combat are weapons, ammunition, vehicles, fuel, petroleum products, and food. Nonessentials, such as extra clothing, laundry service, furniture, tentage, extra toilet articles, soft drinks, and the like, which were provided in such lavish profusion during World War II, probably will not be furnished.

While it is a commonly accepted fact that all the means for conducting a war are expendable while we are engaged in the actual conflict, more emphasis must be placed on supply control, stock control, and supply economy in the future, in order to reduce the ever increasing logistical burden. This need is pointed up by Colonel S. L. A. Marshall in his article, "Mobility and the Nation" (*Combat Forces Journal*, August 1950), in which he states:

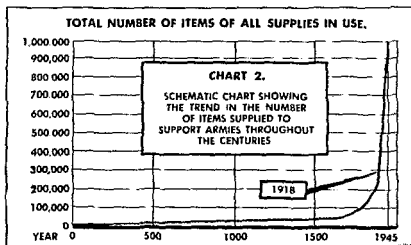
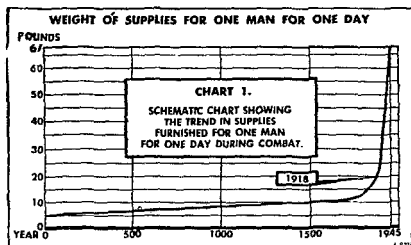
... In actual goods we wasted more matériel in Western Europe in getting from Normandy Beach to the Elbe River than the two million men of the original AEF required throughout its operation. The total requirements of the first AEF were several million tons less than the surplus of the second expedition of 1944-45.

Storage

The storage of supplies will be affected radically by the new developments in warfare. In World War II, the tendency was to have large storage installations, both in the Zone of Interior and in theaters of operations, so located or so constructed that full advantage was taken of the existing transportation network—roads, railroads, airfields, and ports. In following this procedure, the accomplishment of the supply tasks by the services was facilitated. The location of these storage installations provided for more efficient and economical supply procedures. Construction effort requirements were reduced, re-handling of supplies was minimized, and the pooling of such items as labor, materials handling equipment, and transportation was feasible. While it is true that there was some degree of dispersion of storage installations and supplies both in the Zone of Interior and within theaters of opera-

tion, it is considered now as being insufficient when one realizes the effect of new weapons on these storage installations.

In order to point out the importance of dispersion, one needs but to consider the possible effect of an atom bomb delivered over one of our major seaports such as New York or San Francisco. While it is probably true that a well-constructed harbor or port will not be put out of commission permanently by a single atom bomb, the damage to its facilities would be such as to render the harbor or port unusable for a considerable period of time. As another example, the final outcome of the Allied invasion at Anzio, in World War II, probably would have been much



different had the Germans possessed and used the atom bomb. So many supplies were concentrated in a restricted area that it was practically impossible for the Germans to fire an artillery shell into the beachhead without hitting matériel of some type.

What solutions are there to the storage problem? One is greater dispersion between supply and storage installations.

However, it must be remembered that there is a point beyond which dispersion is impractical. Taking into consideration the dispersion necessitated through compliance with prescribed safety precautions, the maximum amount of ammunition that can be placed in open storage is 5,000 short tons for each square mile of storage space. Assuming that more dispersion is required because of the new developments in warfare, and, consequently, we are compelled to reduce the amount of ammunition stored in a square mile to 500 short tons, it is easy to perceive the space, transportation, and handling problems that will arise when the ammunition requirements for modern combat are considered.

The use of underground storage facilities is another possible solution. However, this, too, has its limitations. Some of the problems presented by this type of storage are: the extra construction effort and materials required to prepare these underground areas (light, ventilation, and so forth); the extra handling required and the difficulty of moving supplies in and out of these areas; and the fact that an item such as gasoline in drums, which is one of the "tonnage" items of supply, cannot be stored safely in a closed space because of the danger from fumes, and the possibilities of an explosion.

A third solution is to maintain balanced stocks of all classes of required supplies in a number of dispersed areas and to accept the risk of losing all the supplies in a given area in the event of an atom bomb attack. This solution has a drawback in that it tends to be wasteful of supplies. Its use will increase the already too high level of supply found in a theater of operations.

Each of these solutions presents difficulties other than those mentioned above. There will be tremendous increases in requirements for means of transportation of the types found most feasible, additional supply personnel and matériel, and

additional construction of access roads or airfields. On top of this will be the added difficulties of maintaining communications and guarding, controlling, and managing these dispersed storage areas.

Distribution

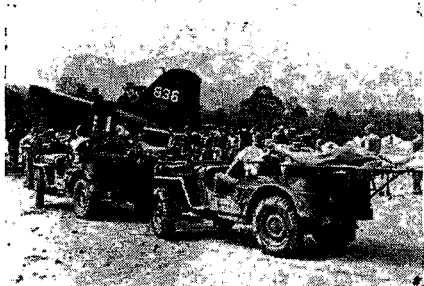
The distribution of supplies will be more difficult as a result of new developments in warfare. Assuming that these new weapons will necessitate the increased dispersion of both supplies and the using troops, what are the problems faced by the logisticians? There will be increases in requirements for transportation, time, and manpower, as well as a need for better, more efficient documentary procedures and management, to accomplish the distribution tasks. These difficulties even may preclude the establishment of forward supply zones and bases such as were used in World War II.

One solution to the distribution problem would be to use a system of direct supply from the Zone of Interior to the users in the combat zone, using aircraft as the primary means of transport. This method of supply distribution would:

1. Reduce greatly the number of personnel in the distribution system, particularly in the theater of operation.
2. Save time.
3. Eliminate much of the rehandling of supplies.
4. Reduce order and shipping time, thus permitting much lower supply levels in the theater.
5. Eliminate much of the elaborate packaging now necessary.
6. Reduce the transportation and storage requirements in the theater.

Although this method of distribution would be simple and direct, it is the most expensive method of effecting supply distribution and would require an enormous fleet of cargo aircraft, as well as air superiority, in order for it to operate successfully.

The Berlin Airlift proved that supply by air is feasible if the distances involved are not too great. After 1 year of operation, the "lift" was able to deliver slightly more than 8,000 short tons of supplies each day, using 225 C-54 equivalents. This



Jeep ambulances waiting to load patients into a C-47 air evacuation transport plane.

tonnage of supplies is approximately the amount required for 1 day of combat by a "type" field army. Compare, however, the tonnage moved in 1 day by the aircraft of the Berlin Airlift after 1 year of operation, with the fact that only two Liberty ships a day can move greater tonnage.

The Korean situation today is a good example of transportation of supplies by aerial means from the Zone of Interior to an active theater of operations. One must bear in mind the fact, however, that the quantity of supplies any aircraft can lift must be balanced against the fuel requirements of the aircraft, to fly that distance; that is, the more fuel required, the less the payload of cargo. Because of the great distances involved, the quantity of supplies delivered to the ultimate users in Korea is negligible and it must, of necessity, be limited to very high priority, critical items.

Evacuation and Hospitalization

The problems of evacuation and hospitalization remain basically the same as

they were in World War II, but their scope has increased greatly because of these new developments. First, the Medical Corps is faced with the problem of treating mass casualties caused by the use of the atom bomb or personnel coming in contact with radioactive materials. Second, the use of chemical or biological agents poses a similar problem, in that medical personnel will be faced with the task of caring and treating mass casualties occurring in a relatively short period of time. A third problem caused by the use of these weapons is the increase, to staggering proportions, in the requirements for the care of civilian personnel, even when the care provided is the minimum required to prevent interference with military operations. As for the effect on logistics, this all adds up to greater requirements for medical personnel and supplies, and for the means of evacuation and hospitalization.

The future probably will see greater emphasis placed on air evacuation of casu-



Patients aboard a transport plane during World War II air evacuation operations.

alties from both the front line and rear areas of the combat zone of a theater of operations to the Zone of Interior. The rapid evacuation, thus made possible, permits casualties to receive better care, reduces the number of deaths from wounds, conserves manpower, and reduces the

fixed bed requirements in the theater of operations. The use of aircraft for the evacuation of the wounded was pointed up by Lieutenant General Laurence S. Kuter, Commanding General, Military Air Transport Service, when he said:

Air evacuation of wounded is sound, economical, efficient, and effective, and, in face of the world situation, it can best be operated by a global command with flexibility of operation. Using the homeward bound space generated by outbound war cargo requirements, air evacuation might be considered as free airlift.

Another comparison of the efficiency of air evacuation was brought out by a medical officer, Captain Arrasmith, United States Navy, who stated:

One and one-half C-54s a day can carry the same number of patients from a theater of operations that a 500-bed hospital ship can in the same time period and, in addition, can return 350 short tons of supplies to the theater.

The advantages of using aircraft for casualty evacuation to the Zone of Interior are that the casualty receives better care and the hospital bed requirements in the theater are reduced which, in turn, reduces the amount of construction effort, matériel, and medical personnel needed in the theater.

Transportation

The effects of new developments in warfare may be greater on transportation than on any of the other logistical services.

Ships and railroads.—In the past and up to the present, the primary and cheapest means for moving the enormous tonnages of supplies required for modern combat have been ships and railroads. However, since both of these means of transportation, along with the marshaling yards, shop facilities, bridges, rolling stock, ships, shipyards, and ports of embarkation, are exceedingly vulnerable and worth while targets for these new weapons, it is doubtful if the same reliance can be placed upon them. Ships, trains, ports, and supporting facilities are relatively

easy to destroy and, undoubtedly, will become primary targets for enemy attacks with atom bombs, accurately directed long-range guided missiles, or with jet and conventional aircraft. The enemy's use of these weapons even may preclude the use of large ports of embarkation and debarkation, and may necessitate recourse to artificial harbors similar to the *mulberry* of World War II fame, both in the Zone of the Interior and in theaters of operations.

The large, slow moving convoys, such as were used in the last war, are certain to become targets for these new weapons delivered by submarine or aircraft. However, the effects can be offset partially through the use of faster ships, increasing the distance between individual ships of the convoy, and by providing better protection by escort vessels against attacks by submarines and long-range aircraft. Another means of minimizing the effects of the enemy's use of these weapons would be to construct a fleet of large, fast, submarine cargo and personnel carriers.

Air.—More reliance may have to be placed on aircraft for the movement of supplies in a future war. The primary drawback is that our present aircraft lack the capacity required to move the required tonnages over great distances. In order to provide logistic support by aerial means, it would be necessary to have a large fleet of cargo and troop carrying aircraft with the following characteristics: a 200,000-pound payload capacity; a 6,000-mile radius at extremely high speeds with low fuel consumption; a rocket-assisted take-off; and reversible pitch propellers and tracked landing gear which would permit landings and take-offs in any comparatively level, obstacle-free area without prepared runways.

Aircraft with *all* the foregoing characteristics are not beyond the realm of possibility, but they certainly will not be

in existence in the very near future. Hence, we must consider effecting supply by the type of aircraft presently available. Some of the limitations of these aircraft were mentioned previously under the heading of *Distribution*, so the discussion here will be limited to points not covered previously. The large airports required for present-type aircraft are certain to be primary targets for guided missiles and bombs. Air superiority will have to be maintained if these aircraft are to remain in operation. In brief, the use of aircraft to accomplish the logistics tasks is feasible if certain conditions can be met, but it is one of the most expensive means to employ. It should, therefore, be used only if supply cannot be effected by other means.

Transportation of fuel.—The problem of providing petroleum products in sufficient quantities, under the conditions of future warfare, is one of major proportions to the logistician. In World War II, petroleum products were moved to theaters of operations by tankers and constituted more than 50 percent of the total tonnage of all supplies moved.

The number of gallons involved in this tonnage runs into astronomical figures, and present trends indicate that more gasoline and oil will be required in a future war.

The next war will be one of greater movement and mobility and will require more transportation to accomplish the logistical and tactical tasks. This, in turn, will increase the requirements for petroleum products.

A comparison of fuel requirements for modern aircraft provides an excellent example of the upward trend in petroleum requirements. At a "minimum operational" airfield, the aviation gas storage requirements for a fighter group equipped with conventional aircraft are 9,000 barrels while that for a fighter group equipped with jets are 35,000 barrels.

This trend toward increased fuel requirements, as a result of new developments, may boost the tonnage of petroleum products up to 60 percent or higher of the over-all tonnage requirements.

There are many instances, in World War II, where petroleum products, or the lack of them, affected the outcome of battles. In the "Battle of the Bulge," many German tanks, self-propelled guns, and other vehicles were found abandoned with empty gas tanks but otherwise intact. In the pursuit of the Germans across France, General Patton's Third Army finally had to come to a stop because of a lack of gasoline, in early September 1944, when it had reached the vicinity of the Moselle River.

All of the foregoing leads to but one conclusion. Petroleum products in greater quantities than ever before will be essential for the successful conduct of war. What solutions are there to this problem? One is to increase the speed of the surface tanker in order to reduce its vulnerability to submarine attack. A second is to construct a fleet of fast submarine tankers, with a capacity of 100,000 barrels, to replace the present surface tankers. A third is to improve the efficiency of the internal combustion engine so that fuel requirements will be less. (For example, a tremendous savings would be effected if one could get 50 to 60 miles a gallon of gasoline from the $\frac{1}{4}$ -ton, 4x4, truck in place of the present 10 to 12 miles a gallon.) A fourth is to develop a universal fuel to replace the many types now required in order to simplify the transportation, storage, and distribution problems. At present, we use motor gasoline, high octane gasoline, jet fuel, Deisel oil, black oil, and bunker fuel.

Regardless of the efficacy of the possible solutions offered above, it appears that, in the near future, there will be no substitute for the seagoing surface tanker to transport the millions of tons of petroleum

products which will be required in a future war. This means that the sea lanes must be maintained for our use.

Transportation within theaters of operation.—Because of the effect of these new developments on means of transportation, motor vehicles may become the primary



German equipment abandoned in the 'Battle of the Bulge' because of a lack of fuel.

means for the movement of both cargo and personnel within theaters of operation. The vulnerability of roads and bridges to attack will force the use of wheeled and tracked vehicles which should have the following characteristics: a capability for full cross-country movement at high speeds both day and night, and the provision for light armor to provide some protection to the driver, the vehicle, and the cargo.

This, of course, does not mean that roads will not be used. They will be used whenever possible, but, because of their vulnerability to interdiction and attack by these new weapons, they cannot be counted upon as in the past.

Railroads will be used to the maximum extent practicable for the movement of supplies and personnel, but they, too, are subject to attack by these new weapons. The roadbeds, rolling stock, bridges, and marshalling yards are all vulnerable targets, and it is doubtful whether the railroads can be depended upon in a future war as a primary means of transportation.

A new development, the helicopter, holds much promise as a solution to the transportation problem within a theater. It is quite possible that it may supplement or replace ground means of transportation for the longer hauls of cargo and personnel. The *H-16* and *H-17* (helicopters) with 6,000 and 10,000 pound capacities respectively could be adopted readily for this purpose. They have speed, maneuverability, flexibility, can take off and land almost anywhere, and are not hampered by the ordinary obstacles to land transportation. Helicopters with detachable pods of 100,000-pound capacity or greater are not beyond the realm of possibility, and may be the solution to the problem.

Service

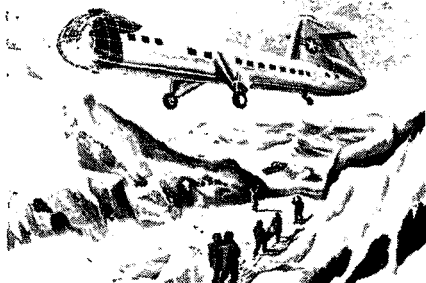
Because of new developments, the service required for the support of combat operations will be much greater than ever before. This has been a definite and constant trend in every war since the beginning of time and undoubtedly will continue. With each war, the proportion of fighting men to support personnel has de-



Artist's conception of the *H-16* helicopter being used in a river crossing operation.

creased. This trend is well illustrated by comparing the Air Force wing slice of World War II with that which presently is being contemplated for use; namely, 5,000 as compared with a 6,500 slice now being used by Air Force logisticians.

Each new weapon and each new scientific advancement in the means of waging war seems to call for an increase in the number of personnel furnishing service support. In addition, the increased dispersion neces-



Artist's conception of the H-16 transport helicopter used in an Arctic operation.

sitated by new developments in warfare will result in greater manpower requirements to perform the services essential to combat operations.

Construction

There is no doubt that more construction will be required in theaters of operation in a future war. This increase in construction requirements will follow the definite general upward trend of past wars. In World War II, it was common practice to take full advantage of existing facilities in towns and cities, and to utilize available buildings for headquarters, hospitals, maintenance shops, storage installations, and other purposes. Because of the dispersion necessitated by the threat of these new weapons, and the vulnerability of cities, towns, and buildings as targets, the over-all construction requirements undoubtedly will increase greatly. Because of a greater use and reliance on aircraft, both for combat and logistic purposes, there will be a demand for more airfields, many of them with runways capable of sustaining

greater weights. There will be greater requirements for underground shelters to be used as headquarters, hospitals, storage areas for petroleum products and other supplies, and work shops.

Even if roads are used to a much lesser extent than they were in World War II, much more effort will be required to repair and maintain roads and bridges if the combat units are to be supplied and retain their mobility. An example of the magnitude of this task is illustrated by the situation in the European Theater where, on 15 April 1945, the engineers were supervising and maintaining 7,476 miles of highway in the military network.

Maintenance

Maintenance is another service that will increase in importance in a future war. With the constant trend toward greater mechanization resulting in the development of new and complicated weapons and machines, there will be a greater demand



The H-17 heavy-lift jet helicopter, which is capable of lifting 10,000 pounds.

for highly skilled, technically trained personnel to keep them operating.

There has been a general trend, since the end of World War II, to make equipment lighter, more rugged, simpler, and easier to maintain. On the other hand, there also is a trend toward the greater use of more complicated equipment, such

as radar, shoran, television, loran, infrared devices, and the exceedingly complicated fire control systems, which will increase maintenance problems. This latter trend is creating a demand for personnel who will have to be highly trained technically in order to be able to perform the necessary maintenance tasks, and this will, in turn, require a longer period of training for those engaged in such maintenance work.

Management

The introduction of new weapons makes the tasks of supply, evacuation and hospitalization, transportation, and service more complicated and difficult than they ever have been in the past. What, then, is the answer to the general trend of greater requirements for trained service troops to perform the required logistical tasks? Briefly, the answer is better management. To obtain better management, we must have better organization, better discipline, and better control in logistical support units. The loosely knit, empire building logistical organizations as were found in the communications zone sections, in the European Theater in World War II, cannot be tolerated, if the supply tasks are to be accomplished under the conditions in which future warfare will be waged.

To overcome these past deficiencies, major logistical support units must be organized. They should be units with a definite command structure and organization. Each must have a definite nucleus which is capable of being expanded and augmented to meet the requirement of furnishing adequate logistical support, under any condition, for any size combat unit.

The Army's Type "A," "B," and "C" Logistical Commands, which were approved by the Chief of Staff on 19 August 1949 for inclusion in the over-all troop basis, are a step in the right direction.

Logex 50, conducted at the Engineer's Center, Fort Belvoir, Virginia, in May 1950, as a training exercise for logistical commands, proved the feasibility of this type of an organization, and a logistical command is accomplishing the supply tasks in Korea at the present time.

The Navy's "Lion," "Cub," "Gropac," and "Fassron," developed during World War II, are units, organized on a functional basis, capable of providing logistical support for various size and type fleet units under combat conditions.

In the Air Force, the maintenance and supply group, air base group, headquarters and headquarters squadron, and station medical group perform the logistical support tasks for a wing.

While these type units are capable of performing the various logistical tasks for their respective services, and of providing for a considerable degree of flexibility to meet varying requirements, one primary deficiency still exists. We do not have an adequate number of trained, experienced units of the above types, except, perhaps, in the Air Force, ready to perform their logistical tasks in the event of a sudden outbreak of hostilities.

Defense

The advent of these new weapons will present new problems as far as the defense of logistical installations, bases, areas, and lines of communications are concerned. From a series of staff studies, made as a result of *Logex 50*, the following are quoted:

With the evolution of warfare, there has been a tremendous increase in specialization in all fields. As a consequence, a rather clear demarcation between "service" troops and "tactical" troops now exists. Geographical areas also show this distinction, and we now have combat zones, and communications zones with varying subdivisions.

Except for purely local security, the defense of these administrative areas has, in the past, been largely a responsibility, either direct or implied, of tactical units. With the constantly increasing pro-

portion of service troops, it is essential that every tactical unit be used in its role of advancing the attack. Therefore, service troops must assume greater responsibility for both local and area defense within their zone of responsibility. In the assumption of these responsibilities, it is necessary that service troops be organized, equipped, and trained to adequately accomplish this additional mission.

Logistical commanders and troops, in the future, must be prepared to cope with the problems which arise from these new developments in warfare. They will have to provide not only for local security but also area defense, including the protection of exposed flanks. They must be prepared to cope with any of the following:

... Penetration of front lines into administrative areas; flanking attacks into administrative areas; amphibious attacks in rear areas; aerial attacks, both high and low level; large-scale air envelopments, air-landing of enemy units for specific operations within our lines; and guerrilla and partisan activity in administrative areas.

The necessity for logistical troops to assume a combat role, in order to meet any one of the situations mentioned above, will increase the problem of providing adequate logistical support to the combat forces. Service troops will not be able to perform their supply tasks while they themselves are engaged in fighting the enemy. To meet this contingency, integrated defense plans must be prepared by logistical commanders, and the logistical organization must be flexible in order that logistical service can be provided despite these attacks.

Each individual joining the military service enters on duty first as a . . . combat . . . soldier, . . . sailor, or airman . . . and his task with either a combat or service mission is a matter of assignment. The original purpose remains paramount . . . he must be able to fight.

Summary and Conclusions

An attempt has been made to show how logistics is affected by new developments in warfare. Separately considered were supply, evacuation and hospitalization, transportation, service, and management.

In examining each of these logistical tasks, a pattern has developed which indicates a definite trend in warfare—a trend that has been going on for centuries. These trends show clearly that *more* of practically *everything* will be required. Items of supply will be more complex and will be required in greater number than ever before. Greater reliance will be placed on aircraft for the evacuation of the wounded, which, in turn, will tend to reduce the fixed bed requirements in a theater of operations. Medical personnel will be faced with the problem of caring for mass casualties which may occur in a short period of time.

Because of these new weapons, more transportation will be required to move the increased tonnages of supplies. The necessity for greater dispersion will complicate still further this important problem, for the use of two of the principal means for moving supplies may be curtailed greatly because of their vulnerability. As a result, greater reliance probably will have to be placed on aircraft and cross-country motor vehicles to accomplish this task.

Requirements for service will increase as matériel becomes more complicated and there is more of it in use. There probably will be a higher proportion of service troops to combat troops than ever before.

More construction and more maintenance will be required, and many of the service troops will have to be more highly trained technically in order to perform their specialties. This, in turn, will require a longer period of training.

All service troops will have to be prepared to fight, in addition to performing their service missions. Better management will be required in order to conserve personnel and reduce the wastage of supplies, and still perform the logistics tasks efficiently.

As to the question, "Can adequate lo-

gistic support be accomplished, if these new weapons and means of conducting warfare are available to the opposing forces?" My answer is yes, since these basic logistics tasks must be performed

if we are to survive. The detailed techniques for their accomplishment must be developed between the present time and the time when these new weapons are being used in actual warfare.

The Army's research and development program seeks basically to provide a series of superior weapons and equipment consisting at the same time of the most economical number of types and sizes. In so doing, we can simplify the Army's logistical problems and increase the rate of production of military equipment.

General J. Lawton Collins

The United States, traditionally a peace loving nation, has consistently opposed any plan, concept, or tendency that might lead to militarism or the creation of large standing military forces. Instead, our national defense concept is based on a small standing force, backed up by adequate reserves and a continuing program of scientific research and development.

Secretary of Defense George C. Marshall

The Refugee Problem

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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.

FROM the time of the Spanish Civil War, mass migrations of whole populations have been a normal concomitant of military operations, a phenomenon which the world had not seen since the seventeenth century, the period of the Thirty Years' War. More than half a million Spaniards crossed the Pyrenees in February 1939. A year later, in the south of France, shelter was sought from the German invasion by Dutch, Belgian, and French refugees. In the second half of the last war, the inhabitants of whole regions in Eastern Europe fled in terror from the Communists. Similar catastrophic happenings have taken place in Korea. Only those who have witnessed and experienced these mass migrations can imagine what such gigantic movements of peoples are really like.

Reasons for Mass Migrations

Why do millions of human beings abandon their homes and deliver themselves

up to an uncertain fate? It is a phenomenon of mass psychology caused, in some instances, by the fear of bombardment; in others, by a dread of the enemy's armies; and, more often still, by the prospect of living under the political régime that is likely to be imposed. Another factor connected with the problem is the total character of modern warfare, which tends more and more to develop into international ideological conflicts. The struggle does not end with victory on the battlefield, but is followed by the indictment of the enemy government as war criminals, and reprisals against a multitude of persons convicted or suspected of collaboration with the vanquished régime. Gone are the times when war was waged by armies only, when the civilian population figured as mere spectators, and when the occupying forces respected the laws, administration, and mode of life of the population of the enemy state.

Influence of Propaganda

Propaganda is another factor that causes people to leave their homes. In order to influence public opinion in favor of the war aims, many stories are spread about the cruelties of the enemy. Although it may be necessary to condone such

The problems inherent to the establishment of an international refugee organization are numerous and diversified because questions of a military, political, judicial, psychological, and social nature must be solved

methods from a political point of view, they are likely to have a boomerang effect in case of retreat. The passionate hatred of the enemy, engendered by propaganda, then changes into a state of panic which drives people into flight. Today, when passion has, to a great extent, subsided, it can be admitted that there was quite a deal of exaggeration in what was said about the German occupation. It was the reverse in the case of the Soviet Army, about which, until the end of the war, only praise was heard.

A Hypothetical Problem

A migration of peoples, such as the world has never yet witnessed, would take place in case of a Communist invasion of Europe. Germans, Dutch, Belgians, French, and many other nationalities—children, old men and women, on foot and transported by every imaginable kind of vehicle—would clutter the roads of the Western countries. Such a mass movement would bring many problems, some of them so gigantic that their solutions would appear to be dubious. Supposing that the number of refugees, amounting to 7 to 10 millions, exceeded the combined strength of all the Allied fighting forces, what direction would these fleeing hordes take? Those seeking to embark for England, America, or Africa doubtlessly would head for the French Atlantic ports. Others probably would strike toward the Swiss and Italian Alpine passes in the hope of reaching Sicily as a stepping stone toward some other destination. Marseille and Toulon would attract those who desired to cross to North Africa. Many others, probably the majority, would head for Spain, with the object of seeking refuge behind the natural barrier of the Pyrenees. In dealing with our subject, we propose to examine the matter from the point of view of the latter supposition, inasmuch as it provides us with a typical problem which

might develop on an international frontier of great strategic importance.

From the military standpoint, the chief danger would lie in the blocking of important strategic communications lines, thereby interfering seriously with operations and, in some cases, even bringing them to a standstill. Unless severe measures are taken, defensive lines may be swept away by the sheer weight of the fleeing masses flowing like a tidal wave over them. Panic-stricken people have fertile imaginations. They spread all kinds of rumors, and their very presence has a disintegrating effect not only on the inhabitants of the rear areas but on the troops as well. Enemy agents and partisans can hide easily in crowds. In case of an invasion of Europe, the Soviet armies could cover their advance by a screen of millions of refugees.

Phases of Wartime Migrations

In spite of the indescribable chaos which characterizes the stampede of fugitives, these modern migrations in wartime show three recognizable phases, which succeed each other almost like the echelons of an army.

Phase 1.—During the first 2 to 3 weeks, like an advance guard in front of the main body of troops, come the people of means who, as a rule, are better informed than the masses. They ride in elegant cars and their papers are in order. As, for the most part, they are financially self-sufficient, they do not cause any special trouble. They disappear quickly, easily finding accommodations in hotels.

Phase 2.—As the stream grows larger, things begin to get livelier. The luxury automobiles are followed by smaller and more modest vehicles, on which are fastened all kinds of boxes and bundles, and even bedding. In this group are to be found state officials and services, which have been evacuated officially, as well as members of the middle classes such as

doctors, engineers, and merchants. Ever greater grows the flood of nomads, and the number of trucks and motor buses increases as compared with private cars.

Phase 3.—The worst off are the refugees found in this phase. Without order or discipline in blind chaos, they occupy the whole width of the highways. In an endless chain, the heterogeneous mass of vehicles rolls on, carrying people of different classes of society, nationality, and age, together with their varied belongings such as furniture, sewing machines, and every imaginable kind of chattel. Horse-drawn carts block the way for motor vehicles, and often it takes hours before a passage can be cleared for them. The crowds of pedestrians also grow larger, many of them pushing their worldly belongings along in perambulators and carts, whereas others try to find a way by hiking across country. Often, deserters mix with the crowds—sometimes armed sometimes weaponless—some on foot, others riding on military vehicles. Demoralized, they strike a tragic note in the kaleidoscopic procession.

