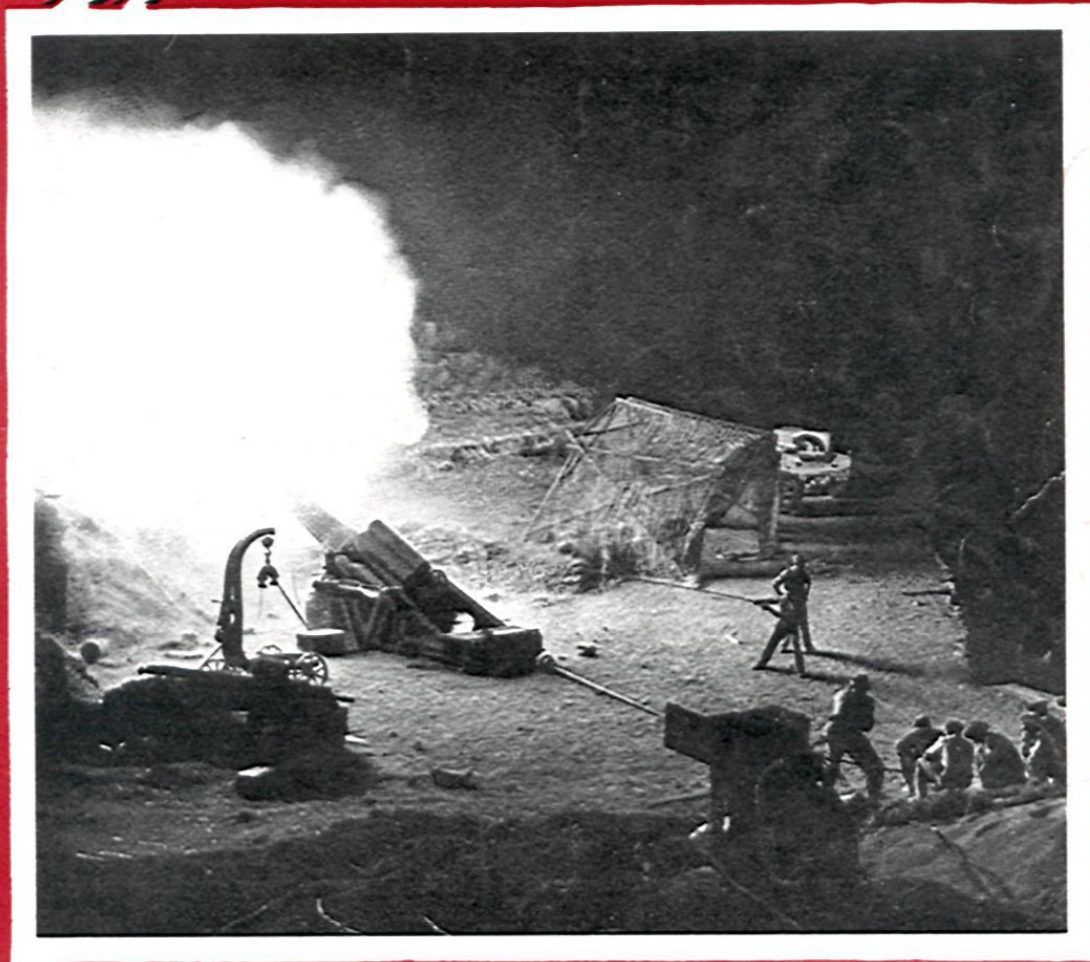


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Journal



NOVEMBER, 1943

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The Field Artillery Journal

"Today's Field Artillery Journal is tomorrow's Training Regulations."

NOVEMBER, 1943—Vol. 33, No. 11

ITALIAN 305/17 HOWITZER, MOD. 1917, appears on this month's cover. This particular piece was captured in Sicily by the British Eighth Army, and is shown firing on Catania at night. Its box type carriage is mounted on a rotating platform which gives 360° traverse. Elevation can vary from 20° to 65°; maximum range is about 18,500 yards. Four loads are formed for transportation. Ammunition (carried on trailers and loaded by means of the crane in left foreground) is fired by a percussion-electric mechanism.

JULY'S COVER showed the 1st Sec of Btry B, MCth FA Bn. Capt. R. Carl Riede, of that outfit, writes: "The picture was taken the morning of 20 Feb 43, when the battery was in position just west of Kasserine Pass. We had been supporting a battalion of infantry at El Mac El Abiod (SE of Tebessa), but the afternoon of 19 Feb I received orders to rejoin the battalion in the vicinity of the pass. We left after dark, marched some 30-odd miles, and arrived there at about 0200 hrs. We were unable to find a good position area, so finally occupied position in four Arab houses of which the illustration shows one, modifying them slightly to meet our needs. The morning of the 20th at about 1100 hrs, German infantry and armor broke through and we were forced to fall back."

OVERSEAS NEWS and articles in the JOURNAL are receiving much attention both here and abroad. Two subjects have not been fully covered, however. Communications and liaison officers are especially urged to jot down their combat experiences, for the benefit of all.

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No articles are official unless specifically so described.



M-1

By Sgt. George R. Else

**What hurt hand, set to moulding
Something keener than a plow,
Made your mouth, shaped for scolding,
Fashioned your throat for ire, holding
This the answer to their "How?"**

**What strange sum of childhood's treasure:
Transformed coasters, games and toys!
Boisterous infant, is the measure
Of your sting the keenness of the pleasure
Sacrificed by wrathful boys?**

**New-born thing! Cleanly shining
Slag-born child of remnant stuff:
Salvaged hope, no more repining!
Blast the foeman's false designing
'Til the answer: "Hold! Enough!"**

LONG TOMS IN ACTION

By Maj. Edward A. Raymond, FA

The second section of "A" Battery, 1st Battalion, fired just two trial shots of a sound adjustment on an enemy battery, and followed them by three volleys for effect. The mission was accomplished.

So began a campaign that took elements of the 1st Battalion into action with every United States division that fought in Tunisia, after two months in line with the British.¹ The record of the unit makes very satisfactory reading on the human side and, being unique, is packed with battle lessons.

At 1700 hours of the first day in action a second mission was fired, this time on Longstop Gap. This paved the way for recapture of the Gap, but just before the last volley was fired enemy shells fell very accurately on the position. The dozen rounds seemed to be coming from a single 105-mm gun. Ironically enough, the second section was the hardest hit. Chief of Section Isbell was struck at the base of the spine by a shell fragment but nevertheless hauled two men, also seriously wounded, to foxholes under fire. By the time the enemy shelling stopped the first-aid man had bandaged six of the seven casualties.

The third mission, fired on an enemy battery at 21,000 yards, was so well carried out that a British brigadier called personally at the battery to express his gratification—he did not say his surprise.

Christmas was still another rainy day. Almost everything had bogged down, and the Catholic chaplain greeted members of the battalion staff with "Muddy Christmas." The staff ate genuine turkey dinner, sitting in an open shed in a barnyard with a full set of accompanying sounds and odors, revelling in their luxury.

MISSIONS

Next to receive its baptism of fire was "C" Battery. Five enemy planes strafed and bombed the bivouac, firing two ammunition trucks, which exploded. The battery was to have its revenge. During 23 March its forward platoon destroyed five enemy aircraft—probably the first ever to have been hit by 155-mm guns—when they shelled an enemy airport near Maknassy. On 1 April a gun of "B" Battery was sent back to the old "C" position to try to repeat the performance, and next day a second gun; this time the box score was not published.

As well as taking its turn as an AA gun, the new 155-mm rifle also served successfully as an AT weapon. An OCS graduate who had joined the battalion ten days earlier, had been at the OP once before, and had fired only two previous missions, was south of El Guettar on a high hill. The 10th Panzer Division, which made its name in Poland, was known to be in the vicinity. Light artillery passed back warning of an enemy armored thrust. At about 20,000 yards Lt. Wall saw numerous large Germans approaching at a long oblique. At approximately 18,000 yards he opened fire. He had to

¹The Americans found British artillery standards high, and during two months with the British, arrived at an excellent understanding with them. Upon departure of the 155s the Commander of Royal Artillery (CRA) of the division, a brigadier, took the trouble to write the battalion commander a letter in which he said:

"My staff and I and my units of the Royal Regiment have formed, if I may say so, a great respect for you and your unit, and we feel the friendship which has sprung from fighting together is, in its small way, exactly what is needed between our two nations in the years to come.

"All good luck to you; good targets; and may we join in the same concentrations in the BIG BATTLE."



"Shot" in Sicily, this photo suggests how our troops appreciated the effectiveness of the 155-mm guns from Tunisia on.

give the enemy tanks leads in both range and deflection. The battery he was shooting gave him a little better than a round a minute for an hour. The men really put their heart into their work: despite the precautions usually taken with separate-loading ammunition, these guns were loaded and ready to go before the next range came down. Minimum range for three of the four guns firing was 9,000 yards. The tanks came on past this range, with the remaining gun still blasting away. The three pieces were switched to another target. At 7,000 yards the Jerries decided that they had had enough, and turned back. At 9,000 the FO got his full battery back. When the Panzers finally got out of range they could count five tanks missing, PzKw IVs and VIs.

British use of the battalion broke all American tradition: 155-mm rifles were repeatedly used on a reconnaissance in force. In December and January three or four guns were sent on more than one occasion to Hill 609 with a mere company of paratroopers and four Bofors guns for local protection. Ten to fifteen miles ahead an armored car unit would develop enemy fire and the guns would execute missions on enemy artillery positions and also on enemy infantry, machine guns, and vehicle assemblies. On 18 January "C" Battery expended 368 rounds in this manner between 0900 and 1630 hours.

As a matter of fact, the ammunition used on these sorties was much better expended than 100 rounds fired later at Sidi Nsir bridge. Aviation units reported that the Germans were constructing a concrete bridge. Extensive map fires were laid down but the German attack on Beja came over the bridge soon after, and a subsequent visit to the site revealed that the concrete work which showed up from the air was a highway project started by the French before the war. This had been ignored by the Germans, who put a temporary bridge in nearby, so placing it that a flat-trajectory weapon like the 155-mm gun could not reach it.

On the other hand, a direct hit was scored on a railroad bridge in the same sector with a moderate expenditure of ammunition (perhaps 30 rounds).

British metro messages prepared in conjunction with the RAF, came in regularly. Although they used centigrade, not Fahrenheit, and foot-seconds instead of our system of lines, and stopped at Line 5, "Mets" (Meteor Telegrams) were finally mastered and worked well.

COUNTERBATTERY

The engagement which stands out in the minds of "A" Battery's personnel as the height of the campaign was a counterbattery

duel in the Medjez area. After having been shelled out of the station yard, and after occupying an Arab cemetery, the battery withdrew across the Medjerda River and fired for 18 days from the same position without detection by the enemy. During this period the enemy bombed and shelled both old positions and also a dummy position 800 yards away.