By leaving their homes, many of the refugees expose themselves to far greater dangers than they would encounter if they remained where they were living. As mentioned above, however, they are the victims of mass psychology. Seized by panic, region after region and village after village are swept along. Most people act under the influence of the steadily growing rumors and only decide to leave at the last moment when faced by enemy occupation. The major portion of the fugitives consists of women, old men, and children, politically insignificant, who would not have to fear any serious reprisals from the enemy. Acting under the impulse of panic, they drag with them those possessions on which they happen to lay their hands at the moment of departure. Instead of warm clothing and provisions, they load their vehicles

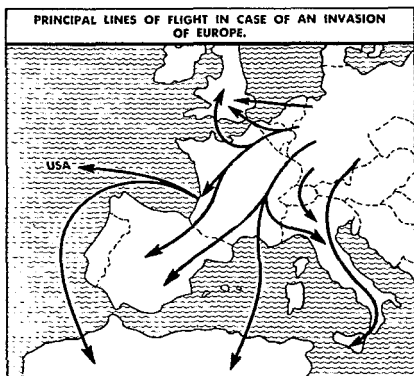
with junk of all kinds and items of no practical value during their flight.

Control of Mass Migrations

To control such mass migrations is not an easy matter. These migrations comprise people who:

1. Are seized with panic and act irrationally.
2. Are imbued with the instinct of self-preservation. Consequently, they are so egoistically constituted that their aptitude to help others is reduced to a minimum.
3. Tend to become irritable because of hardships already endured, and because they are faced with the prospect of an uncertain future.
4. Are obsessed by an insensate jealousy of those better off than themselves. As a result, the lowest human instincts come to the surface.

Under such circumstances, the authorities, civil or military, who try to help, reap little thanks. On the contrary, they become very soon an object of hatred.



Anybody who is called upon to handle this problem primarily should take all these psychological factors into consideration while maintaining a profound understanding for all human weaknesses. These weaknesses are not characteristic of any one nationality or race; they would be mani-

fested by all peoples subjected to the same psychological influences.

Preventive Measures

The measures to be taken against such chaotic mass movements of peoples should, above all, be preventive, which is, of course, only possible if they are adopted well in advance. It is especially important that a central board should be formed, with branches in all areas of the country, charged with the task of studying the problem closely and, at the same time, developing the necessary practical measures to cope with it. Press propaganda, radio broadcasting, and all other means should be used to dissuade the people from engaging in wild flights into the unknown.

It is the duty of the authorities to restrict the number of refugees to a minimum. Only those persons should be evacuated who are likely to suffer reprisals at the hands of the enemy, or who, for military or economic reasons, are likely to be of value to the war effort.

The Geneva Convention of 12 August 1949 requires governments to designate, in advance, sanitary or neutral zones in a theater of operations. Thus, one of the preventive measures would be to demarcate clearly several safety regions, to be held inviolate by the armies. These zones would serve as sanctuaries for the protection of passive persons, generally speaking those who are incapable of military service and who would not be exposed to political reprisals. A local committee, supported by executive personnel, with police backing, should ensure the functioning of each of these zones, which would be subject to the authority of the Red Cross and representatives of the nonbelligerent states.

Whether such steps are likely to meet with success is a moot question as, especially during the days immediately preceding an occupation by the enemy, it is exceedingly difficult to reason with a panic-stricken community.

Hypothetical Problem Continued

We will stick to our example and examine the problem from the point of view of a Soviet invasion of the West, involving the organization for the evacuation of refugees over the Franco-Spanish frontier.

The execution of such an operation would be facilitated considerably by an agreement between the two countries interested. Roughly, such a convention would have to be drawn up in such a way as to settle, among other things, the following matters:

1. The necessary co-operation between the civilian and military authorities of both countries, both on French and Spanish territory, together with the appointment of liaison officers.

2. The designation of routes by which the stream of civilian refugees and the retreating military units are to be canalized, together with the frontier crossing points.

3. The organization of the refugees in orderly columns and their being provided with foodstuffs and fuel, as well as the appointment of escorts in the shape of police or gendarmery responsible for their discipline.

4. Arrangements for the evacuation of refugees by railroad. (This is less practicable in the case of the Pyrenean frontier, as Spain and France have different rail gauges.)

5. The organization of sanitary services.

6. The security measures to be taken against politically unreliable elements, together with the prevention of an infiltration of enemy agents.

7. The problem of deserters. From the outset, it should be decided that all military persons, or small groups of soldiers, not under responsible control, should be considered as refugees. Such a rule would, in principle, apply to units smaller than a

battalion. The fate of such military personnel could be decided upon later.

It is clear that there exists a series of problems whose eventual solutions should be studied thoroughly months in advance. However, would any government be prepared to tackle such matters in advance at the risk of creating, by such preventive measures, a defeatist psychosis among its population? If the Soviets cross the Elbe, attempts, undoubtedly, would be made to stop them at the Rhine and then at the Seine or the Somme. If, on the other hand, they got as far as the Loire, it would already be too late. Again, it is probable that the Spanish Government which, by granting the right of asylum, would assume an enormous task and responsibility and, therefore, might adopt a waiting attitude until the last moment.

Be that as it may, whether or not the refugee problem is subjected, in advance, to consideration between the respective governments and the high command of the Atlantic powers, it certainly will arise in case of an invasion of Europe. If it is not possible to hold up the Soviets on the Elbe or the Rhine, within 3 to 6 weeks 3 to 5 million desperate people will be clamoring, more and more violently, at the doors of the Pyrenees and, unless appropriate measures are taken in time, will end by bursting them open by force. We have remarked already, and would repeat, that it is hardly within the power of man to find an entirely satisfactory solution of the problem. What should be done then in order to bring at least some semblance of order into the chaotic confusion and thereby save as many human lives as possible? As it is hardly likely that the necessary steps will be taken in anticipation of this catastrophe, we will act on the assumption that everything has to be improvised.

Guiding Principles

In order to achieve our purpose, we shall have to conform to the following principles:

1. The solution of the problem can be sought only on a collective basis. There only can be one standard for all refugees, irrespective of their social status or nationality. However tragic the fate of many persons may be, the loss of time incurred by the individual treatment of separate cases easily could prove fateful for many others. Passports or similar documents, which, in normal circumstances, entitle the bearer to cross frontiers, can, at a certain stage, no longer be taken into consideration, either for lack of time or for reasons of security. Special cases can be dealt with later.

2. In order to prevent any demoralization of the rear areas and to make it difficult for enemy agents to carry on their activities, refugees not only should be kept isolated from the civil populations of the hinterland and the troops but all traffic between the various camps in which they are interned should be controlled and reduced to a minimum.

3. No state or army can provide the necessary means in personnel and material needed for the control, transport, and maintenance of the mass of fugitives suddenly appearing on the scene. For this reason, an organization should be created under the strict control of the responsible authorities and on which all able-bodied refugees should be made to serve, their vehicles being put to communal use.

4. The task should be undertaken with the utmost energy. In order to canalize the stream of fugitives in a certain direction, with a view to removing them from the scene of military operations as quickly as possible, it is often necessary to adopt justifiably Draconian measures.

Influence of Terrain

Exactly as in military operations, the configuration of the terrain also has a decisive influence on the solution of the problem. What would happen in the case of our imaginary example? North of the

Pyrenees, the country is flat and, consequently, is abundant in communications and large localities. South of the Spanish frontier, the roads are less numerous and the main routes, in any case, would be reserved for military purposes. The townships are small and incapable of sheltering any considerable number of refugees. There would be great danger of congestion in the narrow mountain passes through the Pyrenees. For obvious strategic reasons, the Spanish Army probably would be forced to establish their advance positions at least 50 miles in front of the Pyrenees, partly in order to take in the exhausted retreating Allied troops before the narrow mountain passes are reached. In these forward areas, the organization for the control of the fugitives would have to begin its work. The operation could be divided into three phases:

1. Pre-Pyrenean arrangements.
2. The canalization of the migrating masses through the passes behind the Pyrenees into transit camps.
3. The transport of the refugees from the transit camps deeper into the hinterland and to camps of a more permanent nature.

Instructions to Refugees

Uncertainty is a state of mind to which fugitives easily become victims. We have mentioned already how quickly rumors spread, causing panic and disorder. To avoid this, the refugees should be told what to expect and how to behave. This can be done by distributing printed leaflets containing the following instructions:

1. You are subject to the jurisdiction of the country offering asylum.
2. All directions of the competent authorities are to be strictly obeyed.
3. All persons crossing the frontier do so at their own risk.
4. In view of the large number of destitute persons, neither food nor lodging can be guaranteed.

5. All movement of displaced persons is restricted to designated roads. (These roads should be listed, together with any special markings.)

6. No one should proceed beyond 1,000 yards on either side of the above mentioned roads. Anyone found outside this zone will be punished.

7. Any modification of the regulations mentioned above can emanate only from the recognized authorities.

8. Fugitives can cross the frontier only at designated points. (It would facilitate matters if a map were provided in order to enable the fugitives to find easily the roads and the crossing points.)

9. The authorities call upon everybody to maintain peace and discipline.

10. In order to prevent traffic blocks, columns not marching in proper order will be diverted to side roads.

With the object of directing the movements of the refugees, large numbers of police and gendarmery should be stationed, in advance, at suitable points. At all important crossings, control posts should be established to observe and regulate the flow of refugees. The authority, whose task it is to deal with the problem, should be kept informed at all times regarding the strength and direction of the moving masses, for which purpose aircraft can be used for observation. Pickets should be stationed to prevent the crowds from using roads of military importance, and from infiltrating across country between the specified routes.

Additional measures to be taken energetically include:

1. The organization of vehicles in groups of 100, which should be split up again into smaller units.
2. The placing of each group in the charge of qualified refugees whose orders must be obeyed. In principle, there should be one controller for every five vehicles. Wherever possible, former policemen or

members of the military should be appointed to these posts.

3. The carrying of only absolutely essential loads. Refugees should be distributed evenly among the vehicles, accommodations being found especially for elderly persons, women, and children.

4. The distribution of all available motor fuel in such a way that all vehicles can keep moving.

5. The diversion of all horse-drawn transport to separate roads.

6. The holding up of all columns not complying with the above measures until the regulations are followed.

Identification

For reasons of security, it is advisable to have several hundred counterintelligence agents disguised as refugees mix with the crowds for the purpose of observing and detecting suspicious persons, to whom the attention of the authorities should be drawn. It would be practically impossible to subject each refugee to an examination at the frontier posts. Interrogations taking 5 to 6 minutes a person are of no practical value, apart from the fact that, in the case of large numbers of refugees, many days and weeks would be required for the purpose. Furthermore, the sudden halting of the refugees at the frontier posts would cause congestion all along the routes which could result only in chaos.

In order to carry out a partial check, it may be more advisable, when issuing the leaflets described above, to distribute numbered leaflets, to be filled in by the refugees themselves. The information should include the name, nationality, profession, and details of the refugee's last domicile. These particulars would be required by the nation granting asylum. Such forms could be completed in quadruplicate, each being printed in a different color. The first copy would be surrendered at the frontier, the second in the transit area,

the third in the final camp, and the fourth would be retained by the refugee. Children under 10 years of age should have tallies tied round their necks for identification.

As many refugees pick up, on their way, a variety of weapons, their disarming is an important matter. Notices, posted along the roads, should point out that anyone found possessing fire arms will be looked upon as a partisan. Rifles or pistols should be allocated only to the police or the military. Collecting points for arms should be created along the roads, at frontier posts, and in the camps. Warnings should be issued repeatedly as it is certain that many refugees will try to hide their weapons.

The Transit Area

An area, consisting of an appropriate number of transit camps, should be established at a distance of from 40 to 50 miles behind the front line. Here, the preliminary sorting out of the refugees takes place. This is done, based upon certain specified criteria such as nationality and age groupings. The principal aim, however, is to get all the refugees out of the operational area as soon as possible. For this purpose, perhaps it would be advisable to regroup them according to the categories of their vehicles. Each transit camp would be divided into several zones, in which trucks, motor cars, motor buses, and ambulances would be parked separately. This would facilitate the organization of homogeneous columns in which all vehicles would have the same general characteristics. [In the hypothetical example of the refugee migration from Western Europe over the Pyrenees, it is supposed that most of the people would use road transport.]

In order to make full use of all vehicles on a collective basis, they should be requisitioned accordingly in the transit area. They would be required for:

1. The transporting of all refugees to the hinterland; this means including those

without their own vehicles. All motor buses, and the greater part of the motor cars and trucks, should be used for passenger transport. They should be organized for continuous traffic between the transit area and the hinterland until the evacuation is completed.

2. Coping with the numerous other tasks arising in connection with the evacuation and administration of the refugees. A portion of the vehicles reserved for the authorities is used for:

a. Provisioning the refugees. Each camp must prepare its own transport unit for this purpose.

b. The different administrative activities, such as road traffic control, camp management, and security and sanitary services.

Self-Help

As we already have mentioned, in wartime, no nation is in a position to provide all that is required for the evacuation of whole populations. Therefore, the refugees themselves must be made to help in every way, and all persons with the necessary qualifications—professional or physical—to carry on useful tasks, should be called into service. It should be remembered that the administration of several hundred thousand or even millions of human beings calls for an organization of several tens of thousands of individuals. It is obvious, therefore, that the greater part of those who will make up this organization must come from the ranks of the refugees themselves. On an average, about 15 to 20 supervisors are required for every 1,000 displaced persons.

As and when the refugees arrive in the transit area or in the hinterland camps, a census should be taken to uncover the following skills:

1. Chauffeurs and mechanics. Wherever practicable, these persons should remain in charge of their own vehicles.

2. Persons whose education fits them

to function in the administration of the camps, in supply, or in other services.

3. Police personnel to perform such duties as maintaining order, controlling traffic, and guarding depots and supplies.

4. Doctors and nurses to organize a health service.

5. Engineers and technicians to be made responsible for the maintenance of roads, the construction of camps, and the supply of water and electricity.

6. Nonspecialists, who are physically capable, who could be organized into units such as labor companies, not only for the purpose of assisting in executing the tasks mentioned above, but also be called up for other duties whenever and wherever necessary.

Printed notices should be posted to make known the categories of individuals required, and where they are to report.

The sojourn of refugees in the transit area should be limited to 24 to 48 hours, the time required for regrouping. When the transport columns are ready and the roads are free, the evacuation should go ahead.

As regards the administration of the camps themselves, it is an unfortunate fact that, in these times, their organization and administration are only too well known, and we need not, therefore, enlarge on the subject. We merely would add that for 100,000 refugees, at least 5 camps are necessary.

Other Problems

Complicated as the measures described above may be, there are problems of a material nature which are much more difficult. For every 100,000 persons, 200 tons of foodstuffs and supplies are required each day. Their evacuation into the hinterland, and the upkeep of the administrative machinery would call for an enormous quantity of fuel. Without medicines and

medical instruments, the sanitary services cannot function. In each camp, barracks and roads have to be built, for which construction materials and tools are required. Cooking ranges are essential to provide mass feeding. What will be the source of all this material? What nation or international organization will supply it? These are the questions to which it is difficult to find satisfactory answers.

Suggested Solutions

In each theater of war, there should be constituted, in advance, a special central organization to deal specifically with this refugee problem, at the head of which would be a central headquarters. In spite of the necessity to co-operate closely with the different military commands, it would appear, nevertheless, that a civilian, international body would be better adapted to handle the problems of mass evacuation rather than a purely military, if only for the reason that the transit areas and camps should, whenever possible, be declared neutral zones. Another reason is that the masses to be dealt with probably will be made up of many different nationalities.

Strong police forces should be placed under the direct orders of this responsible authority by the nation offering asylum. The setup of such a headquarters might be as follows:

First Department (Personnel).—This department will contain the records of all permanent officials employed or under the protection of the organization (refugees), the information office for all refugee inquiries, and the press service.

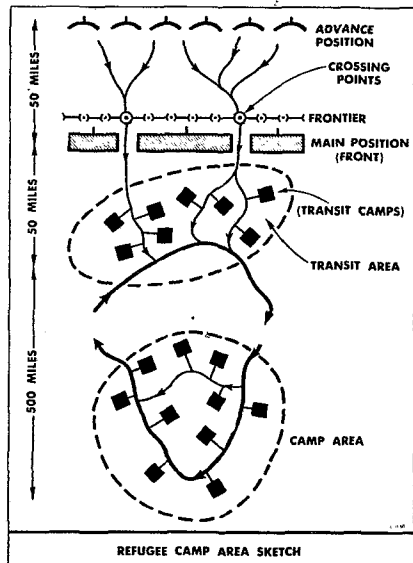
Second Department (Security and public order).—This department is concerned with the supervision of refugees, counter-intelligence activities, interrogation and the establishment of identities, the police, and the administration of justice.

Third Department (Operations).—This department is concerned with the carrying out of the evacuation, traffic control, and the administration of the camps.

Fourth Department (Quartermaster and maintenance service).—The supply of foodstuffs, fuel, building materials, and tools is the concern of this department.

Fifth Department (Sanitary services).—The function of this department is self-evident.

This outline of the headquarters of a refugee organization gives us a rough idea of how vast and diversified are the problems which have to be tackled. Questions of a military, political, judicial, psychological, and social nature are interwoven



closely with each other. Under the control of this central headquarters there should be subordinate headquarters functioning in all sectors of the field of operations, whose task it would be to keep in close touch with the army commands. As is the

case in normal military operations, there should be specially reserved wireless and telephone networks to ensure constant contact between the separate headquarters, traffic control posts, and camps. After the completion of the evacuation, parts of the

organization, especially those in the transit area, could be inactivated whenever redundant. The administration of the camps and the question of the final destination of the refugees would remain as final problems to be solved.

We have learned that without industrial preparedness, military forces alone are impotent. We are convinced that if war should ever come again, our great productive capacity and the proven ingenuity of our men and industry would assure us the means we would need to attain ultimate victory.

General J. Lawton Collins

Reduction of the Colmar Pocket

A 6th Army Group Operation

Colonel Jonathan O. Seaman, *Artillery*
Headquarters, Seventh 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.

IN HIS book *Top Secret*, Ralph Ingersoll wrote "... many of the most heroic stories of the war will come out of the Franco-American campaign. . . . The war on the Continent could not have been won without the 6th Army Group; but the 6th Army Group did not win the war. It remained a 'me too' organization until it ended its fighting career. . . ."

Although a great deal already has been written about the campaigns in Europe, relatively little has been recorded of the operations in Southern France. One of the operations that is least known is that of the Colmar Pocket. It is interesting not only from the standpoint of pure military maneuvers, but also because in the final phase it was a combined operation of French and American units under the immediate command of the French First Army, which, in turn, was a part of the American 6th Army Group. Furthermore, the territory being fought over was politically important to both France and Germany.

To understand the Colmar Pocket operation, which was part of the Franco-American campaign referred to by Mr. Ingersoll, it is desirable to sketch briefly the formation of the 6th Army Group and the operations which preceded it.

Background

The landing in Southern France was conceived by the Combined Chiefs of Staff at the Quadrant Conference in Quebec, in August 1943, for the purpose of assisting the cross-Channel operation by holding German units in the south, and drawing additional units from Northern and Central France. At the Sextant Conference in Cairo, in November 1943, the Combined Chiefs of Staff confirmed their views and obtained agreement from President Roosevelt and Prime Minister Churchill. Immediately following the Cairo Conference, "The Big Three"—Roosevelt, Churchill, and Stalin—met at Teheran where they agreed on the strategic plan for the assault against Western Europe. It was to consist of a main assault against Western France and a secondary effort against Southern France. This southern force was destined to become the 6th Army Group.

The Headquarters, Seventh Army, under the command of Lieutenant General Alexander M. Patch, was charged with the de-

The 6th Army Group operation in Alsace during World War II provides the military student with classic examples of the proper utilization of the armor-infantry team, and the problems of a combined command

tailed planning for the invasion of Southern France. In planning and launching this operation, many obstacles had to be overcome. The greater part of the necessary men and matériel had to come from the Mediterranean Theater so there was, quite naturally, an inevitable competition for available resources.

Mid-June, 1944, was the original target date for the invasion. However, as a result of the stalemate at Cassino and Anzio, resources earmarked for the Southern France operation were utilized in the Italian campaign and the invasion was postponed indefinitely. Finally, D-day was set for 15 August 1944. The invasion force, under the command of General Patch, was a veteran force composed, initially, of the Seventh Army—consisting of one United States corps (VI) of three infantry divisions (3d, 36th, and 45th)—one provisional airborne division, and the French Army "B" of two corps of seven divisions under the command of General de Lattre de Tassigny.

At 0800, 15 August, the VI Corps assaulted the French Riviera and, meeting light initial resistance, advanced rapidly inland and established a firm beachhead.

The American divisions fought with great skill and quickly pushed up the valley of the Rhone River. Meanwhile, the French force landed and pushed westward capturing Toulon and Marseille, after which it was directed to advance northward on the west bank of the Rhone and assist in the capture of Lyon. The race northward continued and, on 14 September, firm contact was established near Chaumont by units of the French 1st Infantry Division of the southern forces and the French 2d Armored Division of the United States Third Army.

Taking advantage of the exploitation possibilities immediately after the landing, General Patch had employed his units in the most advantageous places as they be-

came available. This had placed the French II Corps on the left of the United States VI Corps. It was appreciated early that, for future operations, it would be more advantageous for the French forces to operate on the right of the front and the American forces on the left. Accordingly, the French II Corps, after being pinched out of action following its contact with the United States Third Army, was directed to move to the east flank and join the French I Corps which had already gone into the line along the Swiss border.

On 15 September, Headquarters, 6th Army Group, under the command of General Jacob L. Devers, became operational and assumed command of the United States Seventh Army and the French Army "B" (later redesignated the French First Army). At the same time, the 6th Army Group was placed under operational control of Supreme Headquarters, Allied Expeditionary Forces (SHAEF). As Headquarters, 6th Army Group, assumed command of the forces in Southern France, the Germans, who previously had been falling back rapidly, began to stabilize their defenses. At the same time, the Seventh Army had to slow up its pursuit so that essential supplies could catch up with front-line elements which were then almost 500 miles from their beachhead supply points.

The 6th Army Group actually held two fronts. The southern front, facing east, was along the Franco-Italian border. This was being held by Major General Frederick's First Airborne Task Force and the French 2d Moroccan Infantry Division. The northern front faced north and northeast in front of the Belfort Gap and generally west of the Moselle River. On the immediate left of the Seventh Army, the XV Corps of the Third Army had closed to the Moselle at Epinal. At General Devers' request, the XV Corps was attached, on 27 September, to the 6th Army Group by SHAEF, which also agreed to

attach an additional infantry division at a later date. The XV Corps consisted of the United States 79th Infantry Division, the French 2d Armored Division, plus supporting troops. The following day, the 6th Army Group issued *Letter of Instruction Number One* which passed control of the XV Corps to the Seventh Army and redefined the missions of the United States Seventh and French First Armies.

Scheme of Maneuver

The general scheme of maneuver was designed to close both armies on the Rhine River. The Seventh Army was directed to Luneville and then on to Strasbourg, while the French First Army was ordered to breach the Belfort Gap and capture Mulhouse and Colmar. Although it was realized fully that the key terrain features of the Saverne Gap and the Belfort Gap would be heavily defended, it was believed that these divergent main efforts provided better avenues of approach and would be less-costly in time and resources than an attempt to force the easily defended Vosges mountain positions, particularly since the approaching winter undoubtedly would provide snow clogged roads and subzero weather in the mountains. The scheme of maneuver further directed that the two armies close to the Rhine in the Strasbourg and Mulhouse areas and then join forces in the Alsacian Plain, thus isolating the enemy in the Vosges Mountains.

The enemy fought desperately for every inch of ground, hoping to gain time to strengthen his Vosges-Belfort Gap position. As a consequence, the French were stopped completely on their right, although small gains were made along the remainder of the 6th Army Group front. Throughout October, the Seventh and French First Armies made every effort to keep the offensive rolling, but they were hampered seriously by severe shortages in ammunition and other supplies, and the increasing resistance of the enemy.

The November Offensive

Since an all-out offensive was impossible because of a lack of supplies, the 6th Army Group began to build up reserves of ammunition and gasoline in the army rear areas. The army group G4 estimated that mid-November was the earliest date a fully co-ordinated all-out attack could be launched. In the meantime, limited objective attacks were continued in order to gain a suitable line of departure for the forthcoming offensive.

The enemy forces facing the 6th Army Group were reported by the G2 to be the German Nineteenth and Fifth Panzer Armies, with a total estimated strength of 77,500 combat effectives, 410 artillery pieces, and 120 tanks.

The 6th Army Group forces had been increased by the United States 44th Infantry Division, in October, and the United States 100th and 103d Infantry Divisions in early November. The French First Army now had six divisions including the 5th Armored Division which arrived from Marseille in October, and the 2d Moroccan Infantry Division which had been replaced on the Franco-Italian border by the 4th Moroccan Mountain Division. Thus, the 6th Army Group comprised a total of 14 divisions, of which 3 were French armored divisions. In addition, the United States 14th Armored Division closed in Marseille on 2 November, and was being equipped rapidly.

In the meantime, Headquarters, 6th Army Group, and the Seventh and Third Armies had had ample opportunities to study German Army tactics. One characteristic, used almost without fail, was the German habit of moving their general reserves on the evening of the second day or the morning of the third day of Allied attacks. It was decided to capitalize on this habit and the Third Army (a part of the 12th Army Group) agreed to initiate an attack in the Metz area between 10 and 15 November. The plan called for the

6th Army Group to attack not earlier than 3 days nor later than 5 days after the Third Army's attack. It was hoped that by this maneuver the 6th Army Group's attack would catch the enemy's general reserves on the move, and that the German commander then would be faced with a difficult decision as to their employment.

Detailed plans for the offensive were made by the armies and submitted to Headquarters, 6th Army Group, for approval and co-ordination.

The Seventh Army plan called for the XV Corps to make the army group main effort on the axis Sarrebourg—Strasbourg, with the 44th and 79th Infantry Divisions making the initial assault, and the French 2d Armored Division in reserve to exploit a break-through. One regimental combat team of each infantry division was motorized to exploit any favorable situation which might develop. The 45th Infantry Division was held in army reserve, but earmarked for use by the XV Corps.

The French First Army plan was to drive on the Montbeliard—Mulhouse axis, bypassing Belfort which was strongly defended. The French I Corps, on the south, was to make the main effort.

On 8 November, 2 days earlier than planned, the Third Army's attack jumped off in order to take advantage of favorable weather which would allow for the maximum participation of air power. This change in timing meant that the 6th Army Group must attack no later than 13 November. Accordingly, officer couriers were dispatched to the Seventh Army and the French First Army informing them that D-day was 13 November.

As the day of the attack approached, the weather on the 6th Army Group front grew worse. Heavy rains and blinding snowstorms raged throughout the area and, in the Vosges Mountains, temperatures dropped to below freezing and the roads became clogged by snowdrifts.

Streams and rivers, throughout the lower regions of the area, overflowed their banks.

General Devers, the Army Group Commander, considered postponing the attack until the weather was better and air support possible, but finally decided to go ahead as planned, stating in effect that the Germans would not expect an attack in such weather and that complete surprise undoubtedly would be obtained.

The Seventh Army launched its attack, as scheduled, at 0700, 13 November, in a heavy snowstorm, encountering little resistance during the first day. The fact that the German trenches in front of the right division of the main effort were not occupied indicated that complete surprise had been obtained. However, large numbers of antipersonnel and antitank mines and booby traps, as well as soft, boggy terrain caused relatively slow progress initially.

The French First Army did not attack as scheduled, postponing its attack by 1 day. At 1200, 14 November, the attack was launched with the French I Corps on the south making the main effort. In spite of snow, numerous mines and booby traps, and boggy ground, the attack progressed well and, on 16 November, the Belfort Gap defenses were broken on a 27-mile-wide front.

The Pocket Forms

On the north of the Seventh Army front, the VI Corps crossed the Meurthe River in the St. Die—Raon-l'Etape sector, the XV Corps captured Sarrebourg, and the French 2d Armored Division rushed through the hole to exploit the success. Meeting little resistance, the French armored division swung north and south of the main route through the Saverne Gap and captured the key communications center of Saverne on 22 November. It then halted momentarily to clear the main highway through the Saverne Gap, did an about face and sped toward Strasbourg, and entered that politically important city

on 23 November. By 25 November, enemy positions in the Northern Vosges had collapsed and elements of the 2d Armored Division were driving south of Strasbourg along the Rhine Plain. (See Figure 1.)