On the 19th day the true position was discovered. Enemy guns of 105-mm caliber or greater adjusted in front of "A" Battery on a ridge (occupied by the AT platoon), and then raised their range to put 20 rounds squarely on the position itself. The FO could see the flash of the enemy pieces and, reversing normal procedure, called "On the Way" to his guns whenever the Jerries fired. As this had to come down to the Exec. through FDC during the time of flight, only about three seconds' warning was afforded the battery, but this was enough. Every enemy shell found the cannoneers in slit trenches, and no casualties occurred. Between German volleys the Americans fired. Each side had three innings, and then the Jerries quit—with two of their pieces and a prime mover *hors de combat* and with an unknown number of casualties. Not even ten days of shelling and bombing in a palm grove south of El Guettar, later in the campaign, provided as great a thrill, though here the battery got its warning of approaching shells by hearing the "wham, wham, wham!" of the enemy guns, and hit slit trenches before the shells arrived. This time a munitions truck was blown up in the battery position, causing 155-mm shell, small arms ammunition, and grenades to explode all over the place. The slit trench provides remarkable protection.

A piece from another battalion of the same regiment was brought up to counterbattery a German gun which had been annoying some American divisional artillery. The BG commanding the artillery of the division went up to the OP and conducted that shooting personally; he did an excellent job.

MOBILITY

One lesson learned by the battalion in the campaign was that tractors were too slow. British staffs were more painstaking than the Americans in setting requirements for the six-mile-per-hour artillery columns, but the Heavies were often asked to make impossible moves. Two batteries were rushed to the Kasserine Pass to support an armored counterattack. When the battalion supported armored divisions—it did so repeatedly—10-ton wrecking trucks were borrowed as prime movers. Shuttling was generally necessary and the units to whom the borrowed prime movers belonged objected, and the tractors were sometimes left far behind. In general, life for the battalion staff was made a burden by lack of organic high-speed prime movers.

Another lesson in regard to traction was that wheeled vehicles as prime movers are not enough. It was near Gafsa, and the only possible position for one of the batteries was in a wadi (a dry stream bed) which shelved half-way down and then had a central channel. All night it rained. Two of the guns were on the shelf of the wadi and some transportation was concealed in the channel. At 0630 hours next morning, without warning, a 4-foot wall of water hit the battery, inundating it and burying one weapons-carrier (mounting a 37-mm gun) to the windshield. The battery was immobilized all day until the ground dried out enough for trucks to get some traction. Had the battery had a caterpillar tractor, towed to the position on a tank-carrier behind a fifth truck, the guns might not have been immobilized.

In an orchard near Medjez a tractor and gun were stuck in the mud so badly that mud rolled up over the wheels of the piece and

the wheels no longer turned. Another tractor was hooked up in tandem, and snaked the gun out like a log. While it is not recommended that two tractors be carried around by each battery, the need for one seems well established.

Peeps proved much better than C&R cars, doing all that the larger vehicle could do and not being so conspicuous. On several occasions higher authority set a line beyond which nothing bulkier than the peep, except ambulances, was allowed to move; an acute peep shortage set in. The battalion wants all the C&Rs replaced by peeps, with half-tracks added for liaison officers and FOs.

The biggest headache of the campaign was wire. In one position 15 miles were out at one time, tying in the artillery of two divisions and the battalion's own OPs. With all the armor that moves about on a modern battlefield, the lines were cut up almost all the time. At the Kasserine Pass the armored division supported by the battalion provided the RO with a half-track and radio equipment, which proved exceedingly useful and demonstrated the desirability of that vehicle and that type of communications in forward areas.

Of all things imaginable to happen to an airplane, the oddest yet occurred to one of the flying OPs of the battalion. It was blown up on a mine, just after landing in front of one of the batteries after a shoot. These planes were used a lot and with good success.

Since the regiment was never together in the same sector, it is felt that the battalion is the largest sensible unit. For reasons of command and liaison it is recommended that the regiment be broken down still further, and that the artillery of each division be reinforced by an organic unit of six 155-mm guns, to correspond to the 150-mm guns the Germans assign to their divisions. If attached to the division artillery section for administration and supply, the six guns could be controlled like a British battery and commanded by a major. Each platoon of two guns should have a lieutenant in charge.

Especially in a defensive situation, the advantages of 6-gun batteries, to fire by platoon over a wide front, were appreciated by the battalion at Kasserine Pass and El Guettar. In each of these sectors a battery was reinforced by one platoon in order to provide the field of fire necessary to accomplish the assigned mission.

The battalion learned that it does not pay to occupy the old position of another unit, even though it seems to be the best position around.

It knows that there is little to be done about flash, which is visible for over 20 miles on a dark night, but it is not convinced that smoke rings, which sometimes go hundreds of feet in the air, are a necessary evil.

Though the Sound and Flash boys were accused of trying to choke enemy patrols by jamming microphones down their throats, they found broken terrain a serious handicap.

Finally, the battalion learned to know its own strength. It learned what it could do as a team of men, and it saw the good work done by its guns. It saw the morale effect of its heavy projectiles. At Medjez a single round was put down 800 yards from an enemy battery, and the battery lost no time in pulling out. On another occasion one round dropped inside a tank concentration caused it to disperse immediately. The men who served the Long Toms thought them the best guns in Africa, and they did a lot to prove it.

A USE OF THE BAZOOKA

By Major R. W. Schmelz, FA

A suggested distribution of bazookas in the firing battery is as follows: One for each howitzer or gun section, one to the fifth section, one to the wire section, and two to the maintenance section (one in the motor truck, the other in the mess truck). In HQ Btry one could well be with each of the following: FD truck, survey section, CP truck, each wire truck and radio truck, the ground crew truck, battalion supply truck, each section of the ammunition train, battery mess truck, battery supply truck, battalion motor supply truck, and battalion motor maintenance truck. It is not intended that this distribution will meet every situation, but the tactical employment of the bazooka herein discussed is based on this distribution.

Artillery needs to protect itself from a tank attack during three general periods: in rendezvous (or bivouac), on the march, and in position. Each of these periods will be taken up separately.

WHEN QUIESCENT (IN BIVOUAC OR RENDEZVOUS)

We are all very familiar with the necessary precautions to take in rendezvous or bivouac — warning sentinels, patrols, proper sighting of organic weapons, etc. How are we going to use the bazooka? If all the battalion is in one location, defenses will be coordinated and each battery will have a certain sector to defend. Figure 1 illustrates the coordinated defense of the area in very open country or desert terrain.

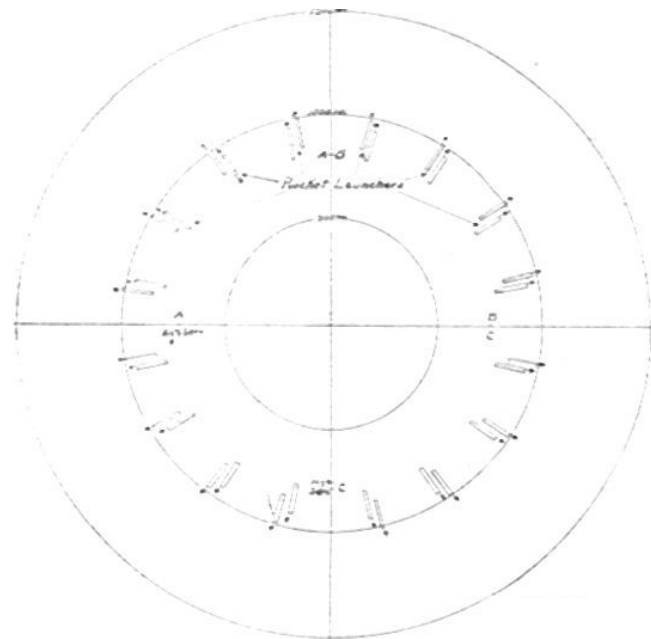


Figure 1

This figure shows only the rocket launchers in a perimeter defense. It is, of course, a schematic diagram taking no account of the terrain. The area is divided into approximately four equal sectors, one for each battery. Placing the launchers approximately 1,000 yards from the center of the bivouac area results in about a 400-yard interval between pairs of launchers,

mutually supporting and echeloned in depth approximately 100 to 150 yards. The rear launcher should also be 30 to 50 yards to one flank of the leading launcher. At a distance of 1,000 yards a good perimeter defense is possible with 4/5 of the bazookas given to the artillery. The remaining 8 from HQ Btry will be kept for close-in defense; three of these (with the ammunition train) may not be available at the rendezvous or bivouac area.

Schematic diagrams such as this do not answer the questions as to how you are to use the launcher in a particular situation. Since every situation and the terrain vary widely, it is impossible to show the many possible variations. However, one example of a particular bivouac area, together with a solution as to the use of the Bazookas, is shown in Figure 2.

This area has been divided into four sectors, not of uniform size. C Btry has much the widest sector of open rolling country, whereas HQ Btry has a relatively narrow sector of rough, hilly, almost mountainous terrain. Thinking in terms of tank protection only, it appears that this is an error and that a wide hilly rugged sector should be assigned to one battery and a relatively narrow sector of rolling open ground assigned to another battery. From the standpoint of tanks alone this would be true. But if we consider the other factors of local security, particularly guerrillas and other infiltration troops, it becomes obvious why only a narrow sector of the rough, hilly type of terrain has been assigned to an active battery. Remember, the tank is *only one* of the threats to the artillery, and the bazooka *only one* of the weapons of the battery. All weapons must be used and all threats guarded against.

In solving this problem, 14 launchers have been assigned areas in the sector of C Btry. Yes, organically there are not that many in that battery, but HQ Btry is using only 2 in its sector, A Btry 8, and B Btry 6. HQ Btry sends 8 (with personnel) to C Btry and 2 to A. This makes a total of 16 for C Btry and each battery then has a reserve of 2 launchers (except HQ Btry, which has 4) for close-in defense. Three of those with HQ Btry will be with the ammunition train, which may or may not be at the bivouac area.

Note that these launchers are approximately 1,000 yards from the center of the bivouac area, except that those to the northwest are approximately 1,500 yards away. In the most likely tank approaches the pairs of launchers are not more than 400 yards apart, and in most instances the pairs are echeloned in depth. Toward the mountains in HQ Btry's sector only two launchers are shown. This area is so rugged that it is extremely doubtful if any tanks could possibly negotiate this terrain. It would be extremely foolish, however, to put no launchers in this area.*

The bazooka is a static defense weapon. However, this doesn't mean that the rocketeer takes his launcher, goes out and digs a slit trench or foxhole, makes a nice bed, and stays there. The term static defense means that they don't go out for 5-10-15 miles looking for tanks. These rocketeers should have a slit trench, but must not always be tied to it. In a given

*Remember, many unexpected things have happened in this war, much impassable ground quickly traversed. Just recall German tanks in the Ardennes, and Montgomery's outflanking of the Mareth Line.—Ed.

area they often can be far more mobile than a tank, and on occasion should make use of this mobility. If a tank attack succeeds in penetrating their defenses, they may be able to follow up the tanks and attack their very vulnerable rear. They must be aggressive, they must be indoctrinated with the killer instinct, and must be "sold" that tanks are vulnerable and can be knocked out. These three principles are absolutely essential if your battalion is to be properly prepared for a tank attack. Always remember that your plans cannot be made when the tanks are attacking: their foundation must be laid in the early training of your men, and the plans and SOP before embarkation.

An organized position as shown on Figure 2 doesn't just suddenly appear out of the ground. It requires considerable forethought, and a quick and excellent appreciation of terrain. You cannot expect and will not have the highly coordinated defense of the bivouac against tanks shown in this figure as the battalion moves into the area. However, your men must be trained—and this includes BC, RO, Executive, and Assistant Executive—so that the instant they come into a bivouac area the rocketeer starts out into the most likely tank approaches. The ideal situation is to have a quartering party precede the

battalion into the bivouac. In this case they should have with them a portion of the launchers and necessary personnel from each battery. The officer in charge should make a ground reconnaissance and place these men where they will be able to give the maximum amount of tank protection to the unit moving into the bivouac area. He should then be able to suggest to the Executive a plan of coordinated defense for the battalion and facilitate the completion of this defense. An SOP is essential to the smooth working of the defenses. It is realized that no SOP will meet all situations and all terrain, but if the SOP is established and practiced at least some defense will be initiated; it can then be changed to fit the existing terrain and situation.

It must be realized that this sketch makes no attempt to show the complete organization of the battalion for defense. Patrols and local security detachments have not been indicated, nor have the machine guns been considered. The only installations shown are the bazookas, the warning sentinels, and the siting of the organic weapons.

WHEN MOBILE (ON THE MARCH)

Alertness and speed must be the key words for protection of

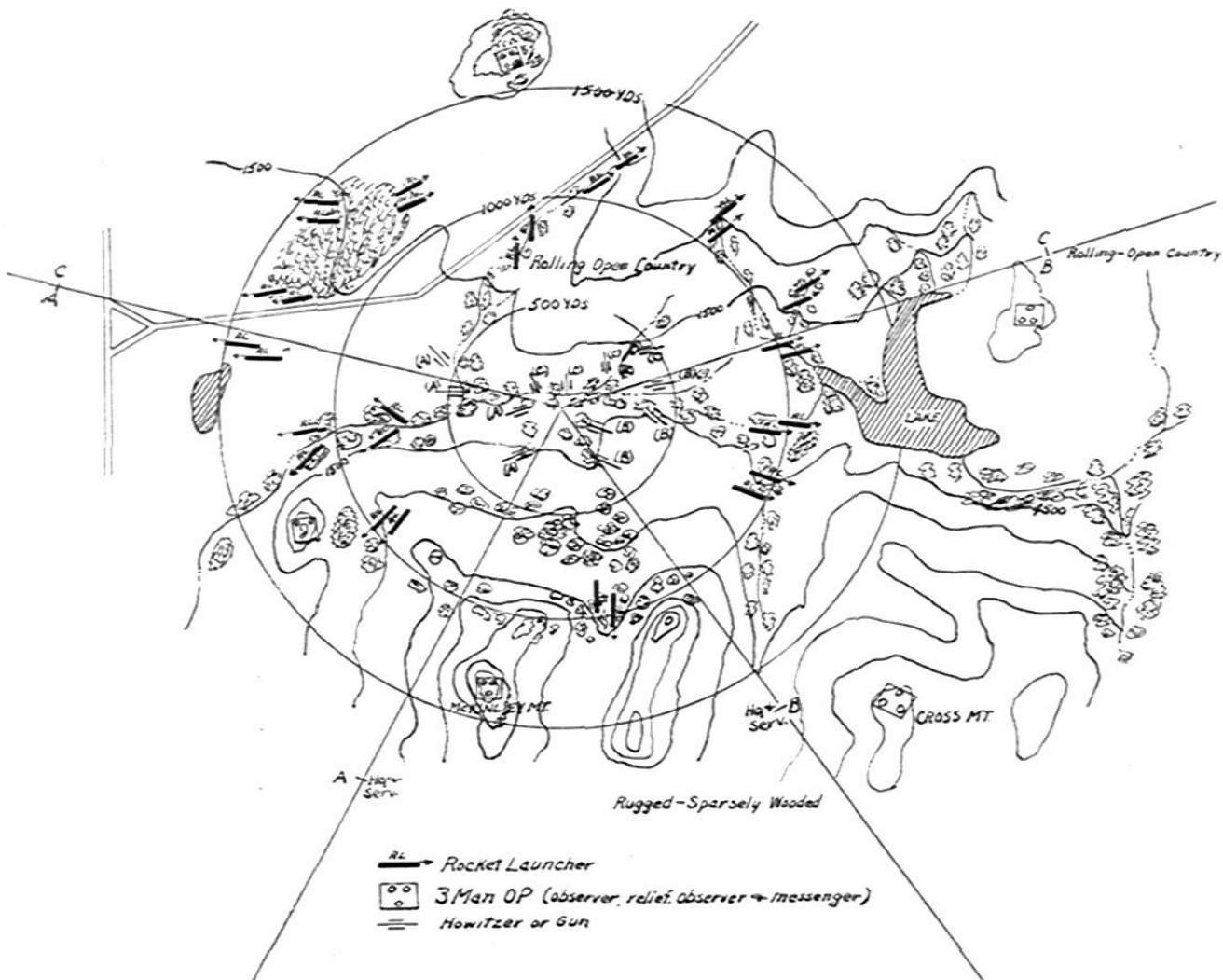


Figure 2

artillery on the march. These can only be achieved by prior planning and training. Both of these are essential and must be stressed continually throughout the training.

The bazooka can be fired from a standing vehicle, though this is not advised. The first objection is the danger to personnel and equipment from the weapon's back blast. The second (and really primary) one is that the rocketeers are apt to become vehicle-bound. This must not occur. The weapon is an ambush weapon, the same as practically all antitank weapons. This doesn't mean, however, that they should sit and wait for the tanks to come to them. The best defense is still a good offense. Rocketeers must jump out of the trucks and obtain the best position from which to knock out the tanks. They must carry the fight to the tanks within their assigned area.

Prior planning is essential. Based on the loading mentioned above, Figure 3 illustrates one SOP that can be used for a battery on the march.

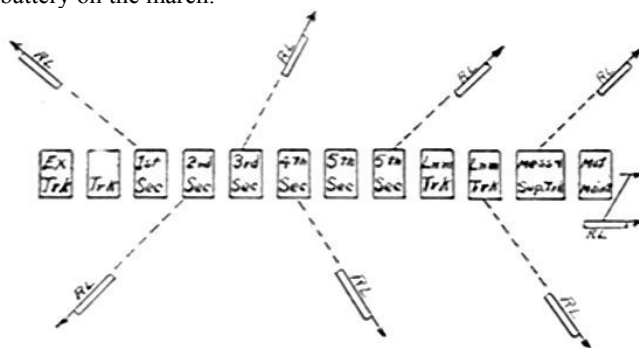


Figure 3

As soon as the tank warning is given, the rocketeers jump off the trucks and run as indicated in this sketch. They will run as far as they have time for, keeping on the alert for tanks. This of course doesn't give you a perimeter defense, but it is as close as you will be able to achieve. Rocketeers shouldn't normally go more than 200-300 yards from the column, and usually they will not have time to go this far if the tanks are attacking. Each man must be trained as to what he should do, and to go where he should go. It is absolutely necessary that a definite direction be given to each man. It doesn't matter whether the men from the first section run to the right front or the left front, and the same for the other men, but SOP must give at least a partial perimeter defense. The men must not be permitted in training to sit in the trucks when a tank alert comes: if they do it in training they will do it in battle, and your outfit will be wiped out. You must train them to be aggressive, to go out after the tanks. They must take the offensive when the tanks attack and they will then be able to knock out sufficient tanks to make the attack too expensive.

GRAND FINALE (IN POSITION)

When a battery is coming into position it is particularly vulnerable to tank attack, and all possible precautions must be taken to protect it. A number of procedures can be developed to give adequate protection. One such procedure is illustrated in Figure 4.

As soon as the vehicles slow down, each rocketeer (but only the men who actually shoot the rocket) should *run* in the directions indicated. It doesn't matter in which direction a given man runs, as long as there is an SOP and each man has a definite direction to go. He should carry 3 rockets in carrier bag M-1 and one in the launcher, for a total of four rockets. He

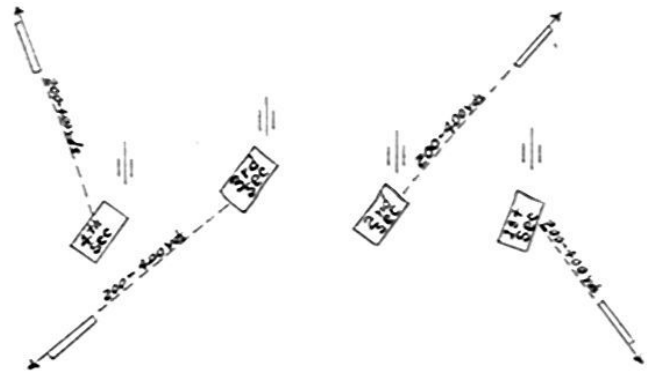


Figure 4

has two missions at this time: his primary job is to furnish as much protection as possible while the battery is going into position, his secondary mission is reconnaissance. He should reconnoiter an area 200 to 400 yards from the battery and about 100-200 yards on either side of the direction in which he moves. This reconnaissance of the terrain is very vital.

Since the T/O does not provide additional men in the battery as rocketeers, the only men available to operate the rocket launcher are the cannoneers in the howitzer section. They therefore have dual duties, and must return and perform their primary duties as soon as the battery is in position. After reconnoitering his area, each rocketeer is better prepared to knock out tanks when a tank alarm is sounded. When the alarm comes he will take his loaded launcher, plus three rockets, and his assistant (carrying 8 rockets in carrier bag M-2), and *run* out to the position previously selected; this will furnish a perimeter defense of the position area. The reason that the reconnaissance is limited to 200-400 yards is due to the brief time that will normally be available to the rocketeers to reach a position before the tanks arrive. During lulls and whenever they can be spared, they should be sent out in their assigned area for further reconnaissance and construction of foxholes or slit trenches. This reconnaissance should extend approximately 800-1,000 yards from the battery. Whenever practicable, leave the rocketeers out in their areas, rather, than at the battery position—but never permit them to become tied to their foxholes. They must take every advantage of the terrain and must move so that they can attack the tank. If these men are not trained to be aggressive and to understand that their job is to destroy tanks, you might as well let them hide in slit trenches or foxholes at the battery position. The tank can and must be destroyed.

Your men also carry with them (or have cached) some sticky grenades, Molotov cocktails, and hand grenades. Never depend upon one weapon to destroy the enemy. Stalker squads should also be formed to annihilate the crews of disabled tanks. Unless salvage operations can be performed very quickly, the tank must be destroyed so that the enemy can not recover it. Only by complete and utter destruction of the enemy's materiel and personnel can victory be achieved. Preach it in your training and practice it on the battlefield.

Figure 4 shows only four of the launchers of the battery in use. Those with the mess truck and motor truck should in most instances be sent to the truck park for its tank protection. The 1st Sgt. should utilize them to furnish as much protection as possible. If a battalion motor park is established, the launchers of all batteries in the truck park should be utilized

to obtain a coordinated defense similar to that of a rendezvous or bivouac area.