The French First Army on the south continued to push with utmost determination and, on 20 November, elements of its I Corps broke through to the Rhine River capturing Huningen and Kembs, while farther to the west Belfort was captured. At this point, fate stepped in and created a situation that had serious effects for some time to come. Two French armored divisions, the 1st and 5th, were turned north to pursue and destroy the completely

the traffic jam and, by that time, the Germans hastily had reorganized and established a defensive position running along the Doller River, north of Mulhouse, hinged on the Hardt Forest and the Rhine River. French units were unable to break through this line for several weeks.

On 24 November, a conference was held at Headquarters, 6th Army Group, at which General Eisenhower and General Bradley, Commanding General, 12th Army Group, attended and discussed the current situation and future plans. It was decided that the Seventh Army should swing northward with the bulk of its forces and breach the Siegfried Line, protect the



The objective of the savage campaign of the Colmar Plain, in 1945, was this peaceful looking town of Colmar, France, as seen from the air.—Department of Defense photo.

disorganized enemy. Combat commands of the 5th Armored Division attempted to utilize the same limited road net which already was being used by other traffic and, as a result, became hopelessly tied up in a huge traffic jam. At the same time, a German counterattack was launched toward Delle but was repulsed. Forty-eight hours was required to unsnarl

southern flank of the 12th Army Group, and, by that maneuver, assist the 12th Army Group in closing to the Rhine in its zone. A secondary mission assigned to the Seventh Army was to assist the French First Army in closing to the Rhine. Four days later, the XV Corps attacked northward and, within 3 days, made gains up to 10 miles reaching the Moder River at

several points. Meanwhile, the French First Army was able to make only minor gains in its attempt to close the Colmar Pocket from the south and west.

In order to assist the French First Army and relieve the Seventh Army of the responsibility of fighting on two fronts, the army group commander directed the Seventh Army to capture Selestat, pinch out two of the VI Corps' divisions which were fighting in the French zone, move them to the north, and pass two divisions (the French 2d Armored Division and the United States 36th Infantry Division) to the control of the French First Army as soon as Selestat was captured. The next day, 3 December, the VI Corps captured Selestat and, leaving the two divisions as planned, then swung northward to assist the XV Corps in breaching the Siegfried Line.

The Seventh Army continued its drive to the north. As the Siegfried defenses were being entered in several places, on 16 December, the Germans struck with their counteroffensive in the Ardennes and the Battle of the Bulge began. For a short time longer, the Seventh Army continued its drive to the north, plowing through the Westwall in at least three places. (See Figure 2.)

On the Defensive

Soon a SHAEF directive was received which called for the 6th Army Group to pass the Seventh Army to the defensive at once and to relieve elements of the Third Army, including taking over a 40-mile sector formerly held by the XII and XX Corps of the Third Army. This additional sector was to be taken over by the forces organic to the 6th Army Group, augmented by the addition of the 87th Infantry Division. These instructions passed the 6th Army Group from a successful offensive to the defensive—and the Colmar Pocket was born.

In the meantime, the 6th Army Group G2, on 21 December, warned that a German

attack in the Homburg area was imminent. The enemy definitely was conducting an aggressive defense and the G2 was convinced that the Germans could start an offensive within 10 days.

The German offensive in the Ardennes continued to move westward. On 26 December, SHAEF forwarded instructions for the 6th Army Group to fall back to the line of the Vosges, and so give up Alsace and the important city of Strasbourg. These instructions apparently had in mind the shortening of the 6th Army Group's lines, thereby making additional units available to SHAEF for action in the Ardennes.

Two days after receiving the order to withdraw, the 6th Army Group was directed by SHAEF to assemble a corps of one armored and one infantry division for SHAEF reserve. To comply with these instructions, Headquarters, 6th Army Group, placed both the Seventh Army and the French First Army on the defensive, outlined main and intermediate battle positions, and prescribed detailed plans for the co-ordination of the defenses of both armies and with the Third Army on the left. The Seventh Army was directed to assemble the XXI Corps—which had just arrived—composed of one armored and one infantry division as SHAEF reserve. The two divisions were the 36th Infantry and 12th Armored, both of which had just been placed in army reserve. Additional changes of attachment of units within the 6th Army Group also were made. At the same time, the Seventh Army again was warned of a possible strong German attack.

The directive of SHAEF was implemented by these actions, which indicated that the 6th Army Group had no intention of falling back on the line of the Vosges until forced to do so by enemy action.

On 30 December, the G2 again warned of a possible German attack (strength: three to five divisions) against the Seventh

Army. It was believed that if such an attack were successful and the enemy were able to reach Sarrebourg, a withdrawal from Alsace would be necessary.

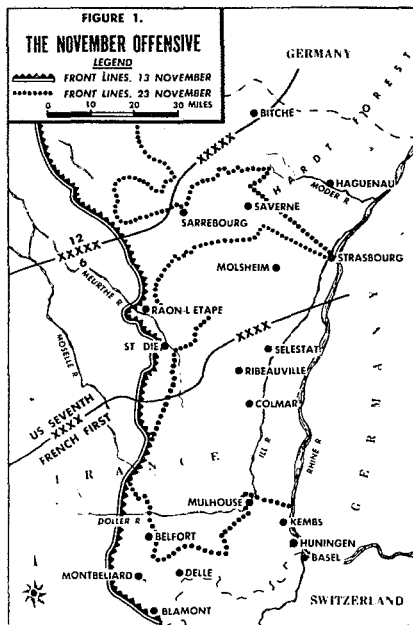
Importance of Alsace and Strasbourg

The political importance of Alsace and Strasbourg to the French should be men-

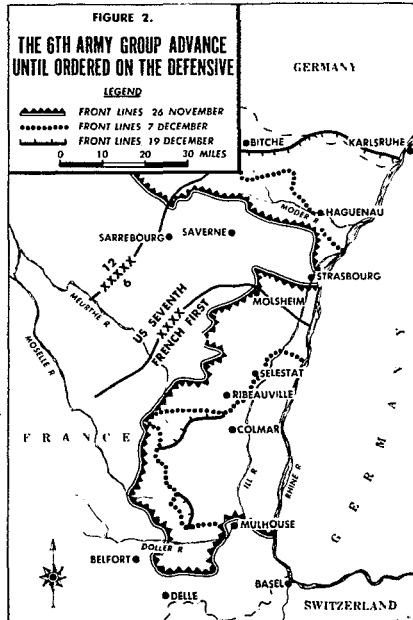
is reported to have urged General Eisenhower to make every effort to hold Strasbourg because of its political importance, and General Devers received similar representations from General de Lattre. So concerned was the French Government that it offered the services of three divisions of the French Forces of the Interior to the 6th Army Group to aid in the retention of Strasbourg. These divisions were inspected to determine their combat readiness and it was decided that only one—the 10th Infantry Division—could be employed effectively.

The Germans Attack

As predicted by the G2, the Germans launched a strong attack, shortly after



tioned. As a result of the Franco-Prussian War of 1870-71, France lost Alsace to Germany and did not regain that province until the end of World War I. When France fell in 1940, Germany again annexed Alsace, and now, in December 1944, a large part of Alsace, including Strasbourg, had been liberated from the Nazis. When the French Government learned that the 6th Army Group had been directed to organize a defensive position along the western edge of the Vosges Mountains, it thought an immediate evacuation of Alsace had been contemplated. General de Gaulle



midnight on 1 January, on the front of the XV Corps, forcing a withdrawal. After heavy fighting, the front was stabilized on 9 January. While this attack was reaching its maximum intensity, the Germans

established a small bridgehead north of Strasbourg after crossing the Rhine River undetected. The VI Corps thought the German action merely was a nuisance raid and only sent a small force to eliminate the bridgehead. The action failed, and the enemy continued to build up the bridgehead. The VI Corps apparently still failed to appreciate the seriousness of the situation and made only piecemeal attacks to reduce it without success. When it became clear that the integrity of his forces was being threatened seriously, General Devers ordered the VI Corps to withdraw to previously prepared positions along the Moder River. This withdrawal took place during the night of 20-21 January and, with the stabilization of the XV Corps front on the left, the serious German threat to the 6th Army Group ended. About this time, the German offensive in the Ardennes was being contained effectively and, appreciating that the 6th Army Group was being attacked from two directions, SHAEF agreed to release the XXI Corps to the 6th Army Group. Subsequently, it was assigned a sector on the left by the Seventh Army.

In the meantime, the French First Army had been unable to reduce the Colmar Pocket with its own means. The only important gains made in the entire sector were by the United States 3d Infantry Division fighting slowly but with determination.

It must be pointed out that the French First Army had suffered heavy casualties among its officers in the long fight from the Mediterranean up through Southern France, and in the Belfort Gap. These losses now were being felt seriously, particularly in the colonial divisions which had lost a large proportion of those officers experienced in handling colonial troops.

The Colmar Pocket

The Colmar Pocket covered an area of approximately 850 square miles. (See Fig-

ure 3.) Instead of having a relatively simple 70-mile front along the Rhine River, the forces of the 6th Army Group were faced with a winding, flooded, and mountainous battle line of more than 100 miles. The terrain varied from the high mountains of the Vosges, near Thann, to the flat Alsacian Plain between Selestat and Mulhouse. This rugged front, which was now the responsibility of the French First Army, was being manned, either actively or in reserve, by three armored and five infantry divisions—all French—and the United States 3d Infantry Division. As long as the pocket remained, it not only immobilized for use elsewhere from seven to nine divisions, but also represented a continuous, potential threat.

It was estimated that the enemy had eight divisional formations, totaling approximately 15,000 combat effectives. Two enemy divisions had been out of contact for a sufficient time to have been refitted with replacements from across the Rhine. Tanks were in evidence, together with a considerable number of *Panzerjägerern* (self-propelled antitank weapons). The short, interior lines of communications permitted the Germans to mass their forces with great rapidity to meet any attacks attempted by the French First Army. Furthermore, the enemy had the capability of bringing in reinforcements from across the Rhine, and the possibility of regrouping and attacking in any sector always remained a threat.

As stated earlier, after the fall of France in 1940, Germany had annexed Alsace. So much did Germany want to keep Alsace that Heinrich Himmler himself, the Deputy *Führer* of Germany, had been directing operations in the Colmar Pocket. Himmler even boasted that he would regain all of Alsace and present Strasbourg to Hitler as a gift on 30 January, which was the anniversary of the rise of National Socialism in Germany.

The existence of the Colmar Pocket not

only tied down the French forces effectively, but also became an increasing irritant to the Seventh Army in Northern Alsace. When the enemy began his offensive against the Seventh Army on New Year's Eve, it was apparent that he hoped either to destroy the Allied forces by a giant pincer movement or drive them back into the Vosges.

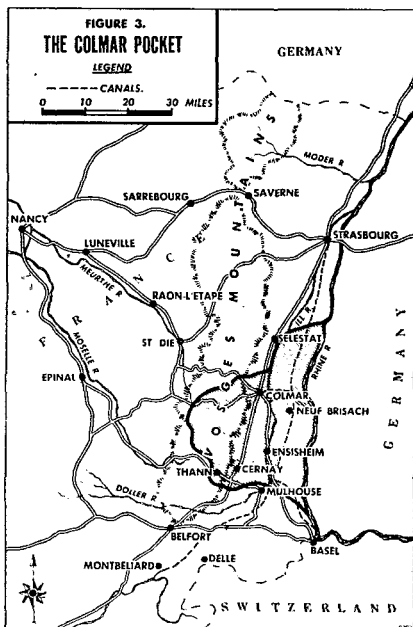
Plans for the Operation

All the time that the 6th Army Group was on the defensive, General Devers looked forward to resuming his offensive at the earliest possible time. He appreciated fully that the liquidation of the Colmar Pocket should have first priority in order that the maximum number of divisions could be made available, as soon as possible, for the all-out offensive to breach the Siegfried Line and, subsequently, to cross the Rhine, and for Operation *Independence*, which was scheduled to be an all-French operation to reduce the German pockets around the port of Bordeaux in Western France. He directed his planners to make detailed plans for the operation—which later became known, through the whimsey of code names, as Operation *Cheerful*.

On 10 January, the plans for Operation *Cheerful* were submitted to Major General David G. Barr, Chief of Staff, 6th Army Group. It was appreciated in the beginning that since the French had been unable to eliminate the pocket, additional troops would be necessary. It was considered that the addition of one United States corps consisting of two infantry divisions (including the 3d Infantry Division still under the command of the French First Army), one armored division, and additional corps artillery and other supporting troops would provide ample forces for complete reduction of the pocket. It was believed firmly that the operation could be completed within a week after it started. The desirability of employing an airborne division was studied and the planners believed

that, although an airborne division was not essential to the success of the operation, its use would block the routes of escape, thus allowing our forces to destroy the enemy rather than to push him across the river to fight at a later date. They felt also that the use of an airborne division might reduce the period of the operation from 1 to 3 days.

After studying all the possible courses of action, the planners recommended the following general scheme of maneuver:



The attack should start with the main effort of the French I Corps in the direction Mulhouse—Ensisheim—Neuf Brisach, while the troops on the left flank of the I Corps made a secondary attack to capture the high ground north of Thann. It was believed this would cause the enemy to displace to the south to meet the threat. As soon as the displacement started, the French II Corps should then attack to cap-

ture Colmar. The main attack, to be conducted by the United States corps, then would start from the north on the axis Selestat—Neuf Brisach, bypass Colmar, and seize the Neuf Brisach area. It was contemplated that if an airborne division were available, it should be dropped in the vicinity of Neuf Brisach, at the same time as the main attack was launched, to seize the communications net there.

The planners studied weather records and Rhine flood records for many previous years and determined that early February probably would have less rain and would be warmer and slightly less cloudy than January. However, the innumerable streams, small rivers, and canals crisscrossing the Alsatian Plain, where most of the fighting would take place, generally were at their lowest stage in late January. Taking all things into consideration, it was recommended that the operation should start in early February, and certainly, prior to the 20th of the month.

One other tremendously important consideration was the serious supply and personnel situation. Numerous shortages existed in such items as field wire, ammunition, radios, tanks, and other combat vehicles. As regards replacements, each of the United States infantry divisions was short approximately 1,100 infantrymen.

General Devers gave tentative approval to the plan and, on 14 January, discussed the entire 6th Army Group situation with Lieutenant General Walter B. Smith, Chief of Staff, SHAEF, who was visiting Headquarters, 6th Army Group. General Devers, at that time, asked for one infantry division for use in the Colmar Pocket operation, and one armored division to replace the French 2d Armored Division so it could take part in the French attack. SHAEF complied by attaching the United States 10th Armored and the 28th Infantry Divisions to the 6th Army Group. However, since the 28th Infantry Division had been badly battered in the Battle of the

Bulge, it was not to be used in a full-scale offensive.

Convinced that he could get no additional units, and based on the latest weather forecasts, General Devers announced that the operation would commence on 20 January. *Letter of Instruction Number Nine* was issued on 18 January embodying the general scheme of maneuver described above but did not include a United States corps as embodied in the plan. The French I Corps was to attack from the south on 20 January, and the French II Corps was to make the main attack from the north on 22 January. Although the operation was expected to last only 7 days, sufficient artillery ammunition for 10 days of battle was allotted from the 6th Army Group's small reserve. The armies were warned that great care must be exercised in its expenditure, and that additional artillery ammunition might not be available.

Operation 'Cheerful'—the Attack

The French I Corps on the south jumped off as scheduled, but the weather failed to agree with the forecast and the corps attack was started in a severe snowstorm. The 2d Moroccan Infantry Division, the 9th Colonial Infantry Division, the 4th Moroccan Mountain Division, and elements of the 2d Armored Division making the attack gained tactical surprise and, initially, made rapid progress. The French, however, failed to exploit their success that night, and stopped advancing. The Germans reacted rapidly and, the following morning, launched vigorous counterattacks greatly slowing up the progress of the French I Corps.

The second phase of the operation started as scheduled on 22 January with the attack of the French II Corps. The 1st Infantry Division, the 2d Armored Division, and the 3d Infantry Division made the main attack. Slow progress was made, initially, because of heavy mine fields, but, during the night, the 3d Divi-

sion infiltrated through the Colmar Forest and jumped off from its eastern edge at daylight. The division continued to make progress and, by the 26th, had cleared the Ill River from Selestat to Illhausen and had reached the Colmar Canal, which runs eastwardly from Colmar, at three points. Farther to the north, the 1st Infantry Division established a bridgehead across the

ingly, asked for and received an additional United States infantry division from SHAEF. The 75th Division moved into the French First Army sector on 27 January. The United States XXI Corps assumed command of the three American infantry divisions (3d, 28th, and 75th) and elements of the French 5th Armored Division. The XXI Corps' mission was to



A French Army half-track moving through a tank barrier which was left open by confused German defenders in the outskirts of Colmar, France.—Department of Defense photo.

Ill River. On the south, however, the French I Corps attack had slowed down considerably and was making only local gains. In the first 5 days of the battle, the French in the south had used their entire supply of artillery ammunition which had been allocated for the whole operation, even though ample warning of the scarcity of all types of this item of supply had been given. Additional ammunition to complete the operation had to be provided from the almost exhausted 6th Army Group reserves.

General Devers was not satisfied with the progress of the attack and, accord-

continue the attack and to capture Neuf Brisach.

By 29 January, the XXI Corps had established a bridgehead south of the Colmar Canal and was advancing on Colmar. In the south, the French I Corps was making slow progress and was fighting in the Nonnenbruck Forest and in the northern outskirts of Cernay. By 3 February, the 28th Division had captured Colmar and the 3d Division had reached Neuf Brisach—a fortified city built in the seventeenth century by the great French engineer Vauban, and considered by many to be his

masterpiece. Units of the 5th Armored Division were relieved by elements of the 2d Armored Division which continued the drive south.

On 5 February, the United States 12th Armored Division, which had just been assigned to the XXI Corps, passed through the 28th Division in the Colmar area, and

ments of the 1st Armored Division at Fessenheim on 7 February. On that day, General de Lattre de Tassigny issued Order of the Day # 6. (See Figure 4.)

The Colmar Pocket was closed: only mopping up operations remained. (See Figure 5.)

The weather during the entire battle

ORDER OF THE DAY #6

7 February 1945

FROM: General de LATTRE de TASSIGNY

Officers, Non-Commissioned Officers and Soldiers, American and French of the French First Army: I do not want to wait until the end of this rugged and victorious fight before telling you of my joy and my gratefulness.

For nearly three weeks I have been granting you no respite, and night and day I called out to you relentlessly and increasingly, "Forward!"

It was necessary.

No task was more important and more beautiful than that of saving Strasbourg and definitely liberating Alsace. No task was more fruitful in its results, military and political. No task more deserving of your generosity and your sacrifices.

You have all understood this, and covered with mud, cold and exhausted, you have found in yourselves the extreme energy necessary to overcome the desperate energy of the enemy.

I thank you, my dear American Comrades, who have brought us your valor and who have spared neither your arms nor your blood in order to help us.

And for you, my dear French Comrades, you can claim with justifiable pride that you have been artisans of a great national event, of which our children will speak with emotion and respect.

All divisions of the Army of Liberation were present and all of them, each with its particular genius, and each with an equal love for the Mother Country, have gloriously consecrated their part of the battlefield.

The German is being completely pushed from the sacred soil of France. He will not return!

FIGURE 4.

drove south toward Rufach. Within 24 hours, the division had overcome resistance and had made contact with elements of the French 1st Armored Division driving from the south, thus isolating the enemy to the west in the Vosges. At the same time, the 3d Division stormed and captured Neuf Brisach. The 2d Armored Division, driving southward, joined ele-

was the worst that had been encountered on the Rhine Plain for more than 10 years. Nonbattle casualties, resulting mainly from the abnormal weather, were greater than battle casualties. The Americans suffered 2,961 battle and 3,228 nonbattle casualties while the French casualties totaled 5,067 battle and 11,963 nonbattle losses. During the operation, 16,438 Ger-

mans were captured and a great many others were killed or wounded.

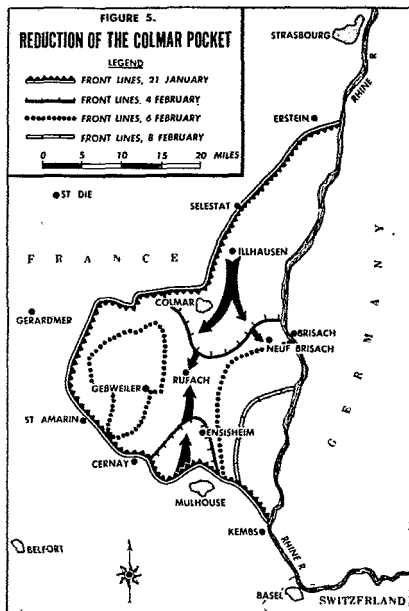
With the closing of the Colmar Pocket, a thorn that had been in the side of the 6th Army Group since mid-November was eliminated. It was now possible for the French to take over a large sector along the Rhine, and additional troops now were available to the Seventh Army for the resumption of the offensive and the ultimate destruction of the enemy.

Conclusions

The November offensive, from a planning point of view, was well conceived and co-ordinated. It was highly successful, producing results greater than expected. The belief that the Germans would commit their general reserves in the Metz area was well founded, and the initial attack by the Third Army to the north paved the way for the Seventh Army to utilize effectively its armor and motorized infantry. The main effort by the XV Corps is an outstanding example of the proper utilization of armor in its primary role of exploitation after enemy defenses have been penetrated. The maneuver which sent the French armored division north and south around the Saverne Gap, outflanking that strong and easily defended position, was brilliant and resulted in the opening of several routes into the Alsacian Plain. The use of motorized infantry to follow closely behind the French armor provided the forces necessary to hold the ground already gained and to aid in the reduction of enemy strong points. The French First Army employed the same principles in the south, thus breaching the strongly defended Belfort Gap, capturing Mulhouse, and reaching the Rhine.

Historians writing of the operations may argue that it was tactically unsound to swing the major part of the Seventh Army to the north to assist the Third Army in penetrating the Siegfried Line while the Colmar Pocket was still in ex-

istence. Such an argument is not realistic. The Germans were reeling backward and the French First Army, by an outstanding maneuver, had breached the Belfort Gap and had reached the Rhine. The French had available for use in the Alsacian Plain a force consisting of four French infantry divisions, three French armored divisions, one United States Infantry Division, and additional smaller units totaling an additional division.



There was every reason to believe that the French would be able to close the pocket from Switzerland to Strasbourg with little difficulty.

Although there were many considerations which contributed to the failure of the French to close the pocket, the principal ones are twofold. First, the terrific traffic jam of armored units, when the Germans were on the run, definitely influenced adversely the whole operation. The Germans regrouped successfully and

hastily established defense positions which, for weeks, prevented other than small gains in that sector. Second, French casualties had been heavy, particularly among the officers in colonial units. Since few, if any, replacements familiar with the handling of colonial troops were available, there was an inevitable lowering of morale and efficiency of these units.

As to the Seventh Army's drive northward, the Siegfried Line actually was penetrated in several places and the swing to the north, therefore, must be considered highly successful. On the Saar front, only remnants of German units stood between the Third and Seventh Armies and the Rhine River when the German Ardennes offensive caused the shifting of American divisions to the north. Whether it would have been preferable to allow the Seventh Army to continue its northward drive to outflank the strong enemy positions in front of the Third Army, rather than to assume the defensive, is interesting conjecture. *If* the northward drive had been allowed to continue, it is possible that some of the German units scheduled for the Battle of the Bulge would have had to be diverted to the south, thus reducing the enemy effort in the Ardennes.

When the Seventh Army was placed on the defensive, Headquarters, 6th Army Group, still hoped to renew the offensive in the Colmar area with the French First Army. The plan failed, not because German

capabilities were not evaluated properly, but rather because of a failure to appreciate the lack of strength of the French forces.

The German New Year's Eve attack had been anticipated correctly, and the XV Corps was able to stop it after losing some ground initially. To the east, the VI Corps failed to appreciate the seriousness of the German bridgehead established north of Strasbourg and, subsequently, the corps was required to fall back to the Moder River in order to protect the integrity of the army group front.

As to the planning for the final Colmar Pocket operation, the official history of the 6th Army Group states that there is no doubt that the plan of operations was sound and that had the entire United States corps recommended for employment been available at the commencement of the operation, the pocket undoubtedly would have been closed in the 7 days predicted.

In this brief summary of events leading up to the formation of the Colmar Pocket and of the operation resulting in its elimination, it is impossible to cover the magnificent actions of the divisions and smaller units which made up the 6th Army Group. It was, however, the heroic actions of these divisions and smaller units—both American and French—which made possible the successful operations of the 6th Army Group.

The Division Slice in Two World Wars

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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.

WHEN Germany surrendered, on 7 May 1945, the United States had some 12-million men in its armed forces. Less than one-fifth of these men were in ground combat units. All of the 89 Army divisions then in existence, and all of the divisions of the Marine Corps, were in overseas theaters of operations, and all but 2 had been in action. No reserves, other than replacements, remained in the United States; nor was there any significant strategic reserve of uncommitted forces in the theaters. For some time, too, the problem of supplying trained replacements to the combat divisions had been critical.

One interpretation of these facts is that our mobilization plans provided with remarkable accuracy for the minimum forces required to win the war. It also may be said that, had our operational plans suffered a serious check, we would have

paid dearly for our shortage of combat divisions.

Certainly, we could have made good use of more than 89 divisions. Several advantages would have followed from a larger number. One would have been the ability to withdraw units from action before the point of fatigue had set in, and beyond which casualties tended to mount seriously. Another would have been more systematic unit training, without the disruption and turnover within units caused by emergency demands for individual replacements. A third would have been greater ability to concentrate decisive force at critical moments.

But could the United States have mobilized, fought, and supported more divisions without seriously reducing the strength and quality of its over-all strategic effort? Were there wastes of manpower, the correction of which would have added to our fighting strength? Is this country's capacity to deploy combat divisions overseas as limited as it appeared to be in World War II? These questions are of more than historical interest, for the proper utilization of American manpower, in a future

Economy of force is necessary even in an army that prides itself on the superiority of its resources. Americans must work harder and live with less. Only then can we build more power in the men behind the guns

war, has become a problem of utmost importance.

One approach to the answer is by way of history. We may compare the employment of manpower and the division slices of the American Army in World Wars I and II, determine points of difference, and establish reasons for the differences. Such an analysis may point to lessons that have an application to the future. This is the approach taken by the present article.

-Analysis of Division Slices in the Two Wars

Number and strength of divisions.—By 11 November 1918, the Army had activated 58 divisions. Of these units, 42 were overseas. However, 12 of the 42 divisions were not functioning as combat units, having been drained for replacements or converted to other uses in France. Of the 16 divisions forming in the United States, 9 were at less than half strength in November 1918. The total strength of the Army (less personnel in the Air Service and related activities) on 11 November was 3,514,137 men. Of this number, 933,862 men were in divisions.

On 30 April 1945, the Army contained 89 divisions (67 infantry divisions, 16 armored divisions, 5 airborne divisions, and 1 mountain division). All were overseas, and all were at or not far below their authorized strength. The total number of men in the Army (less Army Air Forces) at the end of April was 5,983,492, of whom 1,194,569 were in divisions.

Effective division slices.—Obviously, we would be led to false conclusions if we were to use the total numbers of *activated* divisions in the two wars as the basis for calculating the respective division slices. It is more reasonable to determine the number of divisions that would have existed if all divisional personnel had been assigned to such units at maximum authorized strength. On 11 November 1918, the table of organization strength of an infantry division was 28,059. Therefore, the total

of 933,862 men then in divisions was equal to 33.3 *World War I* full strength infantry divisions. Similarly, on 30 April 1945, the authorized strength of an infantry division was 14,037. The total of 1,194,569 men then in divisions was equal to 85.3 *World War II* full strength infantry divisions.

On this basis, the world-wide division slice of *World War I* was 105,000 men, and that of *World War II* was 70,000.

Equivalent division slices.—It is apparent that these slices also are faulty for purposes of comparison because the *World War I* infantry division at authorized strength had twice as many men as the infantry division of *World War II*. Therefore, a further adjustment is necessary if we are to have a valid basis for comparison. Based on this adjustment, we can calculate the number of "equivalent divisions" on the two dates in terms of a *single* authorized strength. If we apply the 1945 strength of 14,037 men to the personnel in the divisions on 11 November 1918, we find that the 58 activated divisions of *World War I* were equivalent in manpower to 66.7 *World War II* infantry divisions. In these terms, the world-wide division slice in 1918 was 52,600 men, as against a world-wide division slice of 70,000 in 1945.

Distribution of personnel.—A more illuminating approach to a comparison of the relative numbers of combat troops in the two wars is the distribution of personnel in the Army by major categories.

Division slices in comparable theaters.—It also is interesting to contrast the division slices of 1918 and 1945 in approximately the same theaters of operations, that is, Western Europe. In the American Expeditionary Forces, the slice, in terms of a division equivalent in manpower to a *World War II* infantry division, was 33,000 men. The comparable slice in the European Theater of Operations was 45,000 men.

Interpretations *

For our purposes, the data presented above have the following significance (consideration is given only to the Army minus Air Force personnel):

1. In 1918, almost half the Army was in *combat categories*; in 1945, only a little over a third.

2. Personnel classifiable as *replacements* numbered somewhat over a quarter of the Army in both wars. However, they were

laneous categories were proportionately much higher in 1945 than in 1918.

5. Aviation drew more heavily on services of the rest of the Army in 1918 than in 1945. Therefore, the division slice of 1945 is *not* disproportionately weighed by support for the Air Forces.

6. The proportion of personnel in the Army whose job was to support troops in divisions was 45 percent greater in 1945 than in 1918, that is, for every 100

DISTRIBUTION OF PERSONNEL IN THE ARMY IN TWO WORLD WARS

	<i>Total Strength</i>		<i>Percent of Total Army (less Air)</i>		<i>Percent of Total Ground Combat Forces</i>	
	<i>15 Nov 18</i>	<i>30 Nov 45</i>	<i>1918</i>	<i>1945</i>	<i>1918</i>	<i>1945</i>
Divisions	933,862	1,194,569	26.6	20.0	56.3	53.5
Nondivisional combat forces (less antiaircraft artillery)	726,149	779,882	20.7	13.0	43.7	35.0
Ground combat forces (less antiaircraft artillery)	1,660,011	1,974,451	47.3	33.0	100.0	88.5
Antiaircraft artillery		259,403		4.3		11.5
Total ground combat forces	1,660,011	2,233,854	47.3	37.3	100.0	100.0
Nondivisional service	945,470	1,638,214	26.7	27.4	56.9	73.3
Replacements	454,863	841,715	13.0	14.1	27.4	37.9
Overhead and miscellaneous	453,793	1,269,709	13.0	21.2	27.4	56.9
Total Army (less Air)	3,514,137	5,983,492	100.0	100.0		
Army Air Forces	190,493	2,307,501				
TOTAL	3,704,630	8,290,993				

considerably higher in proportion to combat troops in 1945 than in 1918.

3. Personnel in *service categories* numbered somewhat over a quarter of the Army in both wars. Service personnel also were considerably higher in proportion to combat troops in 1945 than in 1918.

4. Personnel in *overhead and miscel-*

men in a division, the number of men in support was 276, in 1918, and 400, in 1945.

Combat Capabilities of Infantry Divisions in 1918 and 1945

Was the increased support given to the combat division of World War II accompanied by greater power on the battlefield?

The essence of success in tactics is the delivery of overpowering fire from the right place at the right time. Two in-

* The data in the table found on page 53 and the material on which "Interpretations" are based, are found on pages 191-193 inclusive of *The Army Ground Forces; The Organization of Ground Combat Troops*, published by the Historical Division, Department of the Army, in 1947.

redients in this essence are fire power and mobility. There are other elements, notably leadership and the will-to-fight, but they cannot be measured arithmetically. The relative fire power and mobility of tactical units, however, can be calculated with a tolerable approximation.

Fire power.—The infantry division of 1945 not only was equipped with more effective weapons than the infantry division of 1918, but it also delivered more fire in battle. The weight of ammunition of all calibers expended, on the average, in each division day of combat in the European Theater of Operations was $2\frac{1}{2}$ times greater than in the American Expeditionary Forces. This contrast is all the more striking when we recall that the infantry division of World War II had only half as many men as were authorized the division of World War I.

Mobility.—The World War I division, unless assisted by nonorganic transportation, was limited in its mobility to the rate of march of its foot soldiers. The World War II infantry division, however, was capable of moving either at the rate of march of its infantry regiments or, by employing its organic vehicles in echelons, at the much higher rate of motor trucks. In rear areas, it could move at least 7 times as far in 24 hours as could the division of 1918. In strategic mobility, the 1945 infantry division (not to mention the tactical capabilities of the armored division) was much superior to its counterpart of World War I.

The higher fire power and mobility of the divisions in World War II were a reflection both of better equipment and of greater logistical support.

Reasons for the Disparity Between Division Slices in the Two Wars

So far, two conclusions have been reached:

1. Substantially more manpower sup-

ported a given number of combat troops in World War II than in World War I.

2. The potential effectiveness of a division on the battlefield was much greater in 1945 than in 1918.

The division of 1945 had more fire power and mobility than its counterpart in 1918 because its weapons, vehicles, and signal communications were superior. These improvements, in turn, were a product of the rapid progress made in science, technology, and industry in the years between the two wars. But the new tools of war had a price: the additional manpower needed to operate and maintain them. The greater fire power and mobility of the World War II division could be achieved only by giving it increased noncombat support.

In other words, technological developments in warfare made necessary a larger division slice. It is possible that there were other reasons, too, for the growth of the noncombat elements of the Army—reasons to be found in the peculiar strategic character of World War II and in the impact of American standards of living upon the military service.

The factor of technology.—We may consider first the matériel requirements that reflected technical developments in the art of war. This is a factor that would have operated regardless of the particular strategy of World War II. The point is this: Because of innovations in warfare, the tools used by the Army in World War II were very different from those used 25 years before. These requirements were expressed not only in an increase in the numbers and types of items of equipment, but also in increased bulk and mechanical refinement of much of that matériel.

The initial movement of one American soldier with his equipment in World War I required an average of 2.7 measurement tons. The comparable figure for World War II was more than 5 tons. Furthermore, an average ton of matériel for the

American Expeditionary Forces took up 63 cubic feet of space; for the United States Army in the European Theater of Operations 99 cubic feet was required. In short, 57 percent more space for each ton in storage and transportation was needed in the European Theater of Operations than in the American Expeditionary Forces. Supply requirements of the American Expeditionary Forces averaged 59 pounds for each man each day; in the European Theater of Operations they averaged 67 pounds. The relative mechanization of the two forces is reflected in the fact that the consumption of gasoline for aviation and all other purposes in the American Expeditionary Forces was a little over 1 pound for each man each day, whereas in the European Theater of Operations it was more than 11 pounds for nonaviation purposes alone.

As we have seen, an infantry division in 1918 had an authorized strength of 28,059 men. An infantry division in 1945 had half that strength. Yet the armament requirements were almost in reverse proportion. The 1918 division had 86 artillery pieces, whereas the 1945 infantry division included 136 artillery weapons. The division of 1918 had 260 machine guns. With half as many men, the 1945 division was equipped with 461 machine guns. In World War I, a division had 804 motor vehicles and 1,080 carts and wagons. An infantry division in World War II had 1,474 motor vehicles. In World War I, there was no armored division. The total number of tanks employed by the American Expeditionary Forces was 265. (Most of these were 6-ton tanks; all were furnished by the French and British.) In World War II, an armored division was equipped with 2,053 self-propelled vehicles, including 272 tanks.

The increased volume, variety, and complexity of the tools of war were accompanied by greater volume, variety, and complexity in the supply of the tools, the

ammunition and fuel required for their operation, as well as in their transportation, storage, and maintenance. Therefore, the factor of technology alone demanded more manpower for the support of a combat unit.

1 *The factor of strategy.*—There also was a major strategic difference between the two wars. This difference inevitably was reflected in the relative sizes of the division slices.

So far as the American Army was concerned, World War I was confined to a relatively narrow front in one major theater of operations. The strategic problem was to move a large, partly equipped army across a single ocean line of communications into a relatively secure and well-organized base; there to assemble and complete the training and equipping of the army; and, finally, to join with strong Allied armies in defeating the enemy upon a single front, primarily by means of infantry and artillery.

The problems of World War II were much more complex. Our strategy in that war was to hold at least one of two major enemies at bay, while gathering our strength for offensive action, and then, because we were unable to attack both opponents in force at once, to give priority to the defeat of the more formidable. The holding phase of our strategy required the provision of great logistic aid to our Allies, the securing of numerous lines of communications, and a preliminary offensive against the enemies' logistic potentials, primarily by means of air and naval action. The second phase of our strategy was executed when our men were trained and equipped, and we were able to bring to bear preponderant weight in matériel. We then launched major amphibious and air offensives designed to seize and secure bases in enemy-held areas, first, in Africa and Europe, and, later, in the Pacific. Once these major bases had been secured, it was necessary further to

assemble large armies for the final offensive toward the enemy homelands.

To say that the American Army's strategic problem in World War I was comparatively simple is not to deprecate the skill with which it was solved. It does lead one to expect that a smaller proportion of the Army's manpower had to be committed to noncombat duties than was required by the more complex and more widely deployed operations of World War II.

The factor of lines of communications and sources of supply.—In World War II, the Army was confronted by a logistical situation different, in important respects, from that of the earlier war. These differences—in part an expression of technological developments and strategy—also must be considered in an analysis of the support required by combat units.

Not only were our troops in World War II more highly mechanized and, in part, more distantly deployed than in 1918, but they also received less logistical help from their Allies.

Only 43 percent of the 2 million men in the American Expeditionary Forces were shipped overseas in American vessels. However, most of the 5 million soldiers overseas at the end of World War II, and virtually all of their supplies, were transported in American ships. In 1917-18, there was but one overseas theater, 3,000 miles from American seaports. At the European terminus were well-developed ports, far from the front and unharassed by the enemy. The unloading of men and supplies proceeded without serious interruption. The troops were moved toward the front over a secure railway system, operated, in large part, by French personnel and equipment. In World War II, our troops were transported to five major theaters, in Europe and Africa, Southeast Asia, and the Western and Southwestern Pacific. Instead of only 3,000 miles, men and supplies were sent 6,000 miles to the

South Pacific and even 12,000 miles to the ports of India and the Persian Gulf. Many of the overseas ports were inadequate, or were badly damaged. In some instances, no ports were available; major assaults were made against defended shores in order to seize harbors and repair them with our own means. Ashore, the troops moved largely with their own transportation.

For its supplies, the American Expeditionary Forces drew, to a large extent, upon the British and French. On a tonnage basis, 51 percent of all supplies received by the American Expeditionary Forces from 1917 to 1919 came from Europe, and only 49 percent from the United States. For particular equipment, notably artillery and aircraft, the Army depended almost entirely upon British and French sources. By the spring of 1918, the Armies of France and Great Britain had suffered very heavy casualties. At this point, America's contribution to the Allied cause became primarily one of manpower. In 7 months, 1½ million American soldiers were shipped to France, there to be supplied, in great part, by our Allies.

The American Expeditionary Forces were handicapped seriously by not having enough service support for their combat units. The shortage of service troops became more and more acute in the last months of the war. In September 1918, it was decided to turn over to the Services of Supply three newly arrived infantry divisions, pending the arrival of more Services of Supply troops. In other words, the division slice of the American Expeditionary Forces was probably too small.

By contrast, the much heavier supply requirements of the American Army in World War II were met far more completely by its own logistical services. Moreover, the Army made large material contributions to the Allied armed forces and to the civilian populations overseas. For example, almost all of the equipment used

by the revitalized French Army, which had 12 divisions in action at the end of the war, was supplied by the American Army. Our forces operated lines of communications in Persia and India for the sole purpose of sending supplies to the Russians and Chinese. The Army also was obliged to assist in maintaining a minimum subsistence for the populations of liberated and occupied areas, and this, too, burdened its service forces.

The long, complicated, and relatively insecure lines of communications of the Army in 1941-45, together with the heavy demands made upon its supply system, thus were additional reasons for the high proportion of service troops in World War II.

The factor of replacements.—We have seen that replacements were in higher ratio to combat forces in 1945 than in 1918. For every 100 men in divisions, there were 38 replacements in May 1945, as against 27 in November 1918. This was an element of greater combat strength in the division slice of World War II.

Before World War II, it had been the practice to fight divisions until they were seriously reduced by casualties, and then withdraw them from the line and rebuild them. In 1918, the American Expeditionary Forces had to reduce the strength of its divisions and, finally, to disband several newly arrived divisions in order to maintain the limited strength of those already in battle. In contrast, the replacement system adopted by the American Army in World War II provided for a flow of individual soldiers from training centers to the divisions in combat, in order to keep those units near full strength. Losses were replaced without the dissolution of any divisions committed to action, although some of them suffered heavy and continual casualties over a period of years.

Not only were there, proportionately, more replacements in World War II than

in World War I, but also they were more fully trained and their movement was conducted more systematically. The personnel required to give this training and to manage the replacement system were a sizable portion of the Army's "overhead."

The factor of living standards.—During the interval between the two wars, the American people approximately doubled their yearly per capita production of goods and services. The increase in output was accompanied by a marked rise in consumption levels. Not only did this mean greater individual consumption of the "essentials"—food, clothing, and shelter—but also more consumption of "luxuries" and near luxuries. As a result, the wants of the American people ranged more and more widely. Increasingly, the bounty of modern industry was expressed in automobiles, radios, skin creams, beard softeners, silk stockings, cigarettes, billfolds, dancing lessons, puffed cereals, and motion pictures. Not merely the luxuries of the fathers, but also luxuries unknown to the fathers, became the necessities of the children. Under the pressures of convention, at least a moderate consumption of such things came to be part of a decent living. People were caught up more and more in an elaboration of dress, diet, housing, recreation, and adornment. At the same time, habits of wasteful consumption became more widespread and firmly fixed. It was easy to recognize the many forms of waste that had become a part of the accepted living pattern. The comparative wastefulness of Americans is widely admitted by Americans themselves. It was widely regarded as a proof of the success of their productive system.

The point made here is not that this is morally reprehensible. It is simply that the rising American living standard, and its accompanying wastes, have been increasingly costly in terms of materials and manpower, and that as a result, the American habits of consumption inevitably are

reflected in the standards of the armed forces of the American people.

It is difficult, statistically, to throw light on the influence of this factor in raising the manpower and material requirements of the Army of 1940-45. Yet there is no doubt that it did have a substantial effect. Everyone who knows the habits of American soldiers of all ranks, everyone who knows of the services provided systematically by the Army, can provide illustrations. There were the laundry and bath units, the refrigerated foods, the efficient postal service, and the well-made shoes and trucks. On the other hand, there were the wasted rations, the gasoline burned in needless jeep rides, the serviceable equipment cast aside, the soft drinks shipped thousands of miles, the elaborate merchandise of the Post Exchanges (at least in the rear areas), and the mountainous baggage that was transported by our moving troops. Possibly the modern American business office—with its lavish use of paper, typewriters, files, and clerks—had its reflex, too, in swelling the demands of the higher headquarters. The American troops of 1918 were hailed by the Quartermasters as “the best fed soldiers in the world.” Yet the average soldier in the American Expeditionary Forces ate only 4.3 pounds of food a day, whereas his European Theater of Operations counterpart required more than 7 pounds. The ration of 1945 was more palatable than that of 1918, but why—even allowing for convenient packaging—should it have weighed 3 pounds more?

The Army of 1918 also had a high standard of living, compared with its Allies, and its soldiers were not noted for thrift. But the pressure of civilian living habits upon the Army—the urge to duplicate the comforts and usages of civilian life—was heavier in World War II, if for no other reason than because these habits were expressed on a materially higher and more lavish plane.

Inflation of the Division Slice in World War II

Was the division slice of World War II larger than can be reasonably explained by the factor of technological development and by the unique strategic and logistical requirements of the war? The discussion of living standards in the preceding paragraphs suggests that it was. The prolific demands for men and equipment to be employed in many ways not related to combat, the habit of “empire building,” the tendency to burden the military establishment with comforts and conveniences, specialized services, and complex agencies of control—these were powerful forces in the inflation of noncombat elements of the Army.

Colonel S. L. A. Marshall—in the *Combat Forces Journal* of August 1950—pointed up certain aspects of the problem in trenchant language: “In actual goods, we wasted more matériel in Western Europe in getting from Normandy Beach to the Elbe River than the two million men of the original American Expeditionary Forces required throughout its operation. The total requirements of the first American Expeditionary Forces were several million tons less than the surplus of the second expedition of 1944-45.

“... such tremendous waste came mainly from two faults in the system. The first is our overindulgent attitude toward our troops; we seem to feel that their loyalties cannot be commanded unless the Army acts as a pappy to them and puts their creature comforts above all else. The second was a basic weakness in the checks or controls over the supply demands of the field armies. . . . Both [evils] came . . . from the illusion that American resources are practically inexhaustible. That idea of the national wealth, and how we should use it when war comes, is by no means confined to the armed services. But to the extent that they follow this public fancy, instead of

determining a fundamental soundness for their own economy, they sanction the bogging down of true mobility under unsupportable weights.

"The lack of a fundamental supply discipline in all ranks of all the services causes more friction and destroys more mobility in the operations of American forces than any other weakness. And it is a chief contributor to our moral weakness."

Not only were there avoidable wastes of manpower and materials in the flow of supplies to the troops, but there also were wastes in the organization and operations of headquarters and of troop units.

The staffs of higher headquarters absorbed many of the most experienced officers, not to mention others who might have been more useful elsewhere. Moreover, the massive paper work, the complicated co-ordination, the network of communications, and the liaison demanded by elephantine headquarters threatened to block the rapidity of action for which the Army was physically equipped. General McNair wrote: "The overhead of headquarters in this war is viewed as staggering. We have the advantage of the most modern equipment in communications and transportation, which should operate to reduce overhead but actually is operating to increase overhead instead. . . . If commanders are allowed to indicate their own needs, experience has shown repeatedly and almost invariably that there will be no end to the increases demanded."

Duplicating supply lines and different standards of service in the Army, Navy, and the Air Forces complicated and slowed logistic operations. Intricate organization for Army administration, services, and supply existed in the overseas theaters. Each theater commander was free to set up whatever type of logistic structure he desired. The result was that no

two were alike. Large headquarters with vaguely defined and overlapping functions were the rule. Differing systems, procedures, forms, and nomenclature were barriers to effective supply co-ordination.

Furthermore, according to the *Final Report of the Army Service Forces*, "a fully satisfactory organization within tactical units of the Army for performing logistic functions in the field was not developed during the war. The number and types of service units, over 150 at the end of the war, is one indication of the confusion in this field. In addition, special units or units with special equipment were continuously created. There was an unnecessary overspecialization in types of service troops, thereby making it difficult to secure maximum flexibility in the utilization of service personnel."

The advantage of hindsight makes it far easier to point to such wastes today than during the war. Many activities that now appear unnecessary could not have been so regarded at one time or another while the conflict was going on. War inherently is wasteful. Nevertheless, it must be evident that a greater sense of the value of men and materials is essential to the safety of this Nation.

Lessons Applicable to a Future War

What lessons can be drawn from this comparison of division slices in the two wars? Have we found any guideposts that point the way toward reasonable reductions in the noncombat elements of Army manpower?

We have seen that a number of major factors operated toward a relatively large employment of manpower in supporting roles in the Army of 1941-45. These very features suggest approaches to the problem of deflating the noncombat categories in a future war.

Technology.—For one thing, the increasing complexity of the tools of war de-

mands more and more manpower in support of the combat troops. Some of this growing complexity adds to the battlefield potential of the Army. But it is at least possible—if not probable—that the net effect of technical developments in certain directions will reduce the Nation's fighting power. The cost of these developments—the manpower that they remove from the pool of potential fighting soldiers—may more than offset their contribution.

This possibility is raised strikingly by the trend toward motorization. To realize that there is a limit to the profitable employment of motor vehicles, we need only envisage the absurdity—in the present state of technology—of providing every man in a combat unit with a vehicle. An excess of transportation surely will immobilize an Army.

The large number of motor vehicles assigned to combat units in World War II added greatly—directly and indirectly—to the demands for shipping space and thereby reduced the number of troop units that could be sent abroad. The more vehicles were used overseas, the more shipping was needed for fuel, spare parts, replacement vehicles, drivers, and maintenance men, and the less was available for combat troops, weapons, and ammunition.

Economy of force is a basic necessity even for an Army that prides itself on the superiority of its technical resources. Let us consider any proposals for the adoption of new tools of war—or, for that matter, proposals for a wider use of existing tools—only if their benefits are evident from the broad standpoint of objectives and costs to the national war effort. These proposals must prove that the manpower and materials needed for the production, maintenance, and operation of the new tools of war would not be employed better elsewhere. They must prove their worth—not in making life more con-

venient or easier—but in adding directly or indirectly to the striking power of our fighting men.

Strategy.—The complexity and the wide range of American strategy in World War II also did much to swell the requirements for manpower in noncombat assignments. A multiplication of strategic commitments also is a multiplication of demands for men, especially for lines of communication. If our limited manpower is to be used for the most urgent tasks, our strategic planning must look to the concentration of force on primary objectives. Furthermore, we must devise better means of estimating long-range troop requirements and for anticipating the deployment of units. This is necessary, if logistical planners are to have a firm basis and sufficient time to furnish sound support for projected operations.

Standards of living and working.—Another lesson, perhaps the most difficult to be learned from the experience of World War II, is that the whole range of our requirements can and must be reduced in the interest of economy. No one consciously advocates waste. Our problem, however, lies in convincing men, in specific situations, that they can get along with less and be the better for it. What is required is a fundamental change in attitudes; a change that will make for a far stricter application of economy in concrete cases. This is a problem of leadership and initiative at every level, civilian as well as military.

It is pertinent to recall the ideas of a resolute spokesman for economy in the Army. General McNair's chief thought in tactical organization was to concentrate a maximum of men and matériel in offensive striking units capable of destroying the enemy's capacity for resistance. The derivatives of this idea were many. One was to have a minimum of noncombat soldiers, to hold down nontactical overhead,

and to make tactical staffs small and efficient. Headquarters companies, staffs, and administrative personnel should be kept small by the elimination of unnecessary links in the chain of command and by reduction of paper work through the use of verbal orders. Combat units should have only such personnel and equipment as they require at all times. Transport and special equipment should be assigned sparingly and pooled where possible. Weapons and units primarily defensive in character should absorb as little as possible of the national resources. Special-type units and excessively specialized personnel, useful on certain occasions only, should be discouraged.

Modern weapons and modern transportation have greatly increased the tactical potential of combat units. But the need for more combat units will not be met, unless we learn that American soldiers can get along with less and be the better for it. Nor does this hold only for the fighting troops. The living standards of troops in rear areas also must fall in line. Furthermore, most people probably can work harder than they do. The duty hours of front-line units can at least be equaled in the rear areas, and, especially, in headquarters.

Administrative and service troops also must be prepared to defend themselves against raids and penetrations. Economy of force argues against stationing combat units in rear areas to guard the lines of communications. All men, in the technical and administrative services, must be trained in the essentials of small unit combat as well as in their technical and administrative specialties. By the same token, administrative and service units must be organized and equipped so that they can engage in combat.

All this is not merely a matter of pro-

claiming doctrine based on a concept of stern supply discipline, nor of applying a red pencil to tables of organization and troop lists. It is, rather, one of devising controls and standards of inspection to make those controls work. All ranks, in all services, must weave tighter discipline into their performance of duty.

Conclusion

There were almost three times as many men in the Armed Forces of the United States in World War II as in World War I. Yet the number of men in our ground combat forces was only 50 percent greater. Furthermore, the Army division slice of 1945 was one-third larger than the comparable slice of 1918.

Several factors were responsible for the limited numbers of men in ground combat units and for the large proportion of non-combat elements in the Army during World War II. One was the heavy allocation of manpower and materials to control the sea and the air, to engage in strategic air bombardment, and to support our Allies. Another was the requirement to secure and maintain long and difficult lines of communications. A third factor was the need for men and supplies to move, operate, and service masses of heavy and complicated mechanical equipment. There was desire and pressure to give the men in the armed forces something comparable with the American standard of living. There also was the large overhead that seemed necessary for the control of a complex of specialized units. And, throughout the process, there was, unfortunately, a great waste of manpower and materials.

Our ability to economize in these factors will determine the extent to which we can increase the relative size of our ground striking force in the future. The value and the cost of technical innovations must

be assessed more carefully. Strategic commitments must be limited to those essential to the national purpose. Above all, Americans must learn that their resources are

limited, and that they must work harder and live with less. Only in this way can we build more power in the men behind the guns.

NEXT MONTH

Main Articles

The Preparation of a Technical Service Mobilization Plan by Major General William H. Middleswart; and *Progress Toward Decentralized Command* by Lieutenant Colonel George W. McCaffrey.

Foreign Military Digests

The foreign digests include "Reflections on Defense" from *Revue Militaire d'Information* (France); and "Logical Methods in Tank Development" from the *British Army Journal* (Great Britain).

Books for the Military Reader

Reviews of *Engineers of the Southwest Pacific 1941-1945, Volume VIII, Critique*; and *Brazil, Portrait of Half a Continent* are included.

MILITARY NOTES

AROUND THE WORLD

UNITED STATES

Bulldozer 'Chuted

The Air Force has parachuted a 9½-ton bulldozer from a cargo plane—the heaviest load ever dropped successfully.

Within 5 minutes after the bulldozer was landed, it was in full operation. Such heavy equipment previously was dropped in sections, but the parts often were damaged on landing, making the entire unit worthless.—News release.

Overseas Supply

The Air Force has geared its overseas supply procedure to meet the urgent world-wide needs of the national emergency.

It has put into effect a new system for supply control designed to speed world-wide delivery of supplies and to keep an up-to-date account of the where-about of all items shipped by the Air Force.

The system includes the use of electrical accounting machines to keep records and an elaborate world-wide communications system to transmit messages. These machines enable the Air Force to keep an accurate record of each item from the time of requisition until it is delivered. A world-wide teletype and radio network speeds requisitions from overseas installations to a monitoring point in this country.—*The New York Times*.

Antisubmarine Plane

The first of a "substantial number" of the Navy's newest, and one of its most



The Martin P5M-1 Marlin flying boat, deadly, antisubmarine weapons, the Martin P5M-1 Marlin flying boat, recently completed its first flight.

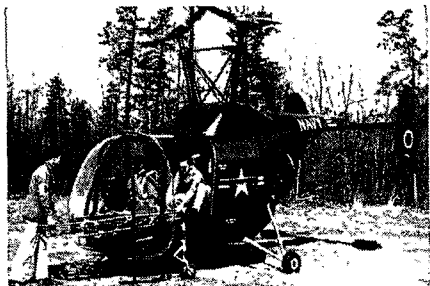
One of the most completely electronically equipped planes ever built, the Marlin is designed especially for the detection and destruction of enemy submarines. In addition to this role, it can be used as a cargo or general utility carrier.—*Armed Force*.

Berlin Radio

The United States radio station in Berlin has added millions of Iron Curtain listeners to its audience with the installation of a 20,000-watt short wave transmitter.—News release.

Navy Helicopter

The Kaman Aircraft Corporation recently completed and demonstrated its first production model of the Navy *HTK-1*



The *HTK-1* being used as an ambulance.

helicopter. It is designed primarily as a two place (pilot and student) training craft, but can be used for combat ambulance work.

Performance data have not been released.—News release.

Monofuel

Gas turbine engines in airplanes may become more widely used with a so-called monofuel which contains, in addition to the combustible material, an oxygen-releasing chemical which supplies the necessary oxygen for combustion. Present fuels used in rockets contain sufficient oxygen to assure combustion.

This newly patented monofuel can be used in rockets, or in other situations where a self-sufficient fuel is desired, but it is recommended particularly for gas turbine engines to permit them to operate without dependence on the atmosphere for oxygen.—*Science News Letter*.

Airports Needed

Nearly 5,000 new or improved civilian airports in American territory are needed to meet the demands of aviation now and during the next 3 years, according to a recent report by the Civil Aeronautics Administration.—*Science News Letter*.

Convertible Stratofreighter

The first production airplane in a new multipurpose *C-97 Stratofreighter* series recently was delivered to the Air Force.

Designated a *KC-97E*, the 72-ton airplane is designed to operate either as a tanker aircraft, troop transport, cargo carrier, or hospital plane.

Convertibility from one to any of the other of these uses can be accomplished in a few hours.—News release.

Improved Compasses

American troops in Korea have received two new types of compasses designed to assist ground forces in reconnaissance and navigation, and for aiding forward observers in directing fire.

Developed by the Army Corps of Engineers, the new wrist-type compass and lensatic compass are vast improvements over those used during the last war.

The new instruments are light, accurate, sensitive, and rugged enough to withstand the most severe conditions of combat for a long period. They are resistant to water, weather, shock, mildew, and fungi; and have been drop-tested for air and airborne operations.—*Armed Forces*.

L-206 Cargo Plane

Lockheed Aircraft Corporation has been selected to develop a new turboprop medium cargo airplane for the Air Force.

Carrying the design designation *L-206*, the new freighter is distinguished by a squat, highly utilitarian fuselage with large aft cargo doors and an especially sturdy floor built only 45 inches from the ground. Straight-in loading of bulky cargo without special freight handling equipment will be possible.

Inherent in the design is the capability of performing a variety of missions under extreme operational conditions. The cargo area provides for carrying many types of loads, including ground force vehicles and equipment.—News release.

'Flyaway Kit'

Durability and compactness are major features of a new portable medical kit containing sufficient drugs and other supplies to give interim care to a squadron of 200 to 300 men for about 30 days.