The launcher with the 5th section will normally stay with this section to furnish protection during hauling of ammunition. When the 5th section is in the motor park, its launcher should be used to give additional protection to either the truck park or the howitzer position. Normally the launcher should not be taken from the 5th section and kept at the battery position—it should always be available to this section for its protection on the road.

The wire section's launcher should be with this section. As soon as communications are completed the Battery Executive may utilize this launcher to strengthen the defenses of the battery position. The sector assigned to these rocketeers will depend upon the situation and the terrain. The SOP shown in Figure 4 could be used in all situations and practically all terrain (unless a natural obstacle to the rear of the battery prevents rocketeers from moving in that direction). This will result in immediate and aggressive tank protection. As time permits and the Executive can better organize the position, he should reassign sectors to improve his protection.

It is suggested that the following men in the howitzer batteries be assigned as rocketeers: in the howitzer sections, cannoners 5 and 7; in the wire section, WT oprs 5 and 7; in the 5th section, the basic and AM server; in the mess truck the basic and cook's helper; and in the motor truck the basic and the auto mechanic. It must be remembered, though, that all of the battery personnel must be trained in the use of this weapon.

Men suggested for assignment to operate the launchers in HQ Btry are:

FD Truck—Computer Sgt and Operation Sgt
 CP Truck—WT Opt 2 and Hq Clk
 Wire Truck 1—WT Opr 11 and 13
 Wire Truck 2—WT Opr 12 and 14

Radio Truck 1—Basic and Rad Opr 4
 Radio Truck 2—Basics (2)
 Ground Crew Truck—Aircraft Mech and Ground Crew Helper
 Survey Truck 2—Basics (2)
 Bn Supply Truck—Basics (2)
 Btry Supply Truck—Basics (2)
 Btry Mess Truck—Cook's Helpers (2)
 Bn Motor Supply Truck—Auto Mech and Welder
 Ammunition Train—Ammunition server and basic of each section

HQ Btry's suggested distribution of rocket launchers places 8 launchers in the forward echelon, 5 in the rear echelon, and 3 in the ammunition train. There are so many different situations with respect to the CP that it is difficult to suggest an SOP for its initial protection. The Ass't S-3 seems to be the logical staff officer to coordinate the tank protection, and he should assign sectors to the rocketeers as soon as possible. The Sgt. Major should make the preliminary reconnaissance, determine the most likely routes of tank approach, and inform the Ass't S-3 of his findings as soon as he arrives in the CP area. The Battalion Personnel Adjutant is a logical man to be assigned the task of coordinating the tank defenses of the rear echelon; his plan should follow the procedure outlined for the protection of the rendezvous or bivouac area.

Whether we use the bazooka to obtain the maximum effectiveness of the weapon depends entirely upon the aggressiveness of artillery officers and soldiers. It has been demonstrated that it is a very effective weapon against tanks. The Russians are using them, but at present no reports have been received as to the results; they want more, however—which is probably a complete answer in itself. No matter what the weapon, it must be used and plans for its employment must be made long before the tank comes. Alertness and speed are necessary to combat tanks, and they can only be achieved by prior planning and training.

FILM STRIPS

Of particular interest to artillerymen are the following recently released film strips:

- 2-22—Use of Lensatic Compass
- 2-23—Simple Land Navigation for Combat Vehicles
- 2-27—How to Tie the Sweeten Diamond and Phillips Cargo Hitches
- 6-26—Preparation of Field Artillery Materiel for Rail Transportation—Part I—Plans, Cars, Loads, Ramps, and Materials
- 6-27—Same—Part II—Loading and Securing Vehicles
- 6-28—Same—Part III—Loading and Securing Weapons
- 6-29—Radio Set SCR 284-A—Part I—Description and Installation
- 6-30—Same—Part II—Operation
- 6-31—105-mm Howitzer M2—Part I—Description and Characteristics
- 6-32—Same—Part II—Mechanical Functioning
- 6-33—The Transit—Part I—Description, Set-up and Leveling
- 6-34—Same—Part II—Verniers
- 6-35—105-mm Howitzer M2—Part IV—Care, Cleaning, and Lubrication
- 7-104—Identification of Foreign Mechanized Vehicles—Part V—Identification of British Tanks and Armored Cars
- 7-111—U. S. Carbine, Caliber .30 M1—Part III—Marksmanship, Known-Distance Targets
- 17-25—Identification of U. S. Armored Vehicles—Part I—Full-Track Laying.
- 17-27—First Aid, Removal of Casualties from Tanks
- 18-3—3" Gun-Motor Carriage, M1—Part I—Controls and Operating Instructions
- 18-5—Same—Part II—First Echelon Maintenance

ARTILLERY IN FOREST AND MARSHLAND

By Col. I. Alexeyev

EDITOR'S NOTE: *As frequently shown by photos in the JOURNAL, the Russians take great pains to conceal AND PROTECT their artillery. Overhead cover is apparently provided for guns of all calibers. This must not, however, be permitted to restrict either fields of fire or mobility, even though much heavy labor may prove to have been done uselessly.*

For scores of kilometers northwest of the Vyazma-Rzhev line, in fact all the way up to Leningrad and beyond to Karelia, the Soviet-German front stretches through marshy forest ground. This bogland—covered in some places with bushes and sparse trees, in others with a dense forest—at times becomes a scene of intense fighting. Rough cart tracks connecting the rare villages in this area are few and far between, and in autumn and spring become altogether impassable even for light carts.

Having defeated Germans in the Boibokalo area, Soviet troops by the end of winter (1942) reached the heart of this marshy forestland. But before positions could be established, roads had to be built. Soviet artillery units laid these roads, moved their heavy guns along them, placed them in position, and thus provided reliable gun protection for the front.

Colonel Ivanov's artillery regiment occupies the very center of this marshy region. A network of corduroy roads connects battery positions with main roads. Battery crews put a colossal amount of work into cutting avenues for roads, surfacing them, and building culverts. Now even heavy rains do not delay the stream of heavy trucks loaded with ammunition, fuel, provisions, and equipment required to supply the regiment.

Some roads are camouflaged by interlaced tree tops, and side roads are closed by barriers. These latter are intended for maneuvering in battle, and connect up the system of reserve and temporary positions. To maintain them in state of repair, they are not used for ordinary traffic.

Installation of heavy howitzers on the marshy soil required considerable preliminary work. Gun sites had to be reinforced by sunken log foundations above which plank flooring was laid. Sodden soil made it impossible to dig the guns in, so wooden and earth structures were designed. Guns are now surrounded by log walls and covered by roofs of the same material. Layers of earth and rubble increase the protective thickness of the roofs. In such structures guns are comparatively safe from the enemy's artillery and mortar fire; only a direct hit can damage them.

Thick vegetation effectively masks the regiment's positions. Moss attached to gun barrels renders them indistinguishable at a quite short distance, as they merge with the moss-covered tree trunks.

As the area is hidden by the forest, the ordinary system of observation proved to be unsuitable here. It was likewise found inexpedient to install observation posts in the trees, as their swaying affected the accuracy of the instruments, while the small size of the branches made it impossible to erect solid platforms in the trees. Instead, observation towers were erected. Made of thick logs and reaching tree summits, they were fitted with wooden platforms surrounded by wickerwork



walls and covered with sandbags. These towers enable the regiment to keep all the desired areas under observation.

Toward the end of August Germans attempted to pierce the Red Army's defenses in one marshy sector with a view of cutting the main roads and driving the Soviet troops into the bog. The Germans massed their forces secretly, but for several days in succession observation towers reported signs of activity in enemy positions. Precautionary measures were at once taken. When a German rifle battalion launched an attack on the regiment's forward positions it was mown down by artillery, mortar, and machine gun fire. Trench mortar batteries forming a mobile reserve at the disposal of the commander of the area were ordered into the region of the attack. Immediately all traffic on the roads stopped. Transport columns and other vehicles went into the by-passes and parking places and, encountering no obstacles, the batteries speedily occupied the previously prepared positions. The enemy infantry suffered heavy casualties and ran into the bog. Tree barriers were laid across the roads and road surfaces were dug up in some places, preventing German tanks and transports from leaving their initial positions. The attack was beaten off.

Besides large operations, small engagements take place in the forest forward fortifications. One night in September the Germans brought up a small gun, and with several shots damaged a fortified machine gun nest of one of our rifle regiments. Next day, the work concealed from the enemy by vertical screens of branches, a space was cleared among the felled trees some 250 meters from the German bunker. This was surrounded by a protective log wall, while the direction of fire was marked on posts. At night an antitank gun was dragged to this prepared position. As soon as the outlines of German positions loomed through the morning mist, the gun rapidly sent six shells into the embrasure of the German bunker; the gun crew immediately took cover in nearby dugouts. The infuriated Germans combed the area with trench mortars and machine guns, but next night the gun was recovered and removed to its former position. Other units quickly profited by this experience, so now garrisons of German fortified points are frequently awakened by shell bursts.

Antitank Action of Soviet Artillery

By Col. P. Afanayev

By radio direct to the *Journal*

In preparation for their July offensive the Germans concentrated large tank and infantry forces in the Orel and Belgorod areas. Major troop movements were reported by Soviet aerial reconnaissance in April and May. The enemy took great pains to veil this redistribution of his troops: some panzer divisions were transferred to the south, then brought back by roundabout routes in order to make it seem that replacement of units, rather than concentration, was taking place.

The Germans placed their main hopes on the mass use of tanks, particularly heavy Tigers and self-propelled guns of the Ferdinand type. These considerations prompted them to keep their artillery concentration to a minimum (3 or 4 pieces per kilometer).

Soviet artillery was prepared to bear the full brunt of enemy tank attacks. Gunners were trained to fire at pointblank range at the tanks' vulnerable parts. Careful study was made of the tactics employed by the new types of German armored vehicles and self-propelled guns. Our antitank defense system, closely coordinated with a powerful AA defense, was designed to ward off all possible enemy panzer thrusts.

On the morning of July 5th the Germans assumed the offensive after a thorough aerial preparation. The Luftwaffe concentrated its blows on our antitank zones, and the initial ground attacks were undertaken mainly by tanks. On the first day 200 to 300 tanks attacked simultaneously along a narrow front in the Belgorod area. Enemy tanks moved in echelons very closely supported by infantry forces. Large groups of level- and dive-bombers didn't confine themselves to our forward trenches and artillery positions, but attacked our defense zone throughout its entire depth.

The enemy depended on heavy PzKw VI tanks and "Ferdinands" to secure the flanks of his attacking troops. He thought these machines were powerful enough to ensure the successful operation, without undue losses, of the medium tanks which were in close support of his infantry.

Our High Command intended to counterbalance these tactics by the mass employment of artillery and the formation of mobile antitank reserves. Antitank defense means were disposed in echelons, guns being emplaced in groups of two or three and supported by pieces located along the next defense line. Thus the attacking enemy tanks immediately encountered mass artillery fire. Every one or two salvos crippled several German machines. On those occasions when tanks did succeed in breaking through or outflanking the first line of antitank guns, they were engaged by mobile artillery reserves. Our antitank zones received effective protection from our AA guns. This system of antitank artillery defense was one of the most effective factors in the failure of the enemy offensive.