Called the "Flyaway Kit" because of the ease with which it may be air-transported, the array of instruments, pills, and similar items has had provisional acceptance by the Air Defense Command, and may become standard for the entire Air Force.—*Armed Force*.

Lightweight Revolvers

Some 2,000 Air Force crewmen are testing three different models of a lightweight, .38-caliber revolver as possible replacements for the .45-caliber automatic now in use.

The revolvers all use a 2-inch barrel, but the frames and cylinders are made of lightweight, high tensile strength aluminum alloy.

The three models include a six-shot revolver weighing 11½ ounces, a five-shot revolver weighing 10½ ounces, and a six-shot revolver weighing 14 ounces.

The .45-caliber automatic now used by aircrewmen weighs about 2½ pounds.—*Armed Force*.

Added Fire Power

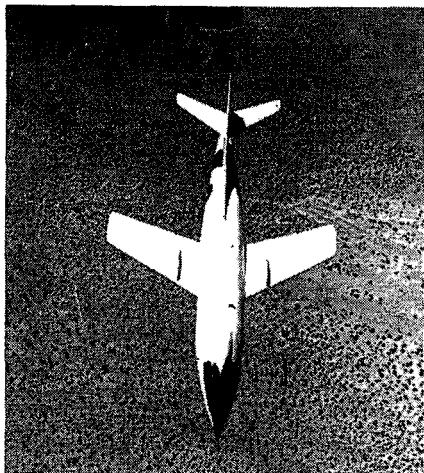
Efforts to increase the fire power of military police units are under way. Reports on MP combat operations in Korea indicate that traffic patrols and traffic control points frequently are attacked by guerrillas or infiltrators. The lack of automatic weapons has handicapped the MPs in such instances.

The Provost Marshal General has proposed to the Chief of Army Field Forces that military police units in field armies be provided with .30-caliber machine guns with pedestal and ground mounts, and with additional M1 rifles.—*Combat Forces Journal*.

World's Fastest Plane

The Navy recently announced that its supersonic experimental plane, the *D-558-2 Skyrocket*, had exceeded all airplane speed and altitude records.

The exact marks attained were not disclosed, but the announcement implied that the speed probably was in excess of 1,000



The Navy's supersonic research plane—the *D-558-2 Skyrocket*—Douglas Aircraft photo.

miles an hour and the altitude more than 12 miles.

The highest previous speed claim was the Air Force's statement that its Bell *X-1* experimental plane had exceeded the speed of sound by "hundreds of miles an hour." The speed of sound at sea level is 760 miles an hour. At the high altitudes at which the current tests have been made, it is 660 miles an hour.

The previous world altitude record was 59,492 feet—about 11¼ miles—made by a British *Vampire* jet fighter. The *X-1* has been unofficially but reliably credited with reaching 63,000 feet, just short of 12 miles. The *Skyrocket's* record breaking flights lasted from 11 to 16 minutes.—News release.

Mineral Exploration Projects

The Defense Minerals Administration (DMA) has signed 93 contracts for mineral exploration projects since the program started last April.

The contracts call for expenditures of more than 6 million dollars, with the Government paying about 58 percent of the cost and private industry paying the remainder.—News release.

Air Cargo Handling Improved

A portable outdoor freight elevator and an in-plane mechanical stevedore have been developed for use at advance landing fields where regular loading aids are unavailable. Both pieces of equipment are powered by the plane's own electrical system.

Large enough to hold many items at a time, the 10 × 10 foot elevator can raise 10,000 pounds more than 12 feet, a height adequate for all major transports today.

The stevedore conveyor, a companion piece to the elevator, is a subfloor endless chain running the length of the cabin. In a floor slot, a device hooked into the electrically driven chain pushes or pulls loads weighing up to 10,000 pounds. Loads slide easily along the metal floor.

Portable switches on a long cable on a swivel reel attached to the ceiling permit the operator to walk beside cargo being hauled by the conveyor.—News release.

WAC Center Proposed

A new, permanent training center for the Women's Army Corps, to cost about 10 million dollars, has been proposed to Congress by the Secretary of Defense.

It would be at Fort McClellan, Alabama, and would replace the present WAC training center at Fort Lee, Virginia.

The Women's Army Corps now has a strength of about 10,000, and it plans to have three times that many by the middle of next year.—News release.

Navy Jet

The Navy has awarded a production contract for an undisclosed number of *FJ-2 Fury* sweptwing jet fighters.

The *FJ-2 Fury* is an advanced development of the Navy North American *FJ-1 Fury*, the first American jet aircraft to carry out operational landings and take-offs aboard a carrier at sea. The new model will be powered by an advanced jet engine designed by General Electric.—News release.

Pacific Islands Control

President Truman recently signed an order transferring administrative responsibility for the Trust Territory of the Pacific Islands and for American Samoa from the Navy to the Secretary of the Interior.

The Trust Territory islands comprise the former Japanese mandated islands—the Marshalls, the Carolines, and the Marianas. There are 96 inhabited islands in a total of about 2,500 that have been designated as a strategic trust territory by the United Nations.

American Samoa has been administered by the United States Navy for the last 50 years. The American island of Guam in the Marianas was transferred to the Interior Department a year ago last August.—*The New York Times*.

Elevator Bridge

The touch of an elevator button will transform the Navy's new \$228,500,000 super aircraft carrier into a flush-deck ship for handling large planes and night operations.

Navy designers plan to mount an "island"—a carrier's bridge—on an elevator to permit the lowering of the bridge to make a flush-deck for plane landings.

Construction of the supercarrier is scheduled to start within a few months, with completion expected in about 3 years.—News release.

Collapsible Jet Helicopter

The Army has announced plans to build a collapsible, lightweight, jet-propelled helicopter, designed for ease of maintenance under field conditions.

Two men can collapse it and load it aboard a jeep. Assembly of the machine can be accomplished with ordinary tools, and critical parts can be replaced within a few minutes. It will operate on ordinary fuel used by Army vehicles.

The Army expects the machine to prove valuable in front-line reconnaissance and observation, and for use during the early phases of airborne operations.—News release.

Atomic Radiation Hazards

Radiation hazards will not delay rescue and recovery work after an air burst of an atom bomb, it was announced officially in the report of Joint Task Force Three upon the atom bomb tests conducted in April and May.

In a high aerial burst there would be no residual radiation. In a low air burst just above the ground's surface, the significant residual radiation would be confined to radius of 300 to 400 yards which would be completely devastated and need no rescue work.—*Science News Letter*.

Transferring Ships

The United States is transferring 24 destroyer escorts to Allied powers in Europe and South America.

Fifteen of the vessels already are in Allied hands under the 1941 lend-lease act. Brazil has eight, France has six, and Great Britain has one.

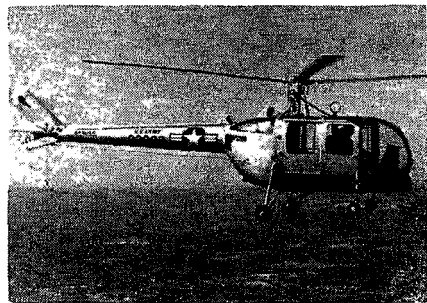
Of the remaining nine vessels, France and Denmark each will get two, while Peru will buy three and Uruguay two at one-tenth the original costs, plus rehabilitation charges.

Most of the warships involved are of a type no longer used by the United States Navy.—*The New York Times*.

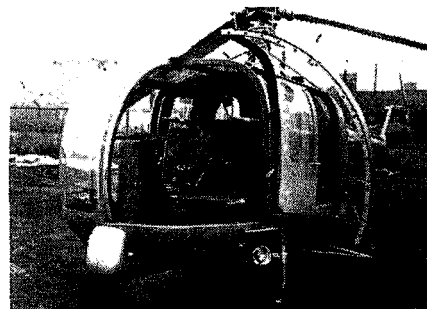
H-18 Helicopter

Sikorsky Aircraft has delivered the first three H-18 helicopters to the Army Field Forces for flight evaluation.

Ideally suited for military observation and transportation, this new helicopter



Above, the H-18 in flight. Below, the H-18 fitted for carrying two litter patients.



can carry the pilot and three passengers, or the pilot, two litter patients, and one passenger.

It has a maximum speed of 112 miles an hour, a cruising speed of 96 miles an hour, and a maximum range of 340 miles.—*American Helicopter*.

Jet Bomber Designation

The Air Force designation for the British *Canberra* twin-jet bomber that will be built in the United States is the B-57A.—*Flying*.

Airborne 'Mechanical Brain'

A "mechanical brain" soon will be airborne and grinding out answers to complicated electromechanical problems high above the earth.

This new "brain"—a digital differential computer—will become part of a "flying laboratory" which North American Aviation is preparing for in-flight testing of guided missile components.

It will provide information to support data which scientists already have obtained with other computers in company laboratories.—News release.

Military Assistance

The United States has announced that it would give a grant of 20 million dollars in military aid to Nationalist China's forces through the agency of the Economic Co-operation Administration.

This specific support of a military program represents a broadening of ECA's fundamental operating principles in Formosa and is designed to help the Chinese Nationalist Government to meet the heavy increased military expenditures without imposing an additional strain upon its civilian economy.

The 20 million dollar grant was half of a general 40 million dollar grant made by Congress.—News release.

Small-Scale Models

Savings of approximately 62 million dollars on Army Corps of Engineers' civil works projects during the past 10 years have been effected through the use of hydraulic model studies.

The compilation is based on 59 model studies for which data are available showing savings effected in construction and operation of the original projects. The small-scale model analysis cover three major phases of engineer projects: initial detailed investigation of the problem; design; and construction.—*Army Navy Air Force Journal*.

Basic Training Extended

The Army has extended the basic training period in its replacement training centers and training divisions an additional 2 weeks.

The extra training time, which brings the basic training period to 16 weeks, is intended to give the soldier further practice in "combat skills," use of individual weapons, and physical conditioning.—*Armed Force*.

'Human' Dummy

The Air Force has developed an "almost human" dummy, with metal, plastic, and fiberglass bones, for use in tests on a human's bone structure.

A series of tests will be conducted on the effects of accidents on the bones of the frangible dummy in the hope of preventing fractures and broken bones of human pilots who may have to crash land airplanes or undergo accidents.

The dummy will do more than just occupy space and supply weight. Its collarbones (the most easily fractured in humans) will snap just as would a man's and its vinyl plastic foam "skin" will show the effects of cuts or abrasions.

Anatomically correct in body mobility, weight, distribution of a weight, and the body as a whole, it can assume the same positions as a human, and was designed to represent measurements of a muscular, 200-pound man.—*Armed Force*.

'Free Piston' Engine

A new type "free piston" engine is being tested by the Navy.

The plant combines the high "thermal efficiency" of the Diesel cycle and the light weight and moderate bulk of the gas turbine. There is no vibration.

Use of the "free piston" eliminates the crankshaft, flywheel, and moving parts such as connecting rods, cranks, and bearings. This means less friction and more power for propulsion.—*All Hands*.

Atomic Weapons

The Director of Defense Mobilization recently announced that atom bombs are being turned out in this country "on an industrial basis," and that the development of atomic war heads for artillery shells and guided missiles is advancing, as is the development of the atomic-powered submarine.—News release.

Cold Weather Research Center

The Department of Defense has established a research center to conduct basic and applied studies in the field of snow, ice, and frozen ground, applicable to Arctic and Antarctic regions.

The scientific data to be sought, involving a comprehensive knowledge of the fundamental physical and mechanical properties of snow, ice, and permafrost, will be used to improve American military operations in extremely cold climates.—*Army Navy Air Force Register*.

Exchange Agreement

The United States has completed negotiations for 25,000 tons of benzol from Germany in exchange for 65,000 tons of premium gasoline. The benzol, a scarce material in this country, is to be used in making synthetic rubber in government-owned plants.—News release.

Atom Protection

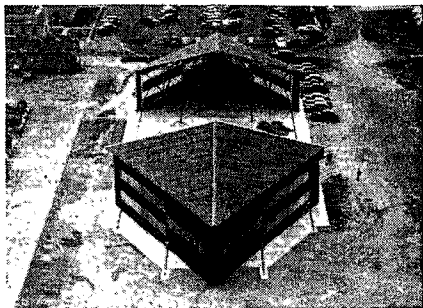
The Navy has announced that it has tested and perfected a way of using a salt water spray system to protect ships and men from atomic explosion dust particles. The system was described as being a semiautomatic spray from foam and fog nozzles which is used to wash down a ship before atomic particles have a chance to dry.

The tests were part of 4 years' research in radiological contamination and decontamination. They are expected to give valuable data for use in designing a fully protective system.—*Armed Force*.

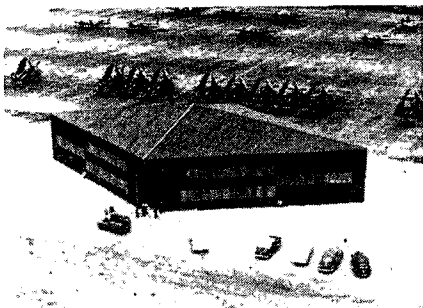
Mobile Hangar

The world's first mobile aircraft hangar has been completed at the Marine Corps Air Station, Cherry Point, North Carolina.

Constructed in two triangular-shaped sections, the hangar is mounted on steel



Above, the new mobile hangar half opened. Below, the hangar in a closed position.



wheels which roll back and forth on railroad tracks. It has been nicknamed the "clamshell" because of its unique clam-like opening and closing characteristics. Planes taxi between the two sections and the hangar closes around them.

It measures 29 feet high, 173 feet long when closed, has 100-foot sides, and weighs 118 tons.—US Marine Corps release and photos.

BENELUX COUNTRIES

Defense Plans Set

The Defense Ministers and Chiefs of Staff of Belgium, the Netherlands, and Luxembourg have reached agreement on the division of naval tasks in wartime and the protection of shipping lanes to Dutch and Belgian ports. In addition, they have discussed co-operation in internal defense.—*The New York Times*.

PAKISTAN

Diesel Locomotives

Pakistan has ordered 23 Diesel-electric locomotives from the United States and 25 locomotives from Japan.

Pakistan is changing over from coal-burning locomotives to be free of her dependence on foreign coal supplies.—News release.

AUSTRALIA

Defense Program

The Prime Minister has announced a three-point program of defense preparedness, which includes:

1. Increasing the trained strength of the armed forces so that effective forces are ready for instant use in event of war, and maintaining training and other facilities ready to produce additional forces.

2. Equipping these forces.

3. Strengthening the whole economy to meet wartime and war preparation plans.—News release.

Rocket Range Fleet

Several Bristol 171 helicopters are to be added to the air fleet operated by the guided missile establishment from the Woomera rocket range.

The first is expected to arrive from Great Britain soon in a Bristol *Freighter*, which also will be added to the rocket range fleet. The fleet at the range already includes *Dakotas*, Bristol *Freighters*, and Vickers *Vikings*.—*Australian Defence and Services Newsletter*.

WESTERN GERMANY

New Metal Developed

A metal developed in Western Germany soon will be available in the United States to ease scarcities of strategic materials. The new metal, known as "Cupal," consists of aluminum with a layer of copper welded to it by an exclusive process, and rolled to specific thicknesses.

A sufficient supply of the metal will be available for defense purposes, as well as for selected civilian uses.—*The New York Times*.

FRANCE

Antisubmarine Plane

Construction has been completed on the *Breguet 960*, a prototype antisubmarine plane for the French Navy, and taxiing tests soon will be started.

The plane has a Mamba airscrew-turbine in the nose for cruising, and a Nene jet engine in the tail for high speeds.—*The Aeroplane*, Great Britain.

JAPAN

Airline Approved

A license for the first private domestic air transport service to be operated in Japan since the end of the war has been granted to a proposed Japanese airline company. The company is planning to buy two *DC-4s* and four *DC-3s*, and expects, initially, to get supplies of spares, hangar accommodations, pilots, and maintenance facilities from other airlines.—*The Aeroplane*, Great Britain.

SWEDEN

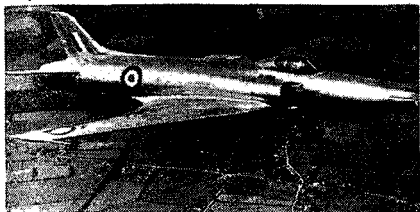
Map Naval Expansion

A new 6-year expansion program for the Swedish Navy has been proposed by its commander in chief. The program provides for construction between 1952 and 1958 of 4 destroyers, 3 submarines, 1 minelayer, 12 minesweepers, 11 motor gunboats, and 15 motor torpedo boats.—*The New York Times*.

GREAT BRITAIN

Supermarine Swift

Quantity production of the Vickers *Supermarine Swift* is now under way for the Royal Air Force. The *Swift*, powered by a Rolls-Royce turbojet engine, is a development of the Nene-powered *Super-*



The *Supermarine 535*, which is regarded as the prototype of the *Supermarine Swift*. *Supermarine 535*. Photographs and other performance data on the *Swift* have not been released, but the *535* is regarded as the prototype of the new plane. —News release.

Sulphur Plant

A large sulphur plant soon will be built near Southampton to help remedy the industrial shortage of that product, for which Britain is largely dependent on United States supplies. The plant is expected to produce about 12,000 tons of sulphur a year.—*The New York Times*.

Jet Helicopters

Work is under way in England on a huge jet-powered helicopter capable of carrying 100 fully armed soldiers.

The Society of British Aircraft Constructors has announced that several major British manufacturers have jet helicopters on their drawing boards. However, it will be 2 years before one reaches the flying stage, and 5 years before the aircraft are in service.

Apart from their military value, airlines are considering using them on a cross-Channel helicopter passenger route to France.—News release.

Jet-Propelled Boats

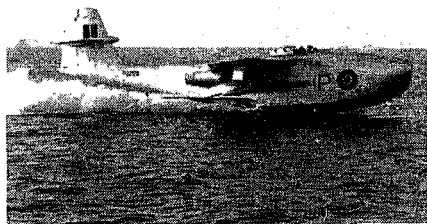
Jet-propelled patrol boats are to be used by the British Navy. The first of these will be launched by the Admiralty in the near future.

The engine to be used in the first jet-driven ship is remarkably light. It weighs only 600 pounds, including the gear box, compared with 2½ tons for the Diesel engine which it replaces.—*British Information Services*.

Flying Boat Fighter

Flight tests have been resumed with the world's first type of jet flying boat fighter, the Saunders-Roe *SR/A1*. The first two prototypes were lost in mishaps, and the new tests are being carried out with a third plane.

The fighting in Korea has pointed to the usefulness of a plane that could sup-



The single-seat, twin-jet, *SR/A1* flying boat fighter plane.—Saunders-Roe photograph.

port land and naval forces in areas far from prepared airfields.

The *SR/A1* is twice as fast as any other flying boat, with a speed of more than 500 miles an hour. It is powered with two turbojet engines fitted side by side in the hull with a single air intake in the nose.

Standard armament of the *SR/A1* is four 20-mm cannon in the nose, but a variety of other weapons can be carried under the wings.—News release.

ITALY

Defense Bill

The Italian Chamber of Deputies has adopted a new defense bill authorizing the enrollment of a force of at least 40,000 men in the Defense Corps (MILITARY REVIEW, February 1951, p. 72). The corps presumably would be assigned to duties now carried out by *carabinieri* (federal police) and regular city police.—News release.

FINLAND

Diesel Locomotives

The state railroad administration is planning to replace worn-out steam locomotives with streamlined Diesel-powered engines. The first of the new locomotives will be imported from Italy before the end of the year, and plans call for the acquisition of 105 such engines during the next 10 years.—News release.

CUBA

Technical Assistance

Cuba and the United States have signed a general agreement on Point Four technical co-operation, which provides for an interchange of technical information and personnel for development projects and industries. The United States already is furnishing technical assistance to Cuba on various projects.—*The New York Times*.

BULGARIA

Armed Forces

The Greek Army General Staff estimates that Bulgaria's armed forces exceed 170,000 troops—more than double the limit set by the Bulgarian peace treaty.

In a press release, the general staff reported that in addition to the regular armed forces, there were tens of thousands in armed Communist organizations in that neighboring Balkan country. The peace treaty limits Bulgaria to an army of 56,800.—News release.

BRAZIL

Indian Aid

One million pounds of rice soon will be shipped from Brazil to the famine-stricken areas in India through the United Nations International Children's Emergency Fund. The rice was contributed by the Brazilian Government, which also donated \$86,253 to the fund.—News release.

COMMUNIST CHINA

Recruiting Program

A high-pressure campaign to get student "volunteers" for enrollment in military academies is under way in Communist China. Youths are being accepted from universities, colleges, middle schools, and technical and normal schools for a program aimed at creating a new elite group of officers and leaders for the Red Chinese armed forces.—*The New York Times*.

War Fund Drive

Donations sufficient to buy 365 war planes have been pledged so far in the Chinese Communist campaign to raise funds for equipping its forces in Korea.

Campaign leaders expect to get enough money to buy more than 1,000 aircraft, in addition to many tanks and artillery pieces, by the end of this year.—*The New York Times*.

USSR

City's Might Underground

Vladivostok, the Soviet's Far East bastion, is a city whose real might lies underground in the surrounding hills. Aircraft hangars, ammunition depots, supply dumps, and troop quarters are buried in huge man-made caves.—National Geographic Society.

Military Aircraft

United States intelligence officials estimate that one-fourth of all Soviet first-line military planes are stationed in the Far East.—*Flying*.



Soviet Tactical Tendencies

Translated and digested by the **MILITARY REVIEW** from an article by
Lieutenant Colonel Berteil in the "Revue Militaire d'Information" (France) 25 April 1951.

SURPRISED, in 1941, by the shock power and maneuvering skill of the *Wehrmacht*, dominated by what the German generals called their "operational superiority," the Soviet Army, at first, did not find anything with which to counter German tactics except the vastness of its territory and the traditional tenacity of its infantry.

However, with their flexibility and capacity for adaptation, the young Soviet commanders soon drew valuable lessons from their defeats and corrected the defects which existed in the Soviet doctrine. If, on the whole, they followed the doctrine of the enemy, in many respects they gave proof of originality, especially in regard to their doctrine of attack or defense of cities, night fighting, mass employment of tanks, use of partisans against the rear of the enemy, and combat against encirclement.

Characteristics of Soviet Doctrine

The most characteristic features of this doctrine are:

1. Great flexibility in the basic principles in the employment of the arms, which, heretofore, we regarded as sacrosanct.
2. A systematic effort to achieve surprise.
3. An attitude that offensive action is

paramount and that the destruction of the enemy must be undertaken by means of close combat.

4. A tendency to attribute a predominating value to the "power" factor, rather than to the "possibilities of maneuver" factor.

5. An extreme flexibility in the co-ordination of arms and the centralization of means.

6. A strict delineation as to the command and staff responsibilities of commanders and their staffs.

7. A pronounced inclination for the systematization and the formularization of tactical procedures.

When one searches to discover the directing principles of the employment and co-ordination of the various Soviet arms, either in documents or by studying the operations of the last war, he immediately is struck by the absence of a prescribed doctrine, and the great freedom with respect to adherence to principles which we regard as inflexible. For example, two such deviations, one regarding close air support and the other the employment of tanks, are particularly striking:

A recent French manual states, in part: "... Air superiority, or, at least,

air control over the theater of operations which has been chosen by the command, is an indispensable condition of every operation. . . ."

Further on, the same manual states: "... On the result of strategic [air] actions depends the expediency of the unleashing of important ground operations. . . ."

Disregard for Air Superiority

The Soviet Command, many times, has deliberately engaged in and won decisive battles without having air superiority, or air control over the battlefield, and without having effected the strategic actions (the isolation of the field of battle) that our manuals consider as indispensable. For example, we can cite the battle of Stalingrad in 1942-43 and the battle of Kursk in July 1943 in which the Soviet Command, without possessing either air control or even marked superiority, employed all of its air forces in close-support missions supporting the tanks and infantry.

The results obtained at Kursk prompted Colonel General Roudenko of the Soviet Air Force to write: "The defense of the front was based on the close combination of ground and air which, during the defensive phase, gave exceptional results."

During the offensive operations at Orel and Kharkov, the Soviets succeeded in their break-through and subsequent exploitation operations although the *Luftwaffe* was able, in the Orel sector alone, to maintain a tempo of 1,000 sorties daily between 21 July and 16 August.

Employment of Tanks

As regards tanks, the French manual mentioned above states, in part: "... The distribution of tanks by platoons in infantry units, under the pretext of ensuring uniform distribution, is, as a rule, to be avoided." Further on, the manual states: "... Tanks and tank destroyers

must not be employed as fixed strong points in a position. . . ."

The Soviets frequently employed their tanks and self-propelled guns in a decentralized manner, in platoons of three to an infantry company, in almost all battles, whether they were offensive or defensive actions.

In offensive operations, Soviet tanks supported the infantry, closely intermingled in its ranks, aiding it with their fire, and received, in return, assistance in the crossing of obstacles, close defense, and demining actions.

In defensive operations, the tanks often were employed as fixed strong points, dug in up to their turrets. The tanks and self-propelled guns constituted the backbone of the strong points, with the infantry's automatic weapons and mortars holding the intervals.

Even though this type of employment caused the Soviets to lose many tanks, it permitted them, on several occasions, to halt massed German tank attacks. At Kursk, and at the second battle of Kharkov, this tactical practice, joined with close air support, permitted the Soviets to destroy the main body of the German tank forces, which, during the 2-month period, lost from 1,800 to 2,000 tanks.

When we study Soviet strategy and tactics, it must never be forgotten that the Russians, strongly impregnated with Asiatic tendencies, are truly the spiritual heirs of "those Greeks of the golden tongue" whose cleaveriness and trickery has been related to us by Geoffroi de Villehardouin.

Deception a Major Trait

Everything in the conduct of operations is aimed at deceiving the enemy, to lead him into making mistakes, to expose himself under wrong conditions, to draw him into traps, or to surprise him.

Well-conceived camouflage, absolute secrecy, false information, the systematic

employment of dummy positions, diversionary attacks, and attacks at night or during bad weather are employed in all echelons.

Every Soviet operation constitutes a veritable puzzle, which is extremely difficult to decipher, for every indication must be run through the sieve of possibilities. When it is recalled that one of the dominant traits of the German doctrine was to search for "the intentions of the enemy," no tendency could be more deceptive for the technicians of the *Wehrmacht* than this aspect of Soviet tactics.

Alongside of this characteristic trait, we find an offensive will manifested in absolute fashion in all echelons and under all conditions.

The Soviet manuals of 1942 state: "Only offensive action conducted with fierce determination to destroy the enemy in hand-to-hand fighting gives victory." Even in the pages devoted to defensive fighting, the manuals emphasize that only in the "counterattacks carried to the point of hand-to-hand fighting bring decisions to defensive action by the destruction of the enemy."

Massed Attacks Were Costly

This idea of offensive fighting, conducted to the limit or at any cost, joined with limitations on the initiative of the subordinate commanders together with comparatively untrained troops, resulted, during the war, in repeated attacks by compact masses, which cost the Soviets great losses in manpower. Hence, the Soviet Command saw the necessity for reacting against the tendency toward massed attacks. It made use, thereafter, of the concept of the *minimum front*.

The 1943 Soviet manuals prescribed:

The width of the attack front of a division is determined by the mission, the strength and fire means of the unit, as well as by terrain conditions and the character of the enemy defense. A medium type division, operating in the framework of an arm group, normally is assigned a zone of action of around 4,500 yards, but never less than 3,400 yards.

Although the average strength of the Soviet divisions was not, at that time, greater than 6,000 to 7,000 men, this density still was great, and the losses continued to be high. Hence, since the end of the war, there is evidence, based on reports and maneuvers, that an effort is being made to produce that balance of all arms which will tend to reduce losses, but which will not reduce the offensive will of the troops.

The minimum front of 1943 has been increased. At the present time, the Soviets hold that a battalion is able to maneuver without difficulty, in offensive action, in a zone more than 1,100 yards wide, and defend itself in a sector 2,200 yards wide.

Likewise, while the 1939 manuals prescribed that an attacking force should attack over its entire front, or, at least, man it in its entirety, we read in an article in a 1946 military publication:

It sometimes happens that a division must attack in a zone of action whose width exceeds the ordinary norms justified by the experiences of war. Under these conditions, the organization and conduct of the offensive must present certain particularities, among which it must first be stated that the principal effort will be made in a narrow and vulnerable sector. In the other sectors of so wide a front, the operations of the attack units will consist in the execution of limited or simulated offensive missions, and the security of junction points and flanks.

Fire Superiority Essential

Stalin has declared that "the cannon is the god of war," thereby affirming the organization and doctrine of the Red Army.

This doctrine is developed in the manuals of the Soviet Army. In the 1942 manuals, can be found the following terms:

The success of the attack is ensured by fire superiority from the very beginning, and by carrying the fire closer and closer to the enemy, until it becomes crushing and the enemy, reduced to impotence, abandons the fight or is destroyed.

Fire superiority is obtained, in accordance with the situation, either by central-

izing the artillery, mortars, close-support aviation, and other support weapons into a single echelon—division or combat team—or by employing the large caliber self-propelled and towed artillery weapons as close to the attack objectives as possible.

In the latter case, the Soviets decentralized to the extreme in certain phases of the fighting, even scattering their artillery weapons for employment in direct fire roles, using their aircraft in close-support of a battalion or company of tanks, and distributing their tanks down to the infantry companies.

The Concept of Density

An enormous quantity of artillery weapons (120,000) and tanks (150,000) was produced by the Soviets during the last war. This, plus the almost total employment of aircraft in close-support missions, permitted the Soviets to achieve power in all echelons. This power is systematized in the concept of density—density of artillery, tanks, mortars, and battalions. Everything is translated into figures, and it is rather curious to find again in the Soviet staff of 1945 and the postwar period the same tendency which existed on the Western front in 1916-17.

The following are a few typical Soviet densities:

Artillery: 480 pieces to the mile at Stalingrad; 560 at the battle of Korsun; and 990 at Berlin, where the operations were supported by 22,000 guns and mortars.

Tanks: 40 to 64 tanks to the mile at Stalingrad; 97 at Kursk; and 320 armored vehicles to the mile at Stettin.

Infantry: One division for every 3,275 yards of front—that is, one battalion for every 550 yards, with a depth of $2\frac{1}{2}$ to 3 miles.

The systematic application to all echelons of these concepts of minimum and maximum fronts and density, although it maintains operations within the specified

norms and facilitates the work of the headquarters, confers on Soviet tactics a rigidity of maneuver which leaves little room for the unexpected.

Formularizing Tactical Procedures

Moreover, the Soviet Command always has attempted to translate tactical procedures into generalized formulas, thereby attempting to provide type solutions within a given framework. Although the great Soviet commanders have given proof of their ingeniousness, initiative, and character, these qualities appear to be but little encouraged in the commanders of the smaller units.

Command and Staff Responsibilities

The Soviet manuals provide strict delineation as to the command and staff responsibilities of the commanders and their staffs. This includes:

1. The absolute subordination of technical chiefs to tactical commanders.
2. A clear distinction between the duties and responsibilities of the commander and his staff.
3. The close fusion of the headquarters of the different arms.

For the Soviets, the commander must be located as close to his units as possible, in order to conduct the battle. However, in this position, he is unable to call for and receive all the information necessary for this task. Therefore, his staff fills this vital role. This staff is not found, nor does it work, in the same area where the commander is located.

There exists, therefore, a separation in space and need for a direct connection between the commander and his staff.

Typical Example

For example, in a tank attack, the commander of an armored regiment will be in his command tank a short distance behind his units. In addition to the radio, he has at his command agents on motor-

cycles or in tanks to convey commands to his units and to maintain contact with his staff. The role of the staff is particularly important. It accompanies, in its movements, the headquarters of the infantry commander, where also is found the artillery liaison detachment. A common observation post is in the immediate vicinity of the headquarters. The chief of staff of the armored regiment is there personally, and ensures surveillance of the field of battle. He complements his personal observations by the reports of an advance mobile observation post which he detaches whenever the need for it is felt.

The chief of staff transmits to the armored regiment commander:

1. The orders of the higher headquarters.
2. The information and requests coming from the infantry.
3. His personal observations.

In turn, he receives from the regimental commander:

1. Information concerning the maneuver pursued.
2. Data concerning the enemy.
3. Requests for fire to be transmitted to the artillery.

The orders to the units and to the direct-support self-propelled artillery are transmitted either by the regimental commander or his chief of staff, depending on the situation.

The Soviets concede, therefore, that though the place of the commander is with his men, he finds himself unable to estimate the situation, and is obliged to fall back on his staff in all matters concerning co-operation with the other arms and the surveillance of the field of battle.

Offensive Operations

In the execution of offensive operations, the Soviets place the accent on two essential elements: surprise and power.

Surprise is achieved by the choice of the

hour and the utilization of meteorological data, the employment of unexpected lines of departure, rigorous camouflage of preparations, diversionary attacks, night attacks, or attacks in bad weather.

Power is strived for by the employment in mass of artillery, aircraft, and tanks.

The methods employed by the Soviets in offensive operations are similar to those in repute in France in 1939. However, they are adhered to with great inflexibility, and emphasize the systematic application of the *Schwerpunkt* (point of main effort), and enveloping maneuvers.

Of particular note in the execution of such operations is:

1. The systematic employment of tanks accompanying the infantry.
2. The utilization of large bases of fire (machine guns, mortars, and artillery).
3. The artillery support in the form of rolling barrages.
4. The use of aircraft in a close-support role.

The commanders influence the action, in the main, by fire, and appear to hold back but a small reserve, which is fixed by the manuals at a platoon for each battalion, and a company for each regiment.

The Soviets draw distinctions between operations conducted against field positions, strongly organized positions, and cities.

Attacks Against Strongly Organized Positions

In the case of operations against a strongly organized position, the proportion of tanks engaged in support is two to three medium tank battalions to two to three infantry regiments. The tanks are apportioned in platoons, at a ratio of one platoon of three tanks for each infantry company.

The attack always is preceded by an artillery preparation and often by air action, which does not last more than 2 hours. It varies with changes in position,

and by concentrations being repeated at varied intervals, with the principal object of forcing the enemy to leave his cover prematurely. A large portion of the artillery—at times as much as a third—is engaged in direct fire missions.

At night, or by infiltration during the preparation, the infantry moves to the line of departure. Its covering fire units participate in the preparation, and at zero hour, the tanks, which had been assembled in a waiting position, move out with machine-pistol troops riding on top of them, heading for their objectives. At the moment that they cross the infantry line of departure, the latter spring to their feet and ~~push~~ rush forward to the attack. The infantry follows the tanks very closely, with machine-pistol troops preparing the way for the advance by infiltrating into the enemy's positions. The covering fire units support the attack by moving forward, by bounds, to remain close to the advancing troops. The self-propelled guns follow the tanks at a distance of from 220 to 330 yards, methodically taking under fire any antitank resistance that shows itself.

The close-support aircraft attack at low altitudes with machine guns or rockets, directing their fire against all enemy personnel and weapons sighted.

The artillery, as a rule, executes a rolling barrage, waiting for the infantry at the principal lines to be taken.

As soon as the first infantry elements enter the enemy positions, they are passed by the second wave of infantry, which continues the attack. As the attack moves forward and the artillery reaches the end of its range, its control is decentralized and it is displaced forward to reinforce the other artillery weapons accompanying the attack formations. The flanks are covered by tanks and groups of artillery, most of which are self-propelled.

In the case of solidly organized positions which are protected by mine fields, the

infantry may attack by itself, until the breaches are opened. If it has demining tanks at its disposal, the latter open the breaches.

The Soviets hold that an attack against a defensive system of a depth of from 4 to 5 miles, and consisting of two to three echeloned positions, generally exceeds the capabilities of a division, even when it is reinforced, and should be undertaken by an army corps, which then attacks with successive divisions. Each infantry division normally receives the support of an armored brigade of heavy tanks. The closest co-ordination is obtained by the commanders of the tank and infantry units, who are located well forward, and by their staffs, which are consolidated into common headquarters, farther to the rear. Special liaison is provided the tank and infantry commanders, who often occupy the same tank during the attack. The chiefs of staff command and control the artillery and the close-support air forces.

Attacks by Soviet Army Corps

The disposition of forces in an attack by a Soviet army corps is illustrated by the following example:

In the lead, demining tanks accompanied by engineers move forward, supported by the fires of the artillery, the tanks, and the self-propelled guns. This forward movement starts during the artillery preparation and continues at a distance of approximately 220 yards behind the barrage. The medium tanks, following in columns at a distance of 55 to 110 yards, constitute the first echelon. They operate in direct support of the infantry, carrying personnel on the tanks, and are accompanied by engineers charged with widening the breaches in the mine fields. After the breaches have been crossed, the tanks deploy, accompanying the first echelon of the infantry. In the rear of the infantry, the heavy tanks form a second echelon, which changes position by bounds at a distance varying between 220 and 440 yards. They,

in turn, are followed by the self-propelled guns.

Behind the self-propelled guns is the towed artillery, and then a second echelon of infantry. The following division marches

152-mm guns used for direct fire. In cities, each assault group receives the mission of taking the two sides of a street in house to house fighting. It is followed by supply groups and supporting detachments which



Artillery, a major factor in all Soviet tactics, was employed extensively during the last war to repel the German armies in the East.—*Army Information Digest* photograph.

in the wake, sometimes followed by a brigade of tanks for use in exploitation.

Attacks Against Cities

In the case of positions fortified by concrete bunkers, or in the case of attacks against cities, the Soviets send out, in advance of the first medium tanks, assault groups made up of rifle and assault troops and specially trained engineers accompanied by heavy tanks and self-propelled guns. Each group is charged with the mission of blowing up a well-defined obstacle that must be crossed, thus enabling the medium tanks and infantry to pass. An assault group may be composed of a company of riflemen, six heavy tanks, a platoon of engineers, two or three self-propelled guns, and a battery of 122- or

occupy and organize the conquered terrain.

The break-through of fortified positions generally is the task of the large infantry units reinforced by artillery and tanks. (Sometimes, the Soviets used armored divisions for this purpose.) For this mission, the tank units, concentrated on a narrow front with 200 tanks for each mile or less, are echeloned in three waves, with the heavy tanks and self-propelled guns forming the leading waves. The medium tanks constitute the second wave, with the infantry riding the tanks. The motorized artillery is used in the third wave. Artillery and aircraft provide a preparation prior to the attack. This method of attack has been very costly in matériel, but it has enabled the Soviets to break through the fortified lines of Stettin and Königsberg.

Exploitation

Exploitation is based on surprise and speed.

Surprise is obtained by diversionary and holding actions, and the employment of reserve groups in new directions to disconcert the enemy. Armored and mechanized units, followed by motorized divisions, are the principal instruments of exploitation. Exploitation groupments are under the direct orders of the army or army group commanders.

Speed is regarded as of prime importance, and is obtained by decentralizing the means, locating the commander well forward where he can issue orders quickly, organizing the rear areas to facilitate the forward movement of supplies and reinforcements, and by audacious reconnaissance action. The latter must, essentially, discover the defended and undefended zones of the front, by going around the positions held by the enemy.

The Soviets seek, systematically, to effect the encirclement of lagging units and the dissection of retreating columns. Pockets are not reduced by the first echelons, but by the reserves. This reduction is effected by splitting the forces trapped in the pockets and cleaning them up one by one. In an exploitation action, all arms are decentralized completely. Close air support officers are assigned to the exploitation units in order to guide the aircraft to the objectives.

The artillery is charged with the protection of the flanks, and flank guard artillery units are formed for this mission. Their commanders, like the close air support officers, are located with the headquarters of the exploitation units.

The infantry is carried in vehicles or towed in trailers by the tanks. In winter operations, the infantry travels on skis.

Detachments left in the rear areas guard critical points in the line of communications.

The orientation of the columns must be such that they will be able to get ahead of or cut the retreating enemy in order to achieve the major objective, the encirclement of the enemy forces.

Delaying Action

The Soviets prescribe the conduct of delaying action in a way similar to that of the Germans, who were their masters in this respect. The Soviet manuals insist on the necessity of conducting delaying action obliquely with respect to the enemy's direction, of march, in order to permit lateral counterattacks and ambushes, and also reinforcing of the troops with artillery, armored vehicles, and engineer troops. There is nothing particularly original in this method of conducting delaying action except the insistence on the importance of counterattacks based on the employment of armor, and action aimed at leading the enemy to deploy in a given direction, thus exposing his flank to a counterattack which has been prepared in advance.

Disengagement is effected under cover of darkness or by using smoke screens. In disengaging themselves, the tanks leave behind dummy tanks to slow down the advance of the enemy. When the mobile defense is conducted by the infantry alone, it is the assault units which form the last echelon.

Tank *versus* tank combat is conducted by the Soviets according to the particular characteristics of their own equipment. The latter are distinguished more by the strength of their armament and their maneuverability than by the protection afforded by them. They always attempt to induce the enemy tanks to move, so that an attack can be made against the exposed sides, thereby making maximum use of the superior range of their artillery. The ambush is the rule. Movements serve, in the main, to draw the enemy into an ambush or to gain a more favorable position for firing. In these operations, the Soviet-

combine the actions of medium and heavy tanks and self-propelled guns.

Night Attacks

This summary picture of Soviet tactical tendencies would not be complete if attention were not called to the special inclination of the Soviets for night fighting. At the beginning of the campaign of 1941, they planned only restricted night actions against limited objectives. However, they rapidly undertook extensive operations conducted by large units. Thus, the great attack on Berlin was a night attack executed by an entire Ukrainian army group in the "artificial moonlight" produced by 163 searchlights. In the case of such attacks, often executed without artillery preparation, the infantry and the tanks, which generally advance with their headlights on, are preceded by special all-arms detachments with well-defined objectives. These detachments, which are formed before the operation, rehearse the attack on models or similar terrain. The command of these detachments is held by either an infantry or engineer officer of regimental or battalion level.

Conclusion

Methodically seeking surprise, by placing emphasis on fire power in offensive operations and on the tenacity of its infantry in defensive operations, Soviet tactics, in spite of their efficacy, lack flexibility. The absence of initiative on the part

of the subordinate commanders has opened a chapter of lost opportunities in many battles. However, it must be realized that the Soviet Army of 1945, and that of 1950, which is its direct heir, were born of the defeats of 1941-42, and the hecatomb of the Soviet infantry.

The units which were constituted at that time, in addition to being hastily trained, lacked qualified subordinate cadres. As always in such a case, the Soviet Command accentuated the employment of heavy weapons and artillery to overcome the weaknesses of the infantry.

For this, it required merely rudimentary maneuvers and an unlimited spirit of sacrifice. Hence, the preponderance of artillery and the systematic search for power rather than for flexibility and skill. This concept has received the blessing of victory and it still dominates the Soviet organization and doctrine.

However, let us not deceive ourselves. The Soviet Army is rapidly reconstituting its subordinate cadres, especially its cadres of professional officers and noncommissioned officers. As soon as these cadres are trained and available in sufficient quantities, they will provide flexibility to Soviet tactics in order to achieve less costly methods of combat.

The experience of the Korean conflict, and the results obtained by the Soviet instructors with the North Korean troops, testify that substantial progress has been made, in this respect, since 1945.

How to Defeat the Soviet Union

Digested by the MILITARY REVIEW from an article by Major General J. F. C. Fuller in the "Weekly Recorder" (Great Britain) 24 March 1951.

IS THE Soviet Union invincible? No! Can the Soviet Union be defeated? Yes! She can be defeated in both the moral and physical fields of war, and, if in the former, a third world war is by no means inevitable. Even if it should erupt, its length is likely to be vastly curtailed.

However, these ends are possible only if the Western powers clearly understand that the problem which now faces them is conditioned by the world situation, and because the Soviet Union holds the initiative by her aims and her strategy.

The World Situation

Today, the world situation is similar to the one which faced the United States a century ago, but on a much larger scale. In 1858, Abraham Lincoln said:

A house divided against itself cannot stand. I believe this Government cannot endure permanently half slave and half free. . . .

It will become all one thing or all the other. Either the opponents of slavery will arrest the further spread of it, and place it where the public mind shall rest in the belief that it is in course of ultimate extinction, or its advocates will push it forward till it shall become alike lawful in all the states, old as well as new—North as well as South.

Consequences

All that is necessary is to substitute "World" for "Government" and "West" and "East" for "North" and "South," and the situation today is the same. This is the primary fact upon which the defense problem of the Western powers is based: a world divided into two irreconcilable ideological camps, the one representing freedom and the other slavery.

Arising out of this is a condition which was unknown a century ago. It is that today all major international conflicts rapidly develop into world wars, and though this is accepted universally, there are four

consequences which are far from being so recognized. They are:

1. In practice, if not in theory—as the words "world war" imply—all nations, whether they like it or not, are either active or passive belligerents, and, in consequence, neutrality is outmoded.

2. The age of national wars has passed into the age of group wars. No single nation has sufficient resources to wage a successful world war, not even the United States or the Soviet Union; only a group of nations can do so.

3. National armies are, therefore, fully operative only when they belong to a group of armies.

4. Logically following this, all major defense problems now are group problems.

The Soviet Union's Aim

What of the Soviet Union's aim? More than 30 years ago, it was laid down by Lenin, and apart from it the Western defense problem cannot begin to be understood. In his own words, it was "To bring to triumph the World Revolution, to create the Soviet Republic of the World." In other words, world revolution was to foster Soviet expansion.

Objectives

In this vast plan of conquest, what were Lenin's primary objectives? Again, in his own words:

To unite the proletariat of industrial Germany, Austria, and Czechoslovakia with the proletariat of Russia, and thereby create a mighty agrarian and industrial combination from Vladivostok to the Rhine, from the Finnish Gulf to the blue waters of the Danube, capable of feeding itself and confronting the reactionary capitalism of Britain with a revolutionary giant, which with one hand would disturb the senile tranquillity of the East and with the other beat back the pirate capitalism of Anglo-Saxon countries. If there were anything that could compel the English whale to dance, it would be the union of revolutionary Russia with the revolutionary Central Europe.

Strategically, Central Europe was the center of gravity of Lenin's plan, which, once occupied, would unbar the door leading to world conquest.

World Conquest

Thus, should this proletarian union be cemented, as Lenin considered it could be by revolutionary means, then it followed that the rest of Europe would become strategically untenable and could similarly be conquered.

Once Europe was reduced to a Soviet satrapy, the Mediterranean would become untenable. Therefore, the Middle East could be won and Africa subverted. Finally, when the entire Old World was Sovietized, the psychological conquest of the New World could be undertaken, and the Soviet Republic of the World established.

How long this grandiose plan would take to accomplish was outside the problem, for the Soviets are Orientals—they do not think in terms of time, instead they think in terms of eternity. A plan to them is a decree of fate; hence its stability.

The Hub

Though in 1920 Lenin's scheme was, for the time being, checked by Pilsudski in the battle of Warsaw, now, thanks to Anglo-American policy in the last war, it has been half fulfilled by Stalin.

Nevertheless, the entire center of gravity of the world campaign has not yet been gained, and its winning is the heart of the plan. Therefore, Western Germany now is the strategical hub of the world problem. Not only because of its vast industrial potential, but because of the high intelligence of its inhabitants, who, like yeast, can leaven the Soviet dough, and thereby create the Knouto-Germanic Empire envisaged by Bakunin.

The Soviet Union's Strategy

What of the Soviet Union's strategy? Like all ingredients of Soviet policy, it

also derives from Lenin. "The soundest strategy in war," he said, "is to postpone operations until the moral disintegration of the enemy renders the delivery of the mortal blow both possible and easy." Therefore, in his system of warfare, psychological took precedence over military attack and defense. However, it must be noted that it did not take precedence over military power, because military power is as essential to the former as the latter.

Today, the Soviet Union's military power is immense, totaling, so we have been told, 175 active divisions—in all, 2,800,000 men whose strength can be doubled on mobilization—also 25,000 tanks, 19,000 aircraft, and about 350 submarines.

Reasons for Large Forces

The gigantic mass of fighting manpower has two purposes: The first is to cover the Soviet Union's psychological war by a terror barrage, a standing threat to all who oppose it. The second is to defend herself should her psychological offensive, as it easily may, lead to actual war.

Revolutionary Technique

Does this mean that the Soviet Union does not want to conquer Western Europe militarily? I think it does. This is not because she could not do so, for as things stand she could easily. Also, this is not because she fears the atom bomb, for she has this weapon and is the least profitable target in the world. The primary reason why the Soviet Union does not want to conquer Western Europe militarily is that actual war does not fit her revolutionary technique, and were war carried into Western Europe, the probability is that it would be undermined.

The aim of this technique is not to persuade the enemy to change his mind by force of arms—the traditional method—but by internal revolution, by force of ideas. Its means are propaganda, fifth columns, strikes, rebellions, and civil wars. It is a technique of conspiratorial subver-

sion, of mental bacteriological war, and not of physical attack.

Under Stalin, this technique has proved so successful that today the Communist world covers one-third of the land surface of the globe, and includes 40 percent of its inhabitants. From being the capital of the Soviet Union, Moscow has become the capital of a gigantic ideological empire stretching from the Elbe to the China Sea.

Soviet Psychological Defense

Why, in the event of war, would the conquest of Western Europe undermine this technique? The answer introduces the problem of Soviet psychological defense. It is because Soviet soldiers would enter a contagious area and risk becoming infected by Western culture.

They would be brought to realize that the Soviet Union, instead of being the most advanced country in the world, as they have been taught to believe, is among the most backward, and that, therefore, they were the victims of a gigantic lie.

Can this be substantiated? Yes! The Soviet Union's fear of contagion is common knowledge, and the most notable example of the influence of Western culture on Russian troops happened during the Russian occupation of Paris in 1814 and 1815.

Among these men were many young aristocrats and army officers, who were so influenced by what they saw that the result was the Decembrist's Revolt of 1825.

From it dates the Russian revolutionary movement of the last century, which culminated in Lenin's Third International. Hence the technique of the so-called "cold war" by conspiratorial subversion instead of by military conquest, because it obviates a repetition of the danger inherent in lifting the Iron Curtain, a traditional feature in Russian history.

Weakness in the Soviet Technique

Paradoxical though it may seem, the weakness of the Soviet technique of terror may be gauged from its intensity, because the more it is relied upon to subdue, the more it discloses the strength of the forces opposing what it is attempting to enforce.

For instance, in the twenties, there were 2 to 3 million political prisoners in Russia; now there are 18 to 20 million. And whereas, in 1941, there were 8,650 prisoners on Soviet territory, now there are 11,760, without counting the forced labor and concentration camps.

When we bring ourselves to realize that the Soviet Union is living under a greater dread of being infected by Western culture than Western Europe is of being corrupted by Soviet Marxism, and that this dread compels the Soviet Union to rely on psychological war more so than physical, the defense of Western Europe becomes a more hopeful problem than it would be were the Soviet Union's aim, as was Germany's in the last war, to conquer neighboring countries by force of arms.

What Is Tank Country?

Digested by the **MILITARY REVIEW** from an article by
Brigadier William Murphy in the "Canadian Army Journal" April 1951.

IN THE early days of the Korean conflict, a fact came to light which was surprising, to say the least, to many Canadian tankmen of the last war. The old question of what is and what is not tank country seems to have reared its ugly head at the time American officers were training the South Korean Army against the day when American troops would be withdrawn. It appears, if the reports on the matter can be given credence, that the officers responsible for the organization of the South Korean forces decided that a tank element was not necessary, on the grounds that Korea was no place for tanks.

Evaluating the Terrain

The writer has not had the opportunity of personally surveying the terrain of that country, but from relief maps, photographs, and reports of present operations it would appear that a large portion of the peninsula is mountainous. As in most mountainous countries, it has valleys, some broad, some narrow. Communications are fairly primitive, there being a lack of roads and very little in the way of railways. Roads generally follow the valleys. Rice is grown fairly extensively, which suggests a good deal of soggy ground, at least during some parts of the year. Doubtless, it was these factors which led the Americans to decide that tanks would be an expensive luxury rather than a practical weapon of war.

North Koreans Employed Tanks

Apparently the Soviets, responsible for the organization and training of the North Korean forces, took exactly the opposite view. Tanks were used in the initial stages of the North Korean attack, and spread considerable alarm and despondency among the tankless South Koreans,

and, later, among the American infantrymen who were rushed in to slow up the advance. No one can blame them for their poor view of the situation. Most infantrymen who have been up against tanks, having no tank support themselves and little in the way of effective weapons to meet heavily armored vehicles, probably have had similar feelings. It turned out that tanks could be used effectively in Korea, and a considerable number of United Nations tanks have been moved to that country.

Applying the Lessons of History

To return to the opening sentence of this article, it is hard to understand how the initial mistake was ever made. When one remembers the lessons of World War II, and contemplates applying them to a war of the future, he must be careful indeed. Future wars usually will be fought with many new weapons, and new tactics will have to be evolved accordingly. One's thinking must proceed along original lines, and not be hamstrung by something that was proper a few years ago. At the same time, there were certain principles evolved during the past war that should be applicable to future operations, and one of these principles is the answer to the question of what is and what is not tank country.

Looking for an Answer

Both present and former members of the Royal Canadian Armored Corps will recollect how eagerly they perused reports from the western desert during the years they sat in England awaiting their turn. They realized that, in all probability, when they saw action it would be with a better vehicle and in totally different country. However, the only reports available, so

far as tanks were concerned, dealt with their use in the desert. Such country permitted commanders to exploit the mobility of this particular weapon to the fullest extent, and it played a great if not predominant part in every victory won, no matter by which side. In rocky country, or where the going was too soft, tanks could not operate, but there were always plenty of other sections of the front where the going was good. Thus, the question of what was, or what was not, tank country did not receive the early consideration that it otherwise might have.

Tank Tactics in Sicily

When Canadian tanks landed in Sicily, it soon was realized that this mountainous country called for far different tactics, so far as tanks were concerned, than did wide open country such as the desert. In almost every case, the infantry was the predominant arm and the tank's job primarily was that of a supporting weapon. Both arms had much to learn in actual warfare in difficult country, and it was hardly surprising that the infantry thought tanks should do more than they were prepared to do, and the tanks thought the infantry was hopelessly ignorant of the tank's capabilities. To begin with, neither really appreciated what a tank could or could not do to give the infantry a helping hand in the varied country that was fought over. Nor did either realize the tremendous help that infantry could afford tanks in close going.

Tank-Infantry Co-operation

Italy, with its mountains, valleys, olive groves, vineyards, crops, walled cemeteries, and other detestable features (that is, from a tank point of view), further complicated relations between the two arms. After all, the infantry wore cloth jackets, and the tankmen had several inches of steel to protect them, so why should not the tanks fight where the infantry had to go? However, at first, the tankmen were reluctant. Their steel was not much good

against the well-concealed antitank gun or the boldly handled infantry antitank weapon. In close country, they could not see such weapons, and, therefore, could not protect themselves. The gunner's telescope was masked by olive groves and vines, and he was unable to give effective support to the infantry in any event. So the interservice battle raged, and, at times, there was considerable feeling between the two arms.

Terrain versus Antitank Weapons

Nevertheless, experience was bearing fruit. The tankmen, who had been taught that tank country was that country which afforded the best going, which contained successive features permitting good fields of fire, and which permitted more effective support between tank and infantry units, began to learn that it was just such country that was the best protected by antitank weapons. Few forces can have sufficient antitank weapons to be strong in them at all points. The antitank weapons usually were concentrated to cover the best tank approaches. The tankmen started to experiment. They found that they could climb slopes they thought were impossible. It was just a matter of skillful driving. They found that much rocky ground could be traversed with care and attention. They found that even terraced hills could be topped by driving the terraces until a low point was found and then charging a path to the next terrace, and so on. Sunken roads and other obstacles could be overcome by the use of explosives, so they took along engineers trained in demolition and mine clearance. They used the tank dozer well forward to help clear the way where necessary.

Time and again, they found these tactics won them that pearl beyond price—surprise—and soon they were looking not for good going, but the going where only skill and experience could get them through.

A Foundation for Teamwork

The policy was laid down, at least in the writer's armored formation, that every request of the infantry must be met, if it were humanly possible to get the tanks over the ground. The response of the infantry was immediate. As soon as they found that the tanks were ready to take

learned that regardless of how close the country, the tanks were right behind them, depending on them to neutralize antitank weapons, and ready to forge ahead when more open country was reached.

Normally, the infantry preferred country which gave them the maximum in covered lines of approach, although often



A flame-throwing tank working over a Japanese emplacement during the battle for Okinawa. In the last war, tankmen found, repeatedly, that by moving over the more rugged terrain they were able to bypass the antitank weapons guarding the best tank approaches and gain that pearl beyond price—surprise.—Department of Defense photo.

on almost anything, their confidence in the tankmen firmed, and the two started to work together in a very satisfactory manner. In not one single instance did the writer find that the infantry, once assured of the tankmen's real desire to help, took unfair advantage of that co-operation.

It soon was realized by all concerned that each arm had its own particular tactics. If tanks stopped to bring fire to bear on a position, the infantry quickly learned that they were not quitters, but that this was the very moment for them to press on under cover of that fire. They soon

this was not the direction of attack the tankmen would have chosen. However, when the tanks had learned that they could depend on the infantry, and as long as they could get their vehicles forward, they cheerfully accepted the infantry's choice of ground. Infantry and tank co-operation reached a high peak of efficiency, and the results were very gratifying—at least to our side.

A Base of Fire

Even in the Appennines, where the tanks were entirely road-bound, they were found

more than useful. They formed a firm base from which the infantry could fan out into the hills. They brought accurate direct and indirect fire to bear when it was most needed. And it gave the infantry a comfortable feeling to have them around. And in this last remark lies one of the major points overlooked by the organizers of the South Korean Army.