One large German tank force pressed forward toward an important highway which emerged in rear of our positions. Artillerymen protecting this sector saw armored vehicles bearing down on them, but held their fire until the enemy was but two or three hundred meters away. Then they hit back with everything they had. A group of guns commanded by Lt. Kapralov hit 11 tanks within a few minutes after firing began, and 4 more tanks were hit with the fifth salvo. The enemy retired to his initial positions, regrouped, and launched another attack; this time he was thrown back with the help of our antitank reserve.

Thus it became clear on the very first day that the enemy onslaught could be held and heavy casualties inflicted. On succeeding days the tempo of the German attacks decreased steadily. Finally the enemy's losses in infantry and tanks became so great that he was obliged to refrain from further assaults and return to the defensive.

From antitank battles in the summer of 1943 it clearly appears that the main reasons for Soviet success were: (1) mass fire of artillery pieces echeloned in depth, (2) employment of mobile antitank reserves, and (3) secure protection from the air. It must not be forgotten, however, that without the skill and courage of the gun crews victory would have been impossible.

Artillery vs. Tiger and Ferdinand

By Lt. Col. L. Vysokoostrovsky

By radio direct to the *Journal*

Besides new PzKw VI ("Tiger") tanks, the Germans this year are using an armored self-propelled gun called "Ferdinand." Tiger, a 60-ton machine with thick front armor and heavy armament, was to be used as a battering-ram to clear the way for other vehicles, while itself remaining invulnerable to artillery fire. The same task was also assigned to Ferdinand, which weighs 70 tons, has even stronger armament, and which outwardly is scarcely distinguishable from a tank. In fact, in early phases of the fighting many Soviet commanders mistook Ferdinand for Tiger. Ferdinand, however, is a relatively low-

speed vehicle, armed in an unwieldy fashion with a single gun mounted on a non-revolving turret. Although resembling a tank and acting in conjunction with them, it actually is a new type of self-propelled artillery. That is indicated by the tactics under which these machines are used, and is corroborated by the men that manned the captured Ferdinands.

Experience in the Orel-Kursk sector shows that both are about equally vulnerable, except that the Tiger is more easily pierced than is the self-propelled gun-tank. Ferdinand readily catches fire when hit on the side near the fuel tanks; its armor is not always pierced—that depends on range, caliber, and angle of impact—but the fuel is often ignited. But regardless



Two views of "Ferdinand"

of the difference in strength of tank and gun-tank, the methods of combating them are the same.

In one engagement the Germans threw against our positions 300 tanks, including 50 Tigers and Ferdinands. Twelve Russian SP guns, under the command of Guards Major Sankovsky, took up concealed defensive positions in depth. While the battle was being fought at the forward position these guns remained quiet, but when some 20 German heavy tanks, 4 Ferdinands, and several medium tanks moved forward, these self-propelled guns entered into action. They emerged from earthworks in order to fire over open sights and, remaining concealed (defiladed), took positions facing the threat. Firing on German tanks was opened at a maximum range of 500 meters, and at the hottest moment of the battle tanks and guns were only 250 to 300 meters apart. Our artillerymen concentrated their fire on Tigers and Ferdinands, and each scored a hit with his first round. At 500 meters Tigers suffered large holes in their turrets and sides. At 300 meters their frontal armor began to crack, and if at this distance a turret was struck by a heavy shell it was shot clean off.

Ferdinands proved somewhat more difficult to stop as their armor, especially in the front, is very strong. But treads, wheels, and bogies were successfully destroyed, and side armor and turrets proved quite vulnerable.

In that engagement German armor suffered heavily. Major Sankovsky's SP gun crews destroyed 8 Tigers and 4 Ferdinands without themselves sustaining any loss. After compelling the enemy to pass to the defensive, our artillery regrouped and assaulted the Germans from new and unexpected angles. In their first engagement they destroyed 30 heavy vehicles, altogether.

Experiences like this show that self-propelled artillery of large caliber is the most effective weapon against heavy machines which are protected with thick armor. But such guns must be properly employed. Where SP guns open fire at long ranges, their effect is small. In such cases, furthermore, guns reveal their location too early and bring upon themselves fire from airplanes, artillery, and heavy trench mortars, which renders their task most difficult if not impossible.

Lt. Col. Babaski's ordinary guns of medium caliber fought against heavy armored vehicles, using both standard and special shells. Each battery took position in triangular formation at considerable distances from one another. Firing in "trios" proved especially effective against Ferdinand, whose turrets, you remember, do not revolve. Its fire is accurate, but when caught within a triangle it became like an animal at bay. It turned from one side to the other while shells were hitting its side and rear armor. The gun crew toward which it was turned did cease firing for the time being, to prevent its flash from disclosing its position, but as soon as the gun-tank changed direction our guns resumed firing.

Other methods also gave good results against heavy German tanks. Point-blank surprise fire (from any gun or light tank) can damage even a heavy vehicle if it strikes a vulnerable spot. There are cases on record where Russian light tanks armed with only 45-mm guns disabled Tigers by firing pointblank from ambush. Tankers aimed at sidewalls and slits. Even infantrymen set several of these machines afire by using ordinary incendiary bottles (Molotov cocktails). Antitank mines, antitank grenades, or a large bundle of standard hand grenades smashed tank treads and damaged wheels.

ARTILLERY COUNTERPREPARATION

By Col. Levidov

By radio direct from Moscow to the Journal

In preparing to repulse the German offensive at Orel and Kursk, we were firmly convinced that in an artillery counterpreparation it is necessary first of all to shell the enemy's artillery and mortars. Of course it was also necessary to cover the enemy troop concentrations, headquarters, and communications centers—but this was planned as a subsidiary action. We felt that once our artillery effectively silenced the enemy's artillery and mortars, his infantry and tanks would be deprived of supporting fires and his attack weakened to the utmost.

With this end in view, an artillery counterpreparation plan was prepared long before the battle began. This was transmitted down as far as battery commanders, who elaborated its details. Each BC knew the positions his battery was to shell. Each knew that upon signal his battery was to fire a specified number of rounds, against certain specified targets, within a

definite time.

The general plan for the counterpreparation was not, however, regarded as rigid dogma in all its details. It was analyzed and changed on the basis of new discoveries made by daily reconnaissance. For one thing, we were very cautious in determining the location of enemy firing positions, making every effort to establish which were main, reserve, or dummy positions. But a correct plan is not enough: it is also necessary to determine accurately the exact moment when the plan should be put into effect. The expected effect cannot be had from a premature or late counterpreparation. In the Orel-Kursk sector, this moment was determined on the basis of exact reconnaissance data which were further corroborated by statements of prisoners of war.

Initially, all participating artillery placed 5 minutes of fire on enemy batteries. As stated above, targets, rate of fire, and the number of rounds had all been indicated beforehand. This

was immediately followed by 20 minutes of methodical firing by a large part of our artillery upon the same targets. Finally another 5-minute concentration was placed, and during this period we also shelled the area where the enemy was concentrating infantry and tanks. At the same time our air force bombed German headquarters, communications centers, and tanks.

The result was the silencing of a large number of batteries and destruction of numerous OPs. This blow necessarily affected German plans for their artillery preparation. This was fired along the entire front, but it was weak and disorganized. We found that even those batteries which had not been included in our counterpreparation plan acted in a highly unorganized fashion.

The German offensive included large tank forces, supported by numerous planes which in groups of 10 to 15 attacked our forward positions. The Germans were unable to reach our front, however, as part of their artillery was paralyzed at the very beginning of the offensive and so could not support the

attacking troops. Because of our artillery counterpreparation our system of defensive fires was not noticeably disrupted, and thus our defending troops were able with confidence to meet the enemy's tanks and infantry—which often themselves walked into prepared firetraps.

Effectiveness of an artillery counterpreparation depends in the first place on how well the enemy's artillery has been reconnoitered. In the Orel-Kursk area our reconnaissance succeeded in correctly locating enemy batteries and reporting changes in good time. That made it possible to make timely corrections in our plan so that when it went into effect it proved eminently sound.

By our silencing German artillery and mortars effectively, the enemy was compelled to use practically all bombardment against our forward defenses. It stands to reason that this considerably reduced air action against our rear areas, thus enabling us to maneuver more successfully all our available reserves.

Offensive Artillery Action

By Col. B. Belayev of the Soviet Guards

By Radio direct from Moscow to the *Journal*

In the breakthrough of the German defensive in the Orel salient, artillery played a leading role. There was a great concentration of guns all along the Orel front, but particularly so near Dudino. This heavily fortified village was the keystone of the Nazi defense system in the area. The center of resistance was located on a command height which was cut up by trenches and covered with blindages,¹ bunkers, and pillboxes. Machine guns in concealed and armored nests, and elaborate fieldworks, covered the most likely avenues of approach. The Dudino garrison was supported by 20 batteries of field artillery and 40 antitank batteries. Realizing that this center of resistance would offer too great a threat to the Russian flank if by-passed, our High Command instructed the commanding artillery general to neutralize every gun and machine gun nest in Dudino.

The artillery commander's primary task was to secure precise information concerning the enemy defense system. This was difficult, since the enemy (having numerous alternate positions) could maneuver his pieces according to developments. It was a job for G-2. Complete success might be expected only if we could determine without serious error the enemy's forward line of defense, firing points, principal and alternate battery positions, infantry concentration areas, and axial and lateral lines of communication. Without this information, no amount of artillery fire could give the infantry effective support.

For an entire month all possible reconnaissance means were employed. Every BC made panoramic sketches of his area and each was supplied with photographs of the sector assigned him. Great reliance was placed on aerial photographs, both strip and mosaic. Of course, ground observation was fully exploited. Acoustic² reconnaissance also played a considerable part in counterbattery action. The direction and density of enemy fires were kept under constant observation. Finally, a

reconnaissance in force was carried out shortly before the attack to provoke the enemy artillery to fire. This made possible a last-minute checkup of information previously received. As a result of all this, our High Command possessed an unusually detailed and accurate knowledge of targets, both along the enemy's forward positions and within the defense area.

Our artillery concentration began three nights before the breakthrough. The number of guns involved can be gauged by the results achieved. The fire was extremely accurate. Every artilleryman from unit commanders down to the cannoners had a clear conception of the task before us. Battery OPs were moved as close to the enemy trenches as possible. Topographic reconnaissance³ determined the exact position of targets. Calculations were corrected by use of meteorological data. Firing schedules underwent constant check, right up to H-hour. This thorough preparation yielded good results.

Fires alternated between adjustments and fire for effect. Our barrage attained maximum intensity just before the infantry and tank attack began. Thick columns of smoke and dust covered the area which only two hours before had been Dudino. All German antitank artillery was put out of action, so our armored vehicles met no resistance as they drove forward. In addition, 12 enemy batteries were smashed. We later discovered that in the area under fire, all German guns had been located and a number of them had been destroyed by direct hits. Enemy trenches, dugouts, and bunkers had been turned into a mass of debris. Accurate fire on troops, concentration areas and communications led to the annihilation of a reserve battalion which had been marching toward Dudino.