The infantry likes to have tanks near them. Possibly the tank is blind in close country, and, therefore, helpless, or it is road bound, or blacked out on a dark night, or otherwise not much of an asset. Nevertheless, the infantry likes to have them around. There is a psychological factor here which is most important and should never be overlooked.

A Psychological Weapon

The old practice of "rear rally" for reorganization, petrol, and rations was discontinued in Italy by the writer's formation. The tanks stayed with the infan-

try, and supplies were taken forward to them. Even if they could not see to fire, they could lay their guns on fixed lines, and the starting up of tank engines, and the sound of their guns at night, were found to have a satisfactory effect both on our own and the enemy troops.

Success Through Confidence

The close and intimate training of tanks and infantry is essential if the best results are to be obtained. Where the tanks are to fight with well-trained infantry who know and trust them, then we have no difficulty in answering the question which forms the title of this article. Under such circumstances, there is only one type of country that is not suitable for the operation of tanks, namely, that terrain over which it is physically impossible to move the tanks even with the use of explosives, tank dozers, or any of the other artificial aids that are available or can be improvised.

The Soviet Union has repeatedly violated its pledges of international co-operation. It has destroyed the independence of its neighbors. It has sought to disrupt those countries it could not dominate. It has built up tremendous armed forces far beyond the needs of its own defense.

President Harry S. Truman

The Application of the Principles of War to Air Power

Digested by the MILITARY REVIEW from an article by Group Captain W. D. Disbrey in "The Journal of the United Service Institution of India" July-October 1950.

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

THE principles of war are fixed quantities, but the methods by which they are applied are variable quantities. These two basic concepts must be appreciated fully before attempting to discuss the application of the principles of war to air power. The time-honored principles of war are all applicable to all three fighting services; it is merely the methods of interpreting them in relation to each of the services which are different.

Applying the Principles

Careful consideration of the principles of war leads us to the conclusion that their general application to the fighting services is not likely to change. As the result of the experience of the last war, some new principles have been proposed. However, when these suggested principles are examined, it is apparent that they are not major principles governing the general conditions of warfare. Rather, they are fundamental factors required for the efficient operation of fighting forces and, as such, they should be given full consideration as essential to the successful application of the principles of war.

Principles Not Limited to the Army

There is a tendency to assume that the principles of war are basically army principles, which have been adopted by the air forces for convenience. This is not true. The principles of war are the result of the experience of mankind at war throughout the ages, irrespective of the type of weapons employed or the ele-

ments in which they are used. War is a national concern and not the concern of any particular service. Therefore, the principles must be applied to the war machine of a nation as a whole and not to any individual service.

When considering this subject, we must be careful not to allow ourselves too many flights of fancy on projected equipment, as it always is dangerous to base ideas on new equipment until such equipment has been tested and proved in the service. For the purpose of this article, the principles of war will be discussed in relation to air forces and their equipment as we know them today.

Before going into detail, it is essential to bear in mind that the principles of war are laid down only as a guide to commanders; they are not definite rules or laws that must be obeyed under all conditions. They are the basic principles that have been found, as the result of experience, necessary for a commander to consider if he is to be successful in war.

Varying the Methods

An air force is a comparatively new service, employing new weapons in a new element, and, therefore, the application of the principles of war must be regarded in a new light if the most efficient use is to be made of an air force. The fact that an air force operates in a different element to the other two services gives it certain advantages and necessitates the employment of different methods when applying the principles. No authoritative work has yet been produced on the detailed application of the principles of war to air forces; the reason being that the rapid strides in aeronautical development have made this impossible.

In this article, the principles will be dealt with in turn, first taking into account their general application and then examining the special application of the principles to air forces as compared with the other services.

Maintenance of the Aim

The principle of the maintenance of the aim is basically the same in its application to all three fighting services. It is not dependent upon the type of weapon being employed. It is essentially a quality belonging to the human element of a service which can be produced only by good training of all personnel. A commander must have an aim whatever service he is in, or whatever weapon he controls, and that aim must be maintained. It must govern the inception of all plans and every plan of action must be based on attaining the aim. In both major and minor operations, the selection of the correct aim takes first place, and an air force has great responsibility in ensuring that the training of all personnel is such that commanders and staff officers can approach their problems with careful and logical reasoning, which will give them every chance of arriving at the right decision.

Distance an Important Factor

There is one major difference which must be considered in the application of this principle to air forces compared with the other services; and that is the effect of the greater distances over which air forces have to operate. One of the greatest factors in ensuring that the aim is maintained is close contact with the enemy when a particular operation is being undertaken. This is not always possible in an air force whose headquarters and "front-line" operational units often are located at considerable distance from the battle zone. Because of this, there is a greater tendency in an air force, when compared with other

services, for the attention of commanders and staff officers to be distracted from the main aim by other problems. Further, the ground personnel of air force units, based at great distances from the battle front, tend to lose their battle lust, which, if not counteracted, results in greatly reduced effort on the part of such personnel. These points must be watched carefully, and it should be made certain that, although they are out of physical touch with the battle or particular operation, all personnel should have the aim clearly in view. External influences must not be allowed to distract their attention. Their enthusiasm and spirit to attack the enemy with the greatest possible effort must be fostered by every possible means.

Maintenance of the aim is a principle that should be infused into every member of a service, particularly those who are likely to become staff officers or commanders, and an air force must ensure that training programs for both officers and men emphasize this important requirement. Lack of proper recognition of this principle is bound to result in an air force being misdirected and inefficiently operated.

Offensive Action

Before discussing the principle of the offensive, in its particular relationship to air forces, it is necessary to review the detailed meaning of offensive action to make sure that its importance to any nation at war is appreciated fully. It is a fundamental principle that victory can be won only by offensive action. The offensive should be taken from the very outset of war, providing, of course, the necessary men, equipment, and supplies are available. However, even if they are not available, and the war is to be continued, the basic policy should be offensive. A defensive policy should be resorted to only as a temporary measure to give suf-

ficient time to build up and launch the offensive.

Obtaining the Initiative

By maintaining an offensive aim, even in the face of adversity, a certain amount of initiative can be obtained, which will reduce the enemy's striking power during the defensive period. At the same time, the offensive has a beneficial morale effect on service personnel and the civilian population, with a correspondingly reverse effect upon the enemy's forces and civilian population. When air forces have to operate on the defensive, it is essential, to prevent deterioration of morale and also to prevent them from becoming stale, that they are given opportunities to carry out offensive actions whenever possible. It will, therefore, be seen that although air forces may have to operate, for certain reasons, on the defensive, the overall aim must be offensive right from the very beginning if final victory is to be won.

Having discussed briefly the general application of the offensive, we now can turn to its detailed application to air forces and show the advantages that are peculiar to air forces in implementing this principle of war.

Air Action Is Three Dimensional

Aircraft attacks are three dimensional, and the direction of attack can be disguised up to the very last moment. This makes it necessary for the enemy to be alert the entire time and make certain that he can protect himself from all directions. Such protection is costly in manpower and equipment, and, if a heavy offensive is maintained, will force the enemy to allot more and more of his resources to the defensive at the expense of his offensive. The other services are incapable of carrying out three dimensional attacks. They can carry out restricted two dimensional attacks, but they have to rely upon lines of communications stretching almost right up to the point of attack, and upon the geographical

and topographical features of the area in which they are fighting.

A Truly Offensive Weapon

Air weapons are the only satisfactory means, at present, of taking the offensive into the enemy's territory before the army is able to do so on land. By this means, it is possible to attack the enemy's industrial and economic resources, and his military reserves of personnel, supplies, and equipment. This is essential in modern warfare in which the fighting forces of a first-class power are entirely dependent upon the nation's entire resources being available to support them. Any reduction in the enemy's industrial and economic capacity will be reflected in his front-line striking power. In this connection, it is important to note that air forces are able to lower civilian morale without actually attacking specific targets by merely maintaining a threat of offensive action against industrial areas. Even the slightest lowering of morale, or inconvenience brought about by this means, will result in a reduction of the productive capacity of the enemy.

Flexibility of Action

In war, great tactical and strategical advantages can be obtained by switching the offensive from one objective to another as rapidly as possible. An air force is extremely suitable for such purposes. Armies and, to a certain extent, navies are dependent upon lines of communications right up to the area in which the fighting is taking place, and any change in direction is a difficult problem. On the other hand, aircraft only need good lines of communications to their airfields, which, except for the tactical air formations operating in direct support of army formations in the forward areas, are situated well to the rear. From such bases, and within the limit of their range, air forces are free to operate offensively in any direction, and changes of objectives

can be made in a matter of hours strategically and in minutes tactically.

Offensive Advantages

To summarize the application of the principle of offensive action to air forces, we must make certain of stressing those points which give air forces advantages over the other services. In brief, these offensive advantages are:

1. The ability to attack targets from various directions, irrespective of the location of airfields and lines of communications.

2. Independence, within reason, of the geographical and topographical features of the area in which they are operating.

3. Rapidity with which attacks can be switched from one objective to another.

4. The ability to attack industrial, economic, and military targets behind the enemy's front line, or which are out of range of the weapons of the other services.

By making full use of these attributes, and by adopting a resolute offensive policy, the enemy can be forced over to the defensive and be made to concentrate more and more on the defensive until, finally, he has to concentrate all his resources on the defensive and is unable to spare any resources for offensive action.

Mobility

War is first and foremost a matter of movement. Mobility, which is a combination of flexibility and speed, indicates the degree or rapidity of movement that a force can achieve. Economy of force is not possible without good mobility, because with the aid of mobility it is possible to cover the maximum number of objectives with a minimum force. When two major powers of equal potential are at war, it is not mobility itself that counts; it is the relative mobility between the forces of the two powers that is the deciding factor.

Air Forces Possess Strategic Mobility

Strategical mobility is one of the great advantages possessed by air forces when compared with the other services, because, by its aid, the greatest economy of force and the greatest concentration in the shortest space of time can be effected. Modern aircraft virtually are independent of geographical and topographical features, when moving from place to place, either in transit between bases or when operating against the enemy. This independence, together with the high speed of movement of the plane, makes an air force the most mobile of the three services. Although it is possible to switch air forces from one base to another in a very short time, their striking power at the new base depends upon the availability of supplies which still have to be taken by land or sea routes. It is essential to remember that it is not sufficient just to concentrate aircraft at any given point, but the necessary personnel, supplies, and equipment must be made available to enable them to operate efficiently from the new bases. Such arrangements are the main limitations to the strategic mobility of air forces.

To a certain extent, air forces are air mobile. Personnel required to operate the aircraft, and a certain amount of ground equipment, can be transported from one base to another by the operational aircraft with the assistance of suitable transport aircraft. However, the time has not yet arrived when supplies, such as rations, fuel, oil, bombs, and ammunition, can be transported economically by air and in sufficient quantities to support normal air operations. Such methods can be resorted to only for special operations.

Tactical Mobility Demonstrated

The tactical mobility of air forces in support of ground forces was proved beyond doubt in the last war. During the

rapid advances by the ground forces, the tactical air forces, by suitable organization, were able to keep up with the advance elements of the armies and give them effective air support. When the conditions on the ground were such that it was impossible to maintain a full supply line right up to the battle area, aircraft were maintained and armed at bases in the adjacent rear and sent forward to advance landing fields for the briefing of pilots, and to await suitable targets to present themselves. This form of mobility enables a large striking force to operate before adequate lines of communications are available for the complete support of the air forces in the forward area.

The mobility of air forces is one of their most important characteristics when compared with the other services, but the degree of mobility and the efficiency with which mobile forces are employed will be dependent entirely upon the suitability of equipment, good training, good staff work, and a good organization. To achieve maximum mobility, units and formations must be trained to be mobile-minded in peacetime. Otherwise, they soon will become outmoded in their ideas and methods, with a consequent loss of efficiency. This entails continuous practice in mobile warfare.

Changing Methods With Equipment

A modern air force has a great responsibility, and a very difficult task, in keeping itself ahead of other air forces as far as mobility is concerned. The equipment of air forces is changing continually, and it is only by keeping ideas and methods constantly under review that full mobility can be achieved. Because of the rapidly changing equipment of modern air forces, mobility does not lend itself to economy in peacetime, and it is only by having efficient and far-sighted commanders and staff officers, who appreciate fully all the

problems involved, that an air force can achieve maximum mobility with the minimum expenditure.

Concentration

The principle of concentration is the application of the maximum force at the decisive time and place. By an outward paradox, true concentration is the fruit of dispersion and full use can be made of it only when the enemy has been accustomed to, or deceived into, the fact that the forces of the opposing side are dispersed.

The mobility and flexibility of air forces give them much greater possibilities in the field of concentration when compared with the other two services. However, when considering concentration as applied to a modern air force, there are two essential factors that must be taken into account. The first is the speed of concentration, because concentration is of little use unless it can be accomplished rapidly so as to make the best use of its complementary principle of war, surprise. Second, preparations for the concentration must be undertaken with the utmost secrecy, because, here again, unless this is done it will be impossible to achieve maximum surprise.

Tactical and Strategic Concentration

Concentration in its relationship to air forces has two separate aspects, namely tactical and strategic concentration. Strategic concentration has to be subdivided into concentration without changing bases and concentration requiring the changing of bases.

Modern radar and radio aids have brought the tactical concentration of aircraft, both in defensive and offensive roles, down to a fine art. In both cases, it is now possible to keep planes in the air waiting for targets to present themselves. When targets appear, the ground organization can decide and arrange for the re-

quired amount of concentration for any particular target, brief the pilots, and control the aircraft on to their targets. This system enables small numbers of aircraft, patrolling just behind the forward troops, to be directed on to targets in the enemy lines by mobile visual control posts operating with the forward troops, thus bringing air concentration down to a matter of minutes.

Applying Strategic Concentration

The great range of aircraft, operating from dispersed bases well in the rear, enables two types of strategic concentration to be carried out. They can concentrate in space on particular targets or they can concentrate on a particular type of target over a wide area. Long-distance concentration, when aircraft have to change bases, is a complicated problem, much more difficult than some of the so-called experts who write in the press would have us believe. Modern aircraft require large numbers of personnel and large quantities of supplies and equipment to be provided at the new bases before they can be operated effectively.

Great strides have been made toward making air forces air transportable, but it must be remembered that requirements in personnel, supplies, and equipment are becoming more complicated every day, and it is unlikely that it will ever be possible to transport all the requirements by air except for special operations. The apparent, simple method is that skeleton personnel and sufficient equipment and supplies should be provided at advance bases to be ready when required. Financial limitations, in peacetime, prevent this being done, and, in war, a nation rarely can afford to allow personnel, equipment, and supplies to remain idle just in case they are required.

Deceiving the Enemy

A concentration of air forces may be

used to deceive the enemy so that he believes that the attack is coming from a certain direction, when, in actual fact, the main attack will be launched from an entirely different point. This method of deception was used to a considerable degree by Field Marshal Montgomery in the last war, and, in particular, was used to deceive the Germans as to where the invasion of the Continent was to take place. As military commanders become more air-minded, we must expect them to make more use of the power of concentration of air forces, not only in the battle proper, but as one of the best methods of deceiving the enemy as to the direction and nature of the forthcoming attacks of the ground forces.

Maintaining Secrecy

There are two main differences in the application of the principle of concentration to air forces when compared with the other services. The first is that naval and army forces cannot concentrate without moving their forces within very close range of the area in which they are going to make the attack, and, at the same time, setting up new lines of communications or increasing the capacity of the old ones, thus enabling the enemy to obtain information of the nature and direction of the impending attack. Air forces, on the other hand, when concentrating on targets within their operational range, are able to do so without setting up special supply arrangements and thus give themselves away. Second, air forces, because they are able to penetrate behind the enemy lines, within their radius of action can attack any target in the enemy's rear. They are, therefore, able to select one of the enemy's weak spots, or bottlenecks, and concentrate on those particular targets over the enemy's entire rear area. This ability to concentrate on particular targets over a wide area, as opposed to concentration on particular targets in a limited area, is a characteristic of air

forces which is not possessed by the other two services.

Potent Striking Power

Summarizing, a strategical and tactical concentration of air forces provides a new and powerful means of striking at the enemy which is not possessed by the

other services. Concentrated blows can be delivered against the enemy's vital points in the rear of his fighting forces which will greatly affect his front-line striking power. In addition, air forces have the ability to keep the objective of the attack secret from the enemy until the very last moment.

We have improved our ability to expend mountains of bombs, rockets, and napalm in exchange for enemy casualties, rather than great numbers of dead and wounded Americans. By constant practice and experimentation, in co-operation with our forces on the ground, the air effort against enemy ground troops and equipment has become increasingly effective.

It has been estimated that air strikes [in Korea] have caused about half the enemy casualties, and more than half the enemy losses in motorized weapons and equipment—not to mention the bridges and buildings and installations destroyed far behind the front lines.

General Nathan Twining

Ration Run—Korea Style

Digested by the MILITARY REVIEW from an article by
Major D. L. Bursleson in the "Canadian Army Journal" April 1951.

THE old adage that "an army marches on its stomach" has been true for centuries. Today, it applies equally well to the United Nations' troops in Korea.

However, a new twist has developed. Royal Canadian Army Service Corps

cliff-climbing roads wind around steep hills, dropping sharply into the valleys. In places, they snake through one-way tunnels and bounce over railway bridges on the 200-mile run to the front. One hundred miles is considered fair distance for a day's run in a convoy. Drivers carrying supplies to the front move off in close convoy at dawn, never traveling alone and generally carrying two men in the lead vehicle. The trip to Taegu takes the full day.

Road, Rail, and Air Transport

From Taegu, supplies move forward to the 27th Commonwealth Brigade in a number of ways. Railroads are used to



A "ration run" convoy moving over the winding, cliff-climbing 'Red Diamond' route. transports literally are rolling on their stomachs to move the rations forward and keep the Canadians marching.

Main supply bases for both British Commonwealth and United States troops are located in Pusan, the southern gateway to the peninsula. Spider-webbing north to the 38th Parallel are two "main arterial highways," the "Red Diamond" route and the "Green Diamond" route.

Roads Poor—Travel Hazardous

Neither route is paved. Neither route is much more than 12 feet wide at any point. Neither route is highly recommended for tourist travel!

Skirting the fringe of guerrilla territory, each road becomes a ribbon of muck during the spring rains and a treacherous trail of ice during the winter months. The



Narrow, muddy roads are a constant hazard for ration vehicles moving to the front.

some extent, and, where necessity demands, supplies are dropped from the air.

The United States Army is supplying all the fresh rations used by the United Nations' troops, and the bulk of combat rations. Recently, Commonwealth troops changed to field rations provided from British resources, with fresh rations com-

ing up periodically or during rest periods behind the lines.

Catering Problems

Catering to the eating peculiarities of the many nations fighting under the United States Eighth Army command in Korea posed many difficult problems for the American Quartermaster Corps. The situation became so serious that the United States Army formed a special "catering team" to study the eating habits, likes, and dislikes of the many nationalities they were required to supply.

The Turkish troops, because of religious beliefs, will not eat pork. United States Army field rations contain a considerable amount of pork and pork products. Therefore, it was necessary for the Americans to package a special field ration in Japan for issue to the Turkish brigade. This special ration contains mainly mutton or beef and the inevitable heavy spices.

Moreover, the Turkish troops will not eat margarine. They must have butter which is left in the open until it turns rancid before eating.

Indian troops must have their curry powder and rice. The Filipinos and Thais prefer heavily spiced foods and strong brands of tea or coffee.

Canadian and British troops subsist very well on the normal type of rations,

but require extra issues of tea and potatoes.

Solving Complex Problems

The complexities of integrating supply lines, providing the amazing variety of rations and amenities to meet the tastes and peculiarities of so many nationalities,



South Koreans carrying rations from forward break-down points to company areas.

constitute problems perhaps never faced before within a single army. However, in Korea, these difficulties are being overcome with great success.

Few troops have ever been fed so well in battle, or at rest in a battle area, as those serving under the United Nations' flag in Korea.

It seems that we must learn and relearn with every war that the ultimate decision in war—and the greatest amount of risk—rests upon the foot soldier, who must meet the enemy face to face on the ground and contest him for that ground.

General J. Lawton Collins

Can We Establish Laws in the History of Civilization?

Translated and digested by the MILITARY REVIEW from an article by Lieutenant Colonel Diderot Miranda in "A Defesa Nacional" (Brazil) February 1951.

IN ALL civilized nations, world history normally is studied by means of a chronological sequence of events. In this way we can obtain the information we desire to know. For example, it is through this means that politicians and newspapermen find arguments to justify or combat a project, speakers find background material for their speeches, teachers find material for their teachings, soldiers find lessons for their guidance, and artists find inspiration for their works.

However, are there laws which govern the actions accorded in history?

Elements of Geopolitics

History tells us everything that was accomplished by the military, the arts, the church, and the state, but, as a rule, describes the events in terms of their political or economic implications.

Since the end of the nineteenth century, certain tendencies of the states have been attributed to geopolitics.

This is a new science, still slightly nebulous and controversial, which has been called comparative geography by Karl Ritter, antropogeography by Friedrich Ratzel, and political geography by Arthur Dix.

Today, geopolitics is its accepted name. This science has established rules or principles which have been followed by the states in their struggle to expand so as to better the living standard of their people.

Basing our comments on Arthur Dix, let us recall some of the principles which govern the expansion of nations:

1. *Advance over the line of least resistance.*—Tribes, looking for new and more adequate lands, upon encountering

large mountains or wide seas, changed their direction to find easier ways to cross such obstacles. They also avoided all powerful peoples, and expanded only where they found the least resistance, either in the form of geographic features or of opposing national forces.

2. *Complete occupation of a body of water by a single government.*—History shows us innumerable examples of this principle. Let us recall only the Chaldean Empire which occupied all of Mesopotamia, from the Tigris to the Euphrates, and the efforts of the Egyptians to reach the Nile.

3. *An exit via the sea.*—Among other examples, Bolivia has been striving for many years to secure an exit to the Pacific Ocean by attempting to regain the territory she lost to Chile during a war in the nineteenth century.

4. *Numerous sea outlets.*—A country which has obtained a port or exit to one sea always attempts to get a port or exit to another sea.

As we know, the primitive Slavic people were defeated and subjugated by the invaders from the East, particularly the famous "Golden Horde." As soon as the Slavs were able to organize an independent government, they tried to obtain an exit to the sea. They reached the Black Sea and, almost simultaneously, after bitter fighting with the Swedes, also reached the Baltic. Later, they obtained ports on the Arctic Ocean, and, finally, Vladivostok, on the Pacific Ocean.

5. *Desire for opposite coasts.*—There is a tendency on the part of a nation possessing a limited seacoast to obtain the remainder of it on the same body of water. Thus, Greece, upon recovering her

independence in the nineteenth century, after years of brutal oppression, immediately tried and was able to obtain part of the coast of Asia Minor, on the Aegean Sea, facing her own coast. However, the Turkish reformer, Kemal Pasha, drove the Greeks out of Asia Minor after the war of 1923.

6. *Great transcontinental routes.*—This principle is the opposite of the previous one. A country which has coastal areas bordering on more than one sea or ocean attempts to join such areas by long transcontinental routes. For example, the United States constructed rail lines connecting the Atlantic and Pacific coasts.

7. *National unity.*—This principle includes the measures taken to join, under the same government, all people of the same nationality, or people who speak a common language. This made the French conscious of their feeling of patriotism or nationalism, and united them under the same flag. Under the influence of this same principle, the Italians fought and united the various principalities to form the Italy of the last century.

8. *Natural boundaries.*—This principle embraces the ideas and actions directed to a country's frontier being located at a point where there is a strong barrier. In some cases, this comes about naturally, as the geographic barrier or obstacle forbids free circulation. Thus, the Pyrenees formed the natural boundary line between Gaul and Iberia. After the invasion of the barbarians, the frontiers between the empires of the Visigoths and the Franks continued to be this same range of mountains. With the defeat of the Visigoths by the Arabs, the latter crossed the Pyrenees and entered the country of the French. Later, they were driven back and, for many centuries, were separated by the same mountains, as are France and Spain at the present time. In other cases, however, the idea of a natural frontier may result in long and difficult wars, as,

for example, the well-known dispute over the Rhine.

Zones of Dispute

Two or more nations, interested in the same area, because of the principles mentioned above or because of complex economic reasons, create what are called "zones of dispute." This is illustrated by the dispute between France and Germany over the Rhine. France, desiring it for her natural frontier, as well as for reasons of national unity and the possession of the rich iron mines in the Sarre, collided with Germany's interests. The latter desired to have all German speaking people on the west bank of the Rhine under her control, as well as control of the Sarre.

In South America, the question of the Sacramento Colony led to many disputes between the Portuguese and Spaniards, and, later, between the Brazilians and Argentinians, ending in the recognition of Uruguay as an independent country.

Geopolitics Systematizes Facts

We have cited eight principles of geopolitics taken from a book by Arthur Dix, illustrating each one, and ending by mentioning the zones of dispute. There are, however, many more that could be found in the works of other geopoliticians. That is why the reasons for any expansion of a people, either toward their neighbors or in colonizing distant lands, can be based on any of the principles set forth by any of the other authors mentioned. This is why so many aggressive ultranationalists, or statesmen of expanding countries, have used geopolitics to justify their ideas, and, as a result, this science has come to be regarded by pacifists with fear and distrust.

The routes followed by the expanding countries can be analyzed and systematized by geopolitics, but this establishes only the relationship between politics and the geographical constant of the

country, or countries, in question. However, would it not be possible to determine the motive, outside of those geopolitical laws, which drives a country in its expansion? Let us try to find an answer in the study of world history, setting aside all political and geographical reasons.

Centripetal Force of States

Civilization, which for many years thrived in the Mediterranean and Asia Minor, was characterized by the appearance, initially, of scattered cultures, both in time and space. Later, these civilizations collided with each other.

For example, let us mention the ancient Sumerians, the Cretans, the Egyptians, the Greeks, the Hebrews, the Medes, the Persians, the Assyrians, and the Babylonians, whose cultures developed without any outside influence, and with very few contacts with other peoples. These civilizations did not have the close economic and political relations that we see between states today.

It seems quite plausible to assume that the development of a solid culture in a tribe, a people, or a nation always was done with a view to absorbing or supplanting their neighbors—whether they were civilized to a greater or lesser extent.

Whether by sea—as, for example, the Phoenicians founding new colonies in northern Africa or the Iberian Peninsula—or by land—as, for example, the Persians expanding from India to Egypt, through trade or armed force—the stronger nations always tried to subjugate others to their rule.

By reviewing world history, we can state that the birth of a solid culture in a particular nation is related intimately to the appearance in its midst of a political nucleus which acts as a powerful magnet, attracting and absorbing other tribes or peoples. This nucleus possesses a centripetal force which is felt in the

immediate area, as well as in distant lands.

Every nation has, in a latent state, an expansionist force. Once we establish this law or principle of centripetal force, which would govern the development of civilizations, we leave to others its study and examination.

Centrifugal Force of States

All tribes and peoples continuously strive to survive and keep their language, habits, and customs. Instinctively or not, all recognize that this is possible only by keeping or regaining their political independence.

In striving to maintain its power and, consequently, its own tongue, culture, and customs, a state sometimes isolates itself from other states; often with fatal results.

We can conclude, therefore, that the culture generated in a certain state, although suffering from the influx of others, systematically rejects being absorbed or influenced by other states.

Centripetal versus Centrifugal Force

A state normally has both centripetal and centrifugal forces working at the same time. One force attracts other states into its sphere of influence, and the other force rejects or repels the influence of a stronger state. Therefore, we have pointed out that civilization develops around a state, and that the state possesses a force of attraction (centripetal) and a force of repulsion (centrifugal). These two forces do not have the same strength. In general, the first exerts more power, very often causing the destruction or absorption of one nation by another.

The Roman Empire provides a good illustration of this principle. Its influence extended over all civilized countries, from Portugal to Rumania, and from England to North Africa—unifying the world under the leadership of one state. This illustrates the domination of the centripetal princi-

ple. Following the destruction of the Roman Empire, there were no states, as such.

A number of centuries after the invasion of the Germans, Normans, and Muslims, once again the framework of great nations started to take form. At the end of the nineteenth century, there were about 20 great powers. At the beginning of World War I, in 1914, we could list the great powers of the world as the United States, Japan, Germany, Austria-Hungary, the Ottoman Empire, England, France, Italy, and Russia. When the last war ended there remained but three great powers; the United States, Great Britain, and the Soviet Union.

A One World Theory

The same phenomenon can be observed today as in the old days; that is, the domination of certain states over other states because of centripetal force. It is true that there are many sovereign states; but three states have incontestable superiority in all points of capital impor-

tance. These three states already have taken two opposite positions. The remaining states, with great effort, are attempting to maintain their political independence or promote the welfare of their people.