Only a small proportion of the German troops who escaped during our preparation and barrage later tried to offer any resistance to our attacking forces. Theirs was a futile attempt, however. A moment after the barrage ceased, our infantry rushed forward, captured the first two lines of German trenches, and pressed on still further—closely supported by artillery.

¹Rest dugouts.

²I.e., sound and flash.

³Surveys.

ARTILLERY AT OREL

By Henry C. Cassidy

WITH THE RED ARMY ON THE BRYANSK FRONT, Aug. 14—Set under way by the heaviest artillery barrage of all time, the Red Army slogged its way steadily west from Orel toward Bryansk today while a new thrust south from Spas Demensk broke the German flank. The advance guard of the Russians approached Karachev, thirty miles east of Bryansk, while the new offensive pushed past the Bryansk-Vyazma railroad 70 miles north of Bryansk.

Steadily rumbling supply columns (many composed of American trucks), grinding tanks, and droning planes joined in a symphony of might as the immense forces drove ahead.

The barrage that put this great march in motion at 3 AM on July 12 was estimated to have been laid down by at least 3,000 gun barrels for each mile of the front, or 10 times more than at Verdun in the other World War. This did not mean that the Russians had 3,000 individual guns in each mile, however, as many mortars now are multi-barreled and Katiusha, the Red Army's secret weapon, is capable of sending numerous projectiles simultaneously.

The Russian bombardment over a front of 20 to 25 miles not only exceeded any previous one on the Russian-German front, but also surpassed in severity the British shelling at El Alamein in Egypt, where it was estimated that 600 guns were used on a 4-mile front. This earth-shaking barrage was a foretaste to the Germans of what they have coming to them if they attempt to make a stand on the Desna River line near Karachev or, later, on the Dnieper.

From Maj. Gen. Peter Petrovich Sabennikoff, 49-year-old member of the Russian General Staff and captor of Orel, I heard a quiet and confident analysis of the first Soviet summer offensive.

"We knew of German plans to cut off our Kursk wedge and knew where the concentrations were," he said. "The Germans began their offensive July 5 south of their concentration, along the railroad in the direction of Malo Arkangelsk and Kursk. By July 10 and 11 they put all their main forces in action. We were ready for this.

"At 3 AM on July 12 we started our counter-offensive by concentric blows on Orel from different directions. By July 15, when we broke the front on the Zusha and Oka Rivers and farther northwest, we began to feel that the Germans were uneasy. There was some panic in their ranks.



Russia's 152-mm gun-howitzer has done yeoman service against the Germans. With a maximum range of around 18,000 yards, many of its characteristics are similar to those of the G.P.F. Note that its present prime movers are full-tracked, but have cabs and bodies similar to those of wheeled trucks.

"We gave them artillery fire in this sector such as they had never seen in any sector. Soviet artillery was so dense that, in the number of gun barrels per kilometer, it was many times stronger than on any sector in this war or any other war, even at Verdun.

"Our artillery, with aviation, covered 6 to 8 kilometers [about 4 to 5 miles] of the German line in depth during the intense period of the battle. This was on a considerable stretch at all points where we needed a breakthrough."

Operations for the capture of Orel started August 2, the general said, when the Red Army crossed the Oktukha River and rushed between two forests south of the city, outflanking strong defenses. The Russians entered the city at 4 AM on August 3, and at 4 AM on August 5 they completed the occupation.

General Sabennikoff was careful to deny the current legend that German Army personnel has deteriorated. Part of the responsibility for the Nazi defeat before Orel he laid to the failure of the German generals to space their reserves properly.

"During the entire period of battle we met only picked troops, tanks and infantry," he said. "I have seen a lot of prisoners. Not one is over 30 years old. All are strong, young, and good. But they are morally shattered by previous battles and are particularly afraid of our artillery and Katiusha."

He said Katiusha was "very good and beautiful; the Germans dance when she sings."

General Sabennikoff said the Red Army was suffering considerable losses, but less than the Germans, owing to the superiority of Russian artillery. The Germans again are using as many as 1,000 planes daily over the Karachev sector, but the general indicated that the Red Air Force was holding its own.

The Red Army is using some American General Grant and British Churchill tanks, mixed with great numbers of their own tanks, which they consider less vulnerable and more maneuverable.

SPECIAL NOTICE

We may now sell restricted War Department manuals to military personnel, by Sec. IV of W.D. Circular No. 215 (16 Sep. '43), which amends Sec. II of W.D. Circular No. 401, 10 Dec. '42. Par. 5 of the latter controls the method of resale. An initial stock of manuals pertaining to field artillery and its weapons is expected to be on hand shortly. A detailed announcement, including prices of available manuals, will be published as soon as possible.

DEATH OR INSANITY

By Walter Kerr

This is a chapter from "The Russian Army," to be published January 3, 1944, by Alfred A. Knopf, Inc., at \$3.00. Mr. Kerr is Moscow correspondent of the New York "Herald-Tribune."

There were about five inches of snow on the ground in January of 1943 when the six Soviet armies of the Don Front, commanded by Colonel General Konstantin Rokossovsky, began their liquidation of the German Sixth Army that was surrounded inside and just west of the city of Stalingrad. The Russian ultimatum demanding surrender had been refused the night before. Early that morning German outposts had seen red rockets go up all along the Russian line. They were the signal for the artillery barrage and within a few seconds the guns had started firing.

About noontime Rokossovsky was standing in an observation post, talking to a member of his staff. Beside him was a slightly-built, rather tall Russian officer who also wore the stars of a colonel general on his epaulets. The tall officer in his gray general's coat stared silently through field glasses, observing the effect of Russian gunfire. Then he turned to Rokossovsky.

"There are only two salvations from this hurricane of fire," he said. "Death or insanity."

There was another salvation—surrender. But the German commander took that only after the guns had ripped his defenses to bits and killed thousands of his men. Men who were on the Stalingrad line in those days say that the barrage was a "hurricane of fire." Shells from all types of guns and howitzers in the Red Army whined over the white fields and exploded near pillboxes, ammunition dumps, command posts, trenches, and lines of supply.

The tall officer who had placed the guns and who was commanding the fire was Colonel General Nikolai Voronov, only forty-three years old, chief of all Red Army artillery. He was on the Don Front as the representative of supreme general headquarters. One week later he was to be promoted to the rank of Marshal of Artillery. The German Sixth Army was destroyed by artillery fire, for it is doubtful whether the Russians ever had assembled as many guns for one battle as they did for the extermination of this surrounded German force. The cannon wrecked enemy tanks, destroyed brick buildings, ripped up barbed wire, exploded minefields. Then the infantry went in with submachine guns, hand grenades, automatic rifles, and rifles, but with the infantry went also light guns that blasted enemy positions with direct fire at short ranges of from two hundred to three hundred yards. In the forward dashes the light artillery was pulled by the gunners over the fields. At times they lined up four or five feet apart on a sector that extended for a half mile or more. This was Soviet artillery in action, the one arm of the service outside of the infantry in which the Russians claimed superiority over the Germans both in quantity and quality. At no time during the year and a half I was in Russia did I hear an officer or a soldier say that the Germans had as many or more guns than the Russians had. As for quality none thought that German guns were so well adapted for warfare in Russia. Artillery was one thing that the Red Army had worked on for years and years

before the war. It had the factories. It had the training schools. Its designers worked with the understanding that the guns would be used for the sort of fighting that must be expected in Russia.

It was well that it had concentrated on artillery, for without artillery superiority the Russians could never have stood up against Germany's twin weapons of blitzkrieg, its armored divisions and powerful bombing aviation. As things turned out artillery was unable to compete in open country with tanks and planes, but in wintertime or forest warfare or night battles it enabled the Red Army to hold its own and paved the way for the great counter-offensives before Moscow and Stalingrad. During the summer of 1942 the Russians could do nothing but retreat across the steppes before the mechanized German Army. But once they were fortified inside Stalingrad where the war ceased to be one of maneuver, artillery could be used as it should be used. In the defense of this Volga city they kept all their heavy guns on the far bank of the river. There they were safe from sudden tank raids. From the far bank they could hurl enough explosives into the German lines to prevent heavy troop concentrations for the final assault.

Perhaps the greatest change in the Red Army during the war involved the centralization of control of field and medium artillery in the hands of the high command. The trend was apparent over a period of many months as the army strove to get mass concentration of fire. In 1941 there were two artillery regiments of thirty-six guns each in every infantry division. By 1943 the divisions had surrendered one of the artillery regiments to the high command, which then was able to organize entire artillery divisions and concentrate them at will up and down the front.

The headquarters of the Supreme Command also took control of most of the antitank battalions and organized them into tank destroyer regiments. These transfers weakened the firepower of the infantry divisions, but an attempt was made to make up for the loss by sending mortar battalions and regiments to the infantry.

The Russian General Leonid Govorov, who later became commander of the Leningrad Front, told correspondents one winter afternoon soon after he had captured Mozhaisk west of Moscow, that the German High Command in preparing for this war had made one great mistake. It had constructed enough tanks and planes. It had enough infantry, engineers, and other troops. It also had a lot of heavy and medium artillery. But Govorov said the Germans had believed they could replace light artillery with mortars. The theory was wrong, as they found out during the invasion.

According to Govorov, the Germans concentrated on the construction of mortars, believing it unnecessary to furnish their troops with light guns and howitzers. As things turned out mortars could do the work of artillery at short range, but the Germans found they were handicapped by a shortage of

longer-range light artillery. After the first three months of the invasion they saw their mistake and three-inch guns from all over Europe were collected and sent into Russia. They never, however, were able to overcome their deficiency.

The Russians, on the other hand, found that they had made just the opposite mistake. When the war began they had plenty of heavy, medium, and light artillery. What they suffered from was a shortage of mortars, also the result of an error of judgment, and so in the third month of the war they worked overtime to build mortars. For this purpose the Soviet Government created a Peoples Commissariat of Mortar Construction whose assignment it was to see that the Red Army got mortars and got them quickly. That was about the same thing as if in this country or Great Britain a cabinet post were created with the man in charge being called Secretary of Mortars.

The war then continued with the Germans trying to improve their light artillery and the Russians working to build more mortars. Both armies were successful, but on the whole the Germans never were able to put more guns in the field than the Russians could. I believe the same is true for antitank artillery and antiaircraft artillery. In antiaircraft the Red Army was all right from the start. It could not cover every part of the front, nor did it have enough guns to protect all of its important targets. But the vital targets were adequately covered. In Moscow there were many British officers and men who had been in London during the German bombings that followed the Battle of Britain. They all agreed that London never was able to put up anything like the barrage that was thrown up over Moscow. As the war continued both the Germans and the Russians discovered, however, that they did not have enough antitank and antiaircraft artillery. It was almost impossible to get too much. Both armies sent more equipment to their divisions. In some branches of the service (for example, the cavalry) the Russians doubled their antitank and antiaircraft strength during the war.