If these two principles are true—centripetal and centrifugal—as well as the domination of the centripetal over the centrifugal force, we may conclude that, in the future, there will be only one great power in the world. How will this be attained? Through persistent and silent economic battles and clever political fencing, or through a clash of arms.

Concluding, we may state that, besides the eventual battles between small nations, there already exists a political and economic conflict between two worlds, which will lead us, after wars and suffering, to one world.

It rests with those conscious of their duties to save the world from this sad contingency. To us—the military—is given the task of readying the nation.

The Communists have pursued a course of psychological and political infiltration in a well-organized campaign to impose a reign of tyranny and despotism on the world. But they have not hesitated to use armed force in the furtherance of their objectives, nor will they hesitate to do so in the future.

General Mark W. Clark

The Evolution of Self-Propelled Guns

Digested by the **MILITARY REVIEW** from an article by R. M. Ogorkiewicz in the "Journal of the Royal United Service Institution" (Great Britain) May 1951.

THE introduction and large-scale employment of self-propelled artillery by the armies of all the major powers has been one of the more notable military developments in the past decade. From small beginnings, self-propelled artillery attained, during World War II, a position of considerable importance. For this reason, it may be of interest to examine some aspects of its development and the evolution of its equipment.

The Beginning

Self-propelled artillery essentially was a development of World War II. However, neither the problem of the mobility of heavy weapons—to which self-propelled guns were offered as a solution—nor the conception of the equipment were new. Almost as soon as the first automotive vehicles appeared, attempts were made to harness them for military purposes. The earliest attempts were exemplified by the armed autocars built at the turn of the century, which were conceived originally as highly mobile carriages for the newly developed machine guns. Heavier guns—even 75-mm weapons—sometimes were mounted, particularly for use against balloons and dirigibles. However, the general tendency, accentuated during the first few months of World War I, was toward the use of lighter weapons and the armoring of the chassis. From this evolved the armored car; in principle a very advanced, self-contained, mechanized fighting unit, but, in practice, one severely restricted by the type of terrain over which it could operate. Its general utility being thus limited, it became more and more a specialized vehicle for reconnaissance and patrolling, and tended to lose the characteristics of a gun motor carriage.

The Influence of Trench Warfare

With the advent of trench warfare on the Western front, an effective stop to the use of armored cars resulted. This brought about the application of another type of self-propelled vehicle—the caterpillar tractor—in the shape of the tank. Introduced with the more immediate object of overcoming the twin problems of machine guns and barbed wire, the tank introduced a new means of increased tactical mobility and a measure of mobile protection.

The Tank—An Infantry Weapon

Of the two, it was the latter, the armor protection, which made the stronger impression on most minds and was reflected in such things as the definition of the tank as a "perambulating fortress." Moreover, the early employment of tanks was dictated by the methods and needs of the older arm, the infantry, which they were called upon to support as barbed wire crushers and machine-gun destroyers. As a result of this, tanks came to be regarded much more as specialized pieces of equipment—not far removed from the siege machines of antiquity—than as a step toward a general increase in the mobility of armament. This was true even in France, where tank development initially was associated closely with the artillery. The first armored units actually were called *artillerie d'assaut*, and were used as such. Nevertheless, tanks ended up as auxiliary weapons of the infantry.

Thus, as in the case of the wheeled vehicles, the new means of mobility led to what came to be regarded as a highly specialized type of fighting machine. Tanks took their place as another addition to the existing and well-established armory, and,

for a considerable time, exerted comparatively little influence on other arms. Outside a small circle of enthusiasts, the more general advantages of mechanized mobility met with comparatively little understanding. Even where tanks were given an opportunity to develop further their potentialities, as in this country in the Royal Tank Corps, such development was confined largely to themselves, apart from the rest of the Army.

Early Developments

During and immediately after World War I, there were a number of developments, other than the tank, in the tracked vehicle field. These consisted of applying the tracked chassis, already proved in tanks, to increase the mobility of artillery within its traditional methods and organization. This country, in the *Gun Carrier Mark I* of 1916, can claim to have produced, as such, the first tracked self-propelled gun. It was designed to carry either a 60-pounder gun or a 6-inch howitzer, which could be fired from the vehicle. However, the 48 vehicles built were used chiefly for carrying supplies, and its development was discontinued.

The French started a little later, and, by 1918, had more than eight different models, ranging from a 75- to a 280-mm gun on a 7-ton light tank chassis. Complete mechanization was visualized by the Inspector of Artillery Equipment, but such views met strong opposition from other artillerymen and the French High Command. The superior cross-country mobility, speed in changing position, and economy in personnel were grudgingly conceded. However, arguments were advanced against self-propelled guns on the grounds that gasoline was an imported product, reliability and road performance poor, and above all—thinking in terms of positional warfare—that the gun could not be placed in position without its motor carriage. The net result was that after the Armistice, further development of self-

propelled guns ceased completely. Only a few 194- and 280-mm guns were retained, and these, with modifications, still were being used during World War II.

United States Efforts

Following the French example, the United States took up the development of self-propelled guns during the last few months of World War I, and experiments continued until about 1922. At least 12 different models were built or sponsored, by the United States Ordnance Department, from a light 5-ton 75-mm to a self-propelled 240-mm howitzer. Again, however, their development was dropped, although self-propelled carriages were considered desirable for medium and heavy artillery. Much the same arguments were used against them as in France, chiefly, that if the power plant of the carriage failed, the entire unit was out of action. Therefore, tractor-drawn artillery was considered the more logical system.

Development Remains Stagnant

In all three countries, what were in many ways very promising beginnings came to nothing, and, in the following 2 decades, there was virtually no further progress in this field. A few isolated attempts were uniformly unsuccessful in reviving interest, since the artillery saw no tactical need for self-propelled carriages, and armored forces were concentrating on tanks.

A good example of this was the self-propelled 18-pounder, built in this country in the late twenties. It marked an important step forward from the original guns of World War I to self-propelled artillery in the present sense, and three different models were built. This development met strong opposition from the majority of the "gunners," while tank leaders were afraid lest this development should be at the expense of tanks. As a result it was abandoned, and the place which the 18-pounder might have occupied in the mech-

anized units was given to the smoke-firing close-support tank, which, incidentally, was considerably less effective and versatile than the self-propelled 18-pounder.

A similar fate, abandonment through the opposition of some and lack of interest on the part of others, befell the few experimental vehicles of other countries: the 37-mm antitank and 75-mm field guns built in Germany in the mid-twenties, and the 75-mm howitzers tried during the thirties in the United States.

Towed Artillery

However, while the development of self-propelled guns remained stagnant, artillery did not, of course, remain unaffected by the progress of the automotive age. In addition to the mounting of guns on vehicles, there was the other, and in some ways quicker, method of using the motor vehicle for towing in much the same way as a horse team.

An early, and not too promising, forerunner of this method was the steam tractor of the South African War. Then, in 1903, the first motor-towed guns were tried in Portugal, and, on the outbreak of World War I, the French Army could boast of the first motorized artillery unit. During that war, the use of trucks and tractors for towing guns became much more widespread, and the process continued in the postwar period.

Apart from being faster than the horse teams previously employed, this method did not depart in principle from the methods consecrated by at least 3 centuries' usage—a fact which made it much more acceptable to the conservative minded majority. The guns went into action in much the same way as before, and, while they were in position, the towing units were kept away. However, because this departed so little from the previous method, it suffered from the same disadvantages, the chief disadvantage being that it still required considerable time and effort to go

into action through the necessity of unlimbering and the associated motions.

Where wheeled vehicles were used, strategic mobility was high, though tactical mobility was poor. With tracked tractors, the reverse was true, and they were in no respect better than tracked self-propelled carriages. The real advantage of the towed over the self-propelled gun was an economic one, since reliable and commercially available vehicles could be used, while only minor modification had to be carried out on the existing guns. This, however, was by no means universally recognized, and this advantage seems to have been lost sight of completely when special tracked tractors were developed.

Special tractors were a necessity if better cross-country performance, without the crippling disadvantages of the slow-speed commercial tracked tractors, was demanded. Before their development, the combination of commercial truck and small farm tractor was tried. The truck carried or towed the gun, tractor, and trailer for road transport, and the tractor was used for hauling the gun over rough terrain. This cumbersome and unsightly combination did not, as might have been expected, prove satisfactory, and gave way to special artillery tractors.

Antitank Guns

During the years when all these developments were taking place, very important advances were being made in the tank field. Although views on the employment of tanks differed considerably, important advances were made in tank design, and, in the thirties, their numbers began to increase rapidly.

One immediate effect of this was a rapid development of countermeasures, principally antitank artillery. At that time, this meant 25- to 47-mm guns, miniature versions of contemporary field guns used defensively. The Germans, who led in this development and who had 75 antitank guns in each division long before anyone else,

were not, however, contented with a passive role for their 37-mm weapons. They began to emphasize the mobility of the motorized antitank units and the importance of their offensive employment. In keeping with this policy, antitank units were designated as "tank hunters," and, in addition, were used offensively in support of the infantry. When war broke out, they moved a stage further and, in 1940, introduced a few self-propelled antitank guns, starting with the Czech 47-mm gun on a light tank chassis. From this somewhat tentative beginning, they moved on and introduced increasing numbers of self-propelled antitank guns, particularly in 1942, as a result of meeting the masses of Soviet tanks. Because of a shortage of suitable chassis, however, they had to rely largely on captured and on their own obsolescent tank chassis for this equipment.

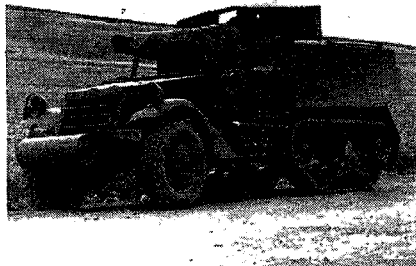
Other armies followed suit out of sheer necessity for some more effective antitank weapon than the towed gun. Thus, after the first few days of the 1940 campaign, the French produced an improvised, wheeled 47-mm self-propelled antitank gun. The following year saw the appearance of British 2-pounders, mounted on light trucks, and other rather primitive forms of self-propelled antitank guns in Libya.

The Americans, who were the last to enter this field, developed the offensive, mobile role of antitank artillery farthest in creating tank destroyer units. From the very beginning, their units were especially designed for offensive action against hostile armored forces. They were equipped with powerful and highly mobile weapons, such as the 75-mm gun on armored half-tracks, later, the 76-mm *M10* and 90-mm *M36* on the *Sherman* chassis, and the 76-mm *M18*.

Armored Divisions

Thus, the appearance of large numbers of tanks on all sides led to the development of self-propelled antitank guns, through

the desire to increase the mobility, and hence the effectiveness, of existing anti-tank weapons. This process was accentuated further by the progressive increase in gun size and weight, and the difficulty—sometimes, also, unwillingness—connected with the mounting of heavier



American tank destroyers featured 75-mm guns mounted on armored half-tracks.

guns in tanks. The other effect of this, or more strictly of the use of tanks in armored formations, was a partial mechanization of field artillery.

In the first permanent mechanized formations, such as the French division légère mécanique of 1934 and the German panzer division of 1935, all artillery was towed. This was still true of all armored formations during the first 2 years of World War II. Even in the panzer divisions, guns continued to be towed in spite of requests from some of the leading panzer commanders for self-propelled guns. The lack of interest, if not actual opposition, on the part of the artillery, combined with a shortage of suitable chassis after meeting other demands, prevented anything being done about this for some time.

Although the German three-quarter-track tractors were the best vehicles for towing yet built, the use of towed artillery in support of tank units presented unquestionable difficulties. As a result, semi-im-

provided self-propelled gun-howitzers, such as the 105-mm *Wasp* and 150-mm *Bumble Bee*, began to appear in 1942.

Further development was, however, severely restricted by the more urgent calls for mobile antitank and close-support guns, and, as a rule, only one artillery battalion in a panzer division was equipped with them. At the same time, the need for them was somewhat diminished by the introduction of heavily armed tanks, such as the *Tigers* and *Panthers*, and there was a tendency to go over to rockets for area bombardment.

It was left to the United States, with her industrial resources, to be the first to put all the artillery in her armored divisions on self-propelled carriages. The United States holds the record for the number of experimental self-propelled guns tried during the war, and among the designs begun in 1941 was the 105-mm *M7* (howitzer) or *Priest*. This became the standard divisional gun of American armored formations as well as some British formations, receiving its baptism of fire at El Alamein. It also served as the model for the still current 25-pounder *Sexton*. Also begun in mid-1941 was the 155-mm *M12* (gun), which saw considerable service in Europe in 1944-45, demonstrating in action a remarkable saving in time and effort over the corresponding towed equipment. By that time, the United States had a complete range of self-propelled guns, from a new, lighter 105-mm howitzer to one of 240-mm.

Close-Support Guns

In addition to the two broad lines of development mentioned, that of self-propelled antitank guns and a partial mechanization of field artillery, and the corresponding evolution of self-propelled antiaircraft guns, there was yet another category of self-propelled weapons. These were first introduced by the Germans, concurrently with their first improvised anti-

tank guns and infantry howitzers, and have been referred to most commonly as assault guns.

Unlike the opportunistic development, or, at any rate, beginnings of other self-propelled guns, the development of these has been much more consistent. Their origin easily can be traced to the evolution of German infantry armament. Rightly concluding that neither the rifle nor even the light machine gun were, by themselves, adequate for the needs of modern combat, the Germans began to transform their infantry into a much more up-to-date and powerful instrument. Not only was every fourth company a heavy machine-gun company, but they were the first to give each section a submachine gun, the first to give each battalion six 81-mm mortars, and each regiment a 12-gun antitank company, as well as a company of infantry guns of six 75-mm and two 150-mm howitzers.

The introduction of the infantry guns was based partly on the sound principle that a gun on the spot is worth an entire battery later. However, it was only, in a small part, a question of decentralization *versus* centralization of guns, and certainly was not made at the expense of the divisional artillery. Far more, it was a genuine attempt to increase the striking power of the infantry, as such, irrespective of any artificial divisions or prejudices between arms as to the use of certain calibers or types of weapons. This departure from the rifle and bayonet principle, to which other armies still clung to a greater or lesser extent, certainly paid dividends in the early *blitzkrieg* campaigns, though it was apt to be overshadowed by the much more spectacular accomplishments of the panzers.

A Mobility Problem

The problem of mobility of these infantry guns, however, was acute, particularly as they were sited well forward. One solution, which was tried in the panzer

grenadier units, was to place them atop modified tank chassis like the rest of the improvised self-propelled guns. The first of these, with a 150-mm infantry howitzer,



American 155-mm self-propelled guns in action during the drive into Germany.

was tried in France in 1940, and was followed later by a few other models. This improvised type, however, because of its large silhouette and incomplete and thin armor, suffered from serious disadvantages when used well forward with the infantry. A more thoroughly designed type was required, and the Germans, anticipating many of the later lessons, produced their now well-known assault guns.

Since the replacement of all the existing infantry guns was out of the question for reasons of supply, assault guns were used to supplement them, particularly under conditions which made the employment of the infantry guns especially difficult, as, for instance, in assaults against well-defended positions. In keeping with this policy, assault guns were grouped in independent battalions and were allotted as required to infantry units. The first two battalions of this type were used in France in 1940, and from then on their numbers grew steadily, particularly as the Germans did not subscribe to any "infantry tank" idea.

Although parallels sometimes have been drawn, the differences between the two

ideas were very considerable. As defined, the primary object of the infantry tank was "to assault to close with the enemy." Even when, finally, effective dual purpose guns replaced those intended primarily for self-defense against enemy tanks, fire support, as such, was regarded as of secondary importance. Unlike assault guns, infantry tanks were not, therefore, looked upon as a mobile source of fire power. Instead, their employment was based on the old conception of the tank as an armored assault vehicle—a sort of armored steam roller which would pave the way for the infantry. Assault guns, on the other hand, from the start based their action on fire power, more mobile and more powerful

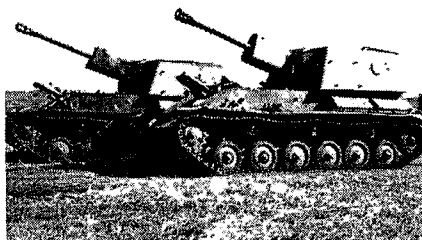


A German assault gun—a powerful support weapon against well-defended positions. than the infantry's own weapons, and they worked with, not for, the infantry.

German and Soviet Developments

The original assault weapon used by the Germans was a low-velocity 75-mm weapon, the same, in fact, as that used on the early German tanks. In 1942, this gun was replaced by a high-velocity 75-mm gun, which enabled it to engage enemy armor very effectively, in addition to affording direct infantry support. This paved the way for the merger of the two classes of equipment, assault guns and self-propelled antitank guns, into a single class. Included in this new class, which came into

prominence in the closing stages of the war, were such vehicles as the 88-mm *Panzerjäger Panther* and the light 16-ton



Soviet-built *S.U. 76* self-propelled guns captured in Korea by United Nations' forces. *Panzerjäger 38t*, which were to form 61 percent of the total armored vehicle production planned for 1945.

There is little doubt that the Germans intended to concentrate entirely on this type of close-support and antitank weapons. By virtue of its low silhouette and good, all round—including the top—armor protection, the assault gun was superior to other types. Also, at the expense of traverse, it had more powerful armament or better protection, or frequently both, than a corresponding tank type, and, therefore, could well take over from the tanks many of the tasks in a fire fight, and thus give the tanks greater freedom to maneuver.

This was particularly true of the Soviets who, benefiting from the lessons of the early German assault guns, introduced from 1943 onward a whole series of vehicles of this type. With their addiction to the use of field artillery for direct fire, the assault gun type of self-propelled weapon appealed particularly to the Soviets. At the same time, it made possible, through quicker mounting of heavier guns on existing chassis, a considerable increase in the fire power of tank units, and gun-

power was the thing the Soviets always regarded as most important in their tanks. Armed both with high-velocity guns and gun-howitzers, Soviet self-propelled weapons were used extensively in support of tanks, acting together with heavy tanks as a fire base on which the more mobile medium tanks pivoted. At the same time, they also were used for the direct support of the infantry, and, in this role, often mixed with tanks right down to platoon level.

The combination with tanks was hardly surprising, since in many ways German assault guns and Soviet self-propelled guns were "turretless tanks." That Soviet tanks and self-propelled guns varied only in small degree from one another was particularly noticeable in the case of the heavy types, the *Stalin* heavy tank and the *S.U. 152* self-propelled heavy gun-howitzer. Both relied on heavy, long-range fire power, and were used in many similar roles. In the *S.U. 152*, the Soviets also managed to combine the functions of a self-propelled gun-howitzer, of a heavy antitank gun, and of an assault gun suitable for use against fortified positions. In this way, they were not only spared the difficulty of having to build three separate vehicles for each of the roles, but, through versatility of the equipment, obtained considerable simplification of employment.

Conclusions

Thus, the development of the assault gun type of vehicle becomes particularly significant both as a clear link between tanks and self-propelled guns, and, what is even more important, as a very significant example of a much more direct and aggressive use of artillery equipment arising out of its increased mobility.

So far, the artillery has been regarded almost exclusively as a supporting arm since, in fact, other roles were difficult, if not impossible, with towed equipment, and the infantry continued to be regarded

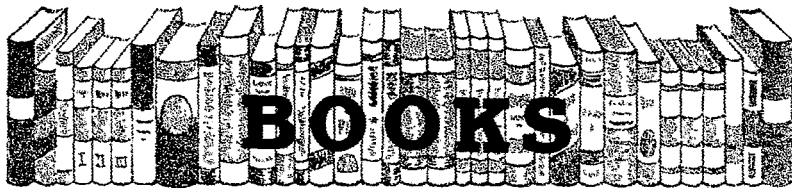
as the basis of every army. In this order of things, cavalry, and more recently tanks, have been given the role of a complementary mobile arm. However, with the adoption of self-propelled carriages, the gun became a much more versatile and direct source of fire power, instead of being a slow supporting weapon. It could act either as an integral part of a completely mechanized force, as the fire base of the smallest infantry unit, or in the more traditional artillery manner.

At the same time, tanks have moved away from the narrow conceptions of armored assault vehicles or of lightly armed

raiders. Instead, they, too, are slowly being recognized as a much more versatile form of mobile fire power. Mobility is no longer used with the main object of transporting a shield of armor, but, on the tactical plane at any rate, to increase the effectiveness of tank armament. Thus, in spite of outwardly different approaches, both tanks and self-propelled guns clearly become the means of increasing the mobility and effectiveness of heavy weapons; and, as a combination of the effective form of fire power and mobility, they all represent, irrespective of shape or name, the truly basic weapons of modern combat.

We in the Army are co-operating with industry in the simplification and standardization of common items. For we recognize that in spite of our tremendous resources and productive capability, we can hope to meet the ravenous demands of war only by reducing the number of types and sizes of weapons and equipment and by simplifying their design and manufacture.

General J. Lawton Collins



FOR THE MILITARY READER

A SOLDIER'S STORY. By General Omar N. Bradley. 618 Pages. Henry Holt and Company, New York. \$5.00.

By COL GEORGE C. REINHARDT, CE

"This is the story of a war fought 6 years ago, unleavened with the passing of time, unseasoned by hindsight judgments." General Bradley's description in his preface cannot be improved upon. Having "deliberately refrained from reading any of the books that have been published so far on World War II" to "avoid the trap of self-justification," General Bradley has indeed told *A Soldier's Story* as he lived it.

His avowed purpose to "explain how war is waged on the field from the field command post, midway between the conference table and the foxhole," has been achieved. The import and value of that achievement cannot escape the reader, whether soldier or civilian. Allied field commanders of the European Theater and many of their staff officers emerge from the pages as human beings, not legends. Many seemingly fortuitous events are made clear as deliberately planned pieces in the jig-saw puzzle of war.

Actions are recounted as the author saw them at the time, even though as occurs more than once, General Bradley is emphatic in his later reconsideration of his own initial estimates. The complete volume carries conviction that it is truly a contemporaneous account with, as the author says, "prejudices, the obstinacy, the pride, the vanity, and the sensitivity that afflicted us at the time."

General Bradley's modesty fails to add that the story has its full measure of many virtues, clear vision, profound courage, and a reasoned optimism in adversity. Of the storm that wrecked Omaha Beach in June he wrote: "Yet even in the gloom of this disaster, we could be thankful that the storm had not struck 1 week sooner."

Of the problem of leadership: "Far from being a handicap to command, compassion is the measure of it . . . the well springs of humility lie in the field." When the magnetic Churchill "journeyed into the field to sound out commanders" regarding matters of high strategy dear to the Prime Minister's heart, General Bradley "listened but did not reply," to become one of the select few who never lost an argument to the redoubtable British leader.

There are jolts in the General's pages for readers whose knowledge of the European Theater is limited to press coverage. The General reports: "I fought the war in total ignorance of Soviet intentions. Even when the Red Army was within 100 miles, we plotted the advances from BBC broadcasts, our only pipe line to the Soviet high command."

Efforts to review *A Soldier's Story* in brief space are futile. It must be read.

THE STATE OF ASIA: A Contemporary Survey. By Lawrence K. Rosinger and Associates. 522 Pages. Issued under the auspices of the American Institute of Pacific Relations. Alfred A. Knopf, New York. \$6.00.

MILITARY ATTACHE IN MOSCOW. By Major General Richard Hilton. 231 Pages. The Beacon Press, Boston, Mass. \$2.75.

By COL. GEOFFREY G. ELLIOTT

Former Chief, British Section, CGSC

"I wrote this book because on my return to England, after the assignment in Moscow, I was worried by the general ignorance as to the true state of affairs in Russia. During my time in Moscow, I had set myself the task of getting the facts from the ordinary *non-official* people. . . ."

The author has done an excellent job, not only in obtaining the facts, but in setting them down in a readable and interesting manner. This book should be widely read by everyone, especially those misguided people who have leanings toward communism (of course, a true Communist would brand this book as lying propaganda).

The USSR cannot be judged by the normal standards of civilized countries—above all, in its attitude toward foreigners resident within its borders. Foreigners may be divided into two categories—those who come on a short visit at the invitation of the Kremlin, and those resident within the country for a longer period by virtue of their duty. The former normally have Leftist tendencies (they would not be invited otherwise) and are so lavishly entertained and carefully shepherded that they usually go away with kindly thoughts toward their hosts.

The latter, one of which was the author—he was British Military Attaché for 2 years—receive very different treatment. They are regarded with profound suspicion, every move is watched, and any attempt to mix with the common people prevented or at least gravely hindered.

The author's experience in eluding his official watchdogs and the official measures to impede his inquiries make delightful

reading. As the result of his experiences, the author obviously has a proper regard for the sturdy, rugged, good natured Russian peasant, who suffers so much from his masters. For suffer he does. "In some districts housewives had to line all night long in the snow to get their daily pittance of bread." Begging is on a large scale. Apparently the nature of the individual Russian changes as soon as he achieves some official status. From an ordinary decent type, he is transformed into an arrogant bully, servile to his masters, obnoxious to his inferiors. Kipling once wrote "The Russian is a charming person till he tucks in his shirt."

On the subject of production, boasted about so frequently, the author points out that the word "remont," or repair, is in very frequent use. Everyone outside the Kremlin appears to be badly clothed; many are in rags. There are innumerable little repair shops in every back street.

My only criticism of this book is that it is too short.

THE SOVIET STATE AND ITS INCEPTION. By Harry Best. 448 Pages. The Philosophical Library, New York. \$6.00.

By CAPT WILLIAM H. BEAUCHAMP, CE

Aware of events in Russia, and their effect on other peoples of the world, the author has produced an orderly and scholarly volume—the subject matter of which is aptly described by the title. However, because of its tone and style, the book will be of greater interest to the researching scholar than the average military reader.

Three chapters, "Russia and Its Ingestion of Revolutionary Doctrines," "International Outlook of the Soviet State," and the author's "General Appraisal," are excellent and give the book its real value.

While the other chapters are accurate, they lack interest because the material presented is too general in nature.

GENERAL DOUGLAS MACARTHUR. By Gene Schoor. 127 Pages. Illustrated. Rudolph Field Company, New York. \$2.00.

By COL WILLIAM F. SPURGIN, *Arty*

A quick, extremely interesting look at the colorful and amazing career of one of America's most famous men, this text of about 10,000 words, liberally supplemented with well-chosen and well-captioned pictures, presents a pictorial biography of General Douglas MacArthur, whose career, for sheer achievement, makes the classic success and adventure stories of Horatio Alger seem distinctly second rate.

Using MacArthur's escape in February 1942 by PT boat, submarine, and plane from the Philippines to Australia as an eye opening starting point, the author skillfully presents the highlights of MacArthur's family background, his childhood, his unparalleled military career, and his role as administrator of the Japanese.

The latter part of the book consists of an album of pictures recording scenes from 1895, when MacArthur is shown as a member of the West Texas Military Academy baseball team, to the October 1950 Wake Island meeting with President Truman, where, incidentally, MacArthur received his *fifth* Distinguished Service Medal.

This capsule story leaves the reader with a feeling of disbelief that so much could have happened to, and been accomplished by, a mortal man. It also leaves the reader with a taste for more about this brilliant personality and military genius.

GEOGRAPHY OF RUSSIA. By N. T. Mirov. 362 Pages. John Wiley & Sons, New York. \$6.50.

By COL GORDON B. ROGERS, *Armor*

A factual, geographic description of the Soviet Union of considerable value as a reference text to the military reader.

SULEIMAN THE MAGNIFICENT: Sultan of the East. By Harold Lamb. 370 Pages. Doubleday and Co., New York. \$5.00.

By IVAN J. BIRRER, *Ph.D.*

Harold Lamb has produced another readable narrative of one of the relatively unknown Asiatics, Suleiman the Sultan, ruler of the Ottoman Empire from 1520 to 1566.

The military reader will find two parts of this book particularly interesting: the report of two remarkable retreats successfully executed (Vienna to Constantinople and Tabriz to Baghdad), and the training of the Janizaris—the Elite Corps of the Turkish Army.

THE STORY OF WENTWORTH. By Raymond W. Settle. 198 Pages. Spencer Printing Company, Kansas City, Mo. \$3.75.

By CAPT RICHARD H. HANSEN, *Arty*

The Story of Wentworth is more than a history of that institution, founded in 1880; it is also the story of its accomplishments and the people who assisted in its growth. However, because of its year-book type format and contents, it will be of interest primarily to the graduates and friends of the institution.

THE SOVIET MILITARY ORGANIZATION. A compilation of articles from the *Army Information Digest*. 64 Pages. Book Department, Armed Forces Information School, Fort Slocum, New York. \$5.00.

By CAPT JAMES S. EDGAR, *MPC*

This booklet, dealing with the organization and training of Soviet forces from the Revolution to the present time, is a readily understandable compilation of articles previously published in the *Army Information Digest*.

With its wealth of background information on the Soviet organizations, this booklet will be of interest to all military personnel, especially those dealing with the Troop Information and Education program.