The man who was most responsible for Russian artillery strength and skill was the colonel general who served with Rokossovsky on the Don Front before Stalingrad. Colonel General (later Marshal of Artillery) Voronov was an artilleryman all his life. Like most other high-ranking Russian officers he had entered the Red Army soon after it was organized in 1918. Then he was eighteen years old and his rank was the lowest there is, just a private.

After the war he was sent to a new artillery school that the Soviets had organized in Leningrad. He was in its first graduating class and came out with his commission as a junior lieutenant. After service with troops Voronov attended an artillery school for higher ranking officers. Later he became the commandant of the First Leningrad Artillery School, which was founded to replace the school he had attended as a cadet. Then Voronov served for three years as commander of an artillery regiment. He held several other posts and in 1937, when he was

barely thirty-eight years old, he was made chief of artillery of the Red Army. Russian officers have told me that it was from the time he was appointed chief of artillery that this branch of the army began to develop into the formidable force it was during the German invasion. The entire system of artillery training was worked out under his supervision. New artillery schools were organized in various parts of the country. Voronov then was chief of artillery during the Finnish campaign that ended after the Russians, primarily with gunfire, cracked the southern part of the Mannerheim Line on the Karelian Isthmus. There is an American correspondent who can testify to the effect of that fire.



Russia's 76.2-mm

During the Finnish war I left Helsinki, the Finnish capital, to visit the Mannerheim Line on New Year's Day. After an overnight stop at Viipuri on the Isthmus we drove down the line, and after a mile-or-so walk through the woods we stopped to talk with the men of one Finnish regiment. They were tired-looking men who had passed a sleepless night and they were not glad to see me coming. They told me why.

The night before another American had visited their sector. He was Warren Irvin, of the National Broadcasting Company, an alert correspondent who had conceived the idea of a New Year's Eve broadcast from the Mannerheim Line. He persuaded the Finnish press department to make the arrangements. Then he showed up with his equipment, trying to think of some way to make his broadcast effective. He got the idea all right, and he sold it. His thought was to have Finnish guns provide sound effects as a background for his talk. The Finns agreed, and at the pre-arranged time Finnish artillerymen opened fire. There was little sense in wasting shells so they fired them toward the Russian lines.

That happened to have been a quiet day along the front when the Russians were not attacking, and when they were not attacking there was little activity because the Finns lacked the equipment and manpower to start something themselves. But on this night the Russians suddenly found the Finns firing without any apparent objective. They thought the Finns must have received reinforcements, that they must be planning an offensive. Immediately they opened fire with everything they had. They fired all up and down the sector from which Irvin was broadcasting. Shells exploded all over the woods, and the heaviest fire was directed at the pathways which the Russians knew the Finns used behind their fortified line. Irvin threw himself down in the snow. The Finns stopped firing and scattered. And the Russians fired for twenty minutes before Irvin and the Finns dared come up for air. After that the Finns ruled there would be no more sound effects from the Mannerheim Line.

Voronov remained as chief of artillery in the period of reorganization of the Red Army that followed the Finnish war. By the time of the German invasion his chief assistant was a thin, gray-haired soldier, Lieutenant General Viktor Tikhonov.

General Tikhonov showed us something of Soviet artillery one afternoon in the summer of 1942 when he took us to visit a regiment of 152-mm (6-inch) howitzers that was in reserve in the rolling, farm country north of Moscow. There we found that like the Germans the Russians have four guns to a battery. He told us that the chief difference in tactics between the two armies so far as artillery is concerned was that the Germans believed more in area fire and the Russians in counter-battery fire. The German theory was that gunfire should be dispersed. The Russian idea was to employ guns to destroy enemy guns or other definite objectives such as pillboxes, troop concentrations, tanks, command posts, and railroad stations.

In the regiment we visited the troops seemed thoroughly trained, although Tikhonov said the unit had been organized only six weeks before. Perhaps the men had been trained first in other units, perhaps at artillery training schools before being assigned to their regiment. Great attention was paid at all times to camouflage. The paths were carefully covered with grass and leaves. Branches hid the guns that were partially buried in pits. Men in observation

posts were either underground or wearing green-and-brown cloaks and hats to blend them into the background. The guns, which could hurl eighty-eight pound projectiles up to eleven miles, were fixed about thirty yards apart. For every gun there were two reserve firing positions.

When we arrived, the guns were in position and the crews were going through all the motions of fire, observation of fire, correction of range, throwing in the projectiles, ramming them home, pretending to insert the charge, closing the breech and pulling the cord.

"How long will it take you to ready the gun so that it can be transported by tractor," the General asked a young gun commander.

"Six minutes," the soldier said.

"Let's see you."

The crew set to work in perfect coordination. Within four and a half minutes the gun was ready for the tractor.

Tikhonov said that since the outbreak of war the Red Army had issued instructions that all crews of guns up to six-inch howitzers were to be trained for antitank fire. Too often in the early weeks had German tanks broken through the line and caught Russian artillery unprepared. While we were at this regiment the gunners were practicing direct fire at six hundred yards.

The backbone of Soviet artillery, however, was not the six-inch gun or howitzer. The most widely-used gun was of 76.2-mm (3"). Next came the lighter 45-mm weapon (1.8"), probably the lightest field artillery piece in use by any army, not counting antitank artillery. Third in importance was a 122-mm (about 5") combination gun-howitzer.

The Germans used for the most part 88-mm and 105-mm guns, later 75-mm guns, a 75-mm howitzer with an incredibly short barrel, a 150-mm gun with a range of twenty-two miles, and a 150-mm howitzer with a range of ten miles. The Germans also had eight-inch and fourteen-inch guns which they planned to use against Moscow and did use against Sevastopol.

German mortars ranged from the little 50-mm weapon all the way up to a huge 615-mm (24-inch) weapon. So far as I know this 24-inch mortar was used only against Sevastopol. The Germans may have had only one experimental model and found it too heavy to handle. They used 81-mm mortars, a six-barrel 152-mm mortar (actually a rocket projector), and in the Battle for Moscow experimented with a few 310-mm (13") weapons.

Russian mortars were of 50-mm, 82-mm, and 122-mm caliber.

Besides this artillery the Red Army used widely during the war a secret weapon that was called either "Katusha" or



"Kostikov's Gun" after its inventor, Andre Kostikov. For many, many months, no American or British observer was ever allowed to see it in action, even after some models had fallen into German hands. It was the Red Army's closest-guarded secret. The weapon was mounted on a platform on the rear of a truck but, whenever the trucks were driven about, a heavy tarpaulin covered the working mechanism.

Russians said, probably correctly, that Katusha was fired only by NKVD or police troops. The idea was that it was driven up to the battle line, fired from the truck and then driven away after the tarpaulin had covered the mechanism. In Moscow for a long time we never knew whether it was a gun, a howitzer, a mortar, or some sort of a rocket gun. Once we were allowed to see vague pictures of it in action. The films were taken at night. It looked as if on the platform of each truck there were six troughs or barrels from which rockets or flaming projectiles were fired in rapid succession. The effect of the fire was not shown. In Moscow, however, we had the impression it was strictly an anti-personnel weapon. The people of the capital believe to this day that it was Katusha that drove the Germans back from the capital.

The Russians during the war proved to be great believers in the theory of using artillery well up in the forward lines with the advance echelons of infantry and engineers. Their lack of tank and air power almost forced them to this opinion, but it worked in winter time even if in summer the Red Army had to resort to other tactics. When the snow lay deep on the ground, forward artillery was possible because German tank and air forces were severely handicapped. In executing their theory the Russians were aided by the lightness of their guns which often enabled them to be hauled by hand over country where German motorized artillery was unable to go. The 45-mm gun could be dragged and pushed by nine men. Three teams of horses usually carried the 76-mm guns.

That was the real strength of Russian artillery. It was adapted to Russian fighting conditions. German weapons were not.



PERIMETERS in PARAGRAPHS



(Based upon latest information available at date of writing, and subject to correction as more complete reports are received.)

By Col. Conrad H. Lanza

THE WAR IN ITALY (August 21 to September 21, 1943)

After the conquest of Sicily, which was completed on 15 August, preparations were made for an invasion of the mainland of Italy. This invasion had been planned in January, 1943, at the Casablanca conference between Pres. Roosevelt and Mr. Churchill, Prime Minister of the United Kingdom. The date (which had been left open) was later fixed for 15 September. Gen. Sir Harold R. L. G. Alexander of the British Army, serving under the American Gen. Eisenhower, was designated to command the invasion.

On 18 August Mr. Churchill, then at Quebec, Canada, attending an Allied conference, wired Gen. Alexander that Italy had made proposals for surrender. Mr. Churchill was of the opinion that if this occurred there might be danger of a Quisling Fascist government's being set up in Italy, or a possibility that Italy might relapse into anarchy. Gen. Alexander was therefore urged to move forward the date of invasion as much as safety to the military forces involved might permit, so Italy could be seized and occupied before any radical change in the local internal situation might occur.

In compliance with these instructions Gen. Alexander planned three invasions. The main one would be in the Gulf of Salerno, which was the point furthest north on the west coast where it was believed possible to assure satisfactory fighter air protection from available airfields. Secondary invasions would be made at the toe of Italy and near Taranto. The date of 15 September had been determined as being the earliest one by which sea transportation would be ready. A large number of barges which had been used in the expedition against Sicily had been damaged, and were absent in North Africa in repair yards. Instructions were given to hasten the repairs, and it was found possible to advance the dates of invasion.

On 3 September the invasion of Italy's toe was launched by the British Eighth Army, with two divisions—one British and one Canadian. The selected landing place was the 10-mile stretch of coast on the east side of the Strait of Messina, extending from Villa San Giovanni on the north to Reggio Calabria on the south. This part of the strait is 4 miles wide at the north and 7 miles at the south.

The troops started from Sicily at hours timed to land the first wave before daylight. An intense artillery preparation was fired to cover the crossing, the Royal Navy covering the south half of the targets and British and American artillery on Sicily the north half. The troops crossed in barges and in amphibious vehicles, the sea being smooth. There was little opposition, so it was found possible to return the barges and amphibians earlier than the prepared schedule had designated.

The Eighth Army divided its forces into two detachments—one to advance along the narrow strip of coast between the sea and the mountains on the north side of the Calabrian toe, and the other similarly on the south side. Demolitions slowed the advance, but resistance was limited to weak rear guards who yielded when attacked. On 4 September a British Commando landed near Bagnara on the north coast with a view to cutting off the enemy's rear guard, which was south of Bagnara. By using interior trails the rear guard avoided combat and escaped. On this date the British reached Palmi (excl.) on the north and Melito (incl.) on the south. Next day a complete battalion of Italian infantry with a battery surrendered without firing a shot. Palmi was thereupon occupied.

It is possible that this Italian force had received orders to surrender, for late on 3 September at Siracusa in Sicily, duly authorized commissioners signed an armistice between the Allies and Italy. By the terms of the armistice, besides providing for a cessation of hostilities Italy promised to place all facilities in its power at the disposal of the Allies, and to guard them with her own forces until the Allies could reach them. The armistice did not provide for surrender of the Italian army, but did for the navy. The Allies reserved the right to disarm and demobilize the army but have not yet exercised this right. The Italian navy, less a few ships, surrendered within a few days. The record of the armistice negotiations shows that Italy did not desire to surrender, but did want to switch sides in the war and from now on fight with the United Nations. Nothing was promised to Italy as to her being accepted as an ally, although she was informed that if her troops fought the Germans they would be recognized and supported by the Allies.

Announcement of the armistice was postponed until 1630 on 8 September, when it was officially announced by Gen. Eisenhower himself. At 1745 a similar official broadcast was made by Marshal Badoglio on behalf of Italy. The reason for the delay in divulging the armistice was that the main invasion was at that moment en route to the Gulf of Salerno. To have postponed the announcement until later would have run the risk of our having Italian opposition. To announce it at the hour selected would give an opportunity, hoped for, that it would create confusion in the Axis ranks and might bring assistance from Italian troops.

THE MAIN INVASION

Gen. Alexander designated the American Fifth Army, Lieut.

Gen. Mark W. Clark, for this expedition. The first invasion force consisted of the U. S. Fifth Army and a British Corps. This expedition departed from north African ports on 7 September and from Sicilian ports on the 8th. It moved in two convoys, with a strong naval escort.

Enemy air scouts discovered the convoys during the 8th. From their course and speed, and from having noted U. S. minesweepers searching for mines in the Gulf of Salerno, the enemy readily deduced that that was where the expedition would land.

The enemy, now Germans only, had troops in south Italy. They were the same ones who had recently retreated from Sicily. The 1st Parachute Division, serving as infantry, was in Calabria opposing the British Eighth Army by demolitions and also watching the coast in Apulia. The remaining force was concentrated in the general vicinity of Naples; it consisted of the Hermann Goering, 15th, and 19th Panzer Divisions and the 29th Motorized Division. The commander of this force in Sicily was Gen. Hube. As far as known, he was still in command.

On receipt of information of the approach of the convoys, Gen. Hube left the 29th Motorized Division to guard his communications around Naples and with the three Panzer Divisions moved rapidly to the Salerno area during the 8th. He now received news of the armistice. He had been warned by the German GHQ that this might occur, so he at once used the division at Naples to disarm Italian troops in that big city, and

he easily disarmed a few Italians on coast guard near Salerno. The Italians are not known to have attempted any resistance.

The shore of the Gulf of Salerno is sandy for over 25 miles. It is also possible to land on the flanks of the sand stretch. Not knowing just where the expedition would strike, the Germans left only small observation detachments near the coast and held the bulk of their forces in readiness some miles back from the shore. The Air Force was directed to raid the convoys. This was done at about 2300 on 8 September. According to available reports it caused no great damage, but it was notice to the expedition that the enemy was aware of its approach.

The plan of the Fifth Army was to land the British Corps on the north coast of the gulf at and near Salerno, while the American troops landed at the south end near the mouth of the Sele River. At 0230 the navy preceding the transports started an artillery preparation against presumed enemy positions. They laid a smoke screen behind which the landing barges approached the coast. The first wave arrived on shore at about 0400. The British landed near Vietri-sul-Mare, 1½ miles west from Salerno, meeting no opposition. The Americans met opposition in some sectors, but nowhere was it severe. The British right division moved eastward into Salerno, which was occupied after repulsing enemy patrols; the left division started inland up the slope of the mountains lining the gulf, astride the high road toward Naples. The two American divisions (south of the Sele River) advanced inland and to the left facing north.



After daylight the Germans rapidly closed in around the landing places. They started artillery fire when the Americans had advanced about a mile from the beaches. The British right division came under fire as soon as it passed Salerno, but the left division advanced several miles before meeting opposition. At the same time the German Air Force attacked the beaches, barges, and transports. These were all protected by barrage balloons, British handled, which protected all debarking operations against dive bomber attacks. Antiaircraft batteries were also available on all warships, with guns on transports and barges. With this cover the enemy air attack, while causing damage, did not interrupt the unloading schedule.

The 2nd and 3rd waves landed after sunrise. They came under severe artillery and machine gun fire while approaching the beach and while advancing inland. Casualties were considerable. Our warships replied to the German artillery, and there appeared to be a roaring artillery duel. However, the enemy's artillery fired primarily on land targets. The effect of the navy's fire could not be observed.

The Americans found themselves in a flat, cultivated plain, criss-crossed with irrigation canals. In their front was a village of stone houses, surrounded by a massive stone wall with a few houses outside it. Around 1100 the enemy commenced a series of small infantry counterattacks led by a few tanks, usually between three and five. The leading American batteries had just gone into position when the enemy tanks appeared, and by their fire the enemy was driven away; his efforts ceased around 1300. The infantry, having built up their front lines by this hour, commenced to advance.

Irrigation canals made good covered ways of approach, although they were very muddy and had some two feet of water in them. They soon were full of crawling, creeping soldiers pushing forward under strong enemy artillery fire. The German batteries were back in the mountains. They had excellent OPs on the high ground. As visibility was splendid, the enemy's artillery fire was accurate and deadly and dominated the plain. Still, with the aid of the terrain the Americans were able before night to push the line forward from 2 to 3 miles from shore.

Landing of equipment and supplies continued without interruption during this battle and on into the night.

* * *

Only limited information is yet available as to the progress of this campaign during the following days. What we have indicates that the action progressed substantially as follows:

Practically all combat troops were ashore by the morning of 10 September, and both British and Americans attacked. In both cases the efforts were successful. The British, although they failed to progress toward Naples, advanced several miles east and south from Salerno. Before night the Americans had taken the railroad junction at Battipaglia and were well beyond this, approaching Eboli. Enemy resistance was mostly confined to artillery fire, but his air force made savage attacks on the continuing debarkations. This caused some losses but as before did not materially interfere with the planned operations.

On 11 September the Germans counterattacked on the south. This was an armored force attack with strong artillery and air support. The enemy drove the Americans out of Battipaglia, and pushing south of the Sele River, captured the triangular space between the Sele and Calore Rivers. An American



Armored Division intervened and aided in bringing the enemy's advance to a stop a few miles from the beaches. According to the German accounts, on this day they captured 1,400 American prisoners and 59 tanks.

On 12 September the Germans, having brought up the division left behind at Naples, renewed the attack and again made gains in both the British and American sectors. The fighting was very heavy, and the navy was called upon to help the troops hold their positions by naval fire directed by radio telephone from forward observers. The navy used the heavy batteries of battleships to supplement the fire of cruisers and destroyers, who had formerly furnished the artillery support to parties on shore.

September 13th the German 1st Parachute Division joined from the south, so that the entire available German force in south Italy was now united. An effort was made to turn the American right by attacking through the high ground, and some progress was made in this direction. The British too were pushed back in the north sector. In view of the situation of the preceding evening the Allied air commander had concentrated for this day all available air forces, who incessantly attacked the enemy throughout the battle area. For reasons not yet known the German air force was present only in limited strength; its offensives were confined against landing operations, which were continuing to beach ammunition, supplies, and replacements.

On the 14th the battle was renewed, the Germans renewing their offensives against the outer flanks of the Allies while the Allies counterattacked at various places. Both sides made gains, resulting at the end of the day in the fronts' having a zigzag shape of salients alternately held by Allies and by Germans. Again the navy materially aided the ground troops. This day marked the high tide of the German offensive.

The Germans ceased their attacks on the 14th. They had observed the arrival of new troops, estimated by them as 2 divisions, giving the Allies 10 divisions on shore as against 5 German divisions. They temporarily assumed the tactical defensive. As the Allies observed the change in the situation they attacked late in the day and made slight gains.

On the 15th the Germans made a limited attack against the American right and secured Altavilla, driving out an American detachment posted there. The British attack made considerable progress eastward from Salerno and reached Pugliano,

9 miles from the sea. A general attack by the Americans was ordered for next day.

In preparation for this all batteries of 155-mm guns and howitzers fired all night at enemy positions in the hills. All batteries joined in an intense artillery preparation fired before dawn, which was assisted by naval fire and by bombing. At dawn the infantry attacked, supported by tanks. As the country was much cut up the advance was slow. It was directed across the plain against the triangle between the Sele and Calore Rivers. The objectives were in general reached before noon, and gave the Americans an advance position 8 miles from the sea. Fighting was very heavy, and particularly so on the right, which came close to Albanella. As there were many orange and lemon groves in the battle area, it was hard to locate targets. The enemy did not neglect to make counterattacks, and in some places he too made gains. The general result was distinctly in favor of the Allies.

On September 17th the Americans (using a division recently joined) endeavored to turn the enemy's left. In pursuit of this mission, the American right reached Roccaspide, which is 11 miles from the sea. The enemy thereupon decided to withdraw his left, as with only 5 divisions his lines were already long.

American parachutists were used on 16 September, by being dropped in enemy rear areas. Details of this operation are not yet known.

On 18 September the Allies found that the enemy had withdrawn. His new line extends along the high ground extending inland from the Sorrento—Salerno peninsula, facing generally southward. The only report available as to losses is a German report. This claims that the Germans captured to date 4,429 American and British prisoners, 155 tanks, 54 guns. The report says nothing about German losses. It estimates the Allied loss in killed and wounded as approximately 10,000.*

OTHER OPERATIONS

The British V Corps was landed at Taranto, a major Italian naval base, on 9 September, the same day as the main invasion. Italian troops cooperated passively. German forces were limited to weak observation patrols which retired in a northerly direction after effecting some demolitions. By 21 September this corps had reached the line Potenza—Bari.

The British Eighth Army continued its advance along the shores of Calabria. There was no opposition. By 20 September this army was entering line on the right of the American Fifth Army in the Salerno area. The left of the Eighth Army was in liaison with the V Corps at Potenza.

Between September 9th and 20th the main islands at the entrance to the Bay of Naples as well as the Ponza Islands were occupied by Allied troops without opposition. German troops in Sardinia completed evacuation of that island on 19 September. According to their accounts four Italian divisions present offered no opposition, except for some sporadic firing at the tail of the rear guard.

German troops in Corsica commenced to withdraw after 9 September, but by the 20th the evacuation had not been completed. French troops from north Africa and one American Commando have landed in Corsica and joined with natives to attack the Germans. Details of this fighting are not yet known.

*After this was written, our losses (killed, wounded, and missing) in Italy from the initial landing near Salerno through Sept. 15th have been officially announced as totalling 3,497.—Ed.

GERMAN REACTION TO THE ARMISTICE

Germany foresaw that Italy would desert her cause. Her Secret Service (Gestapo) had secured reliable information that armistice negotiations were in progress. Consequently plans for such an event had been prepared and distributed.

When news of the armistice was flashed through the air, German reaction was immediate. The Italian Fourth Army (of about 7 divisions, in south France) was surrounded and promptly surrendered. A small force from this army took to the hills, and on 20 September was between Turin and the French border. This force, acting as snipers and guerrillas, is reported as having interrupted all rail and road traffic across the Mt. Cenis pass.

The Italian 11th Army (of about 10 divisions and with CP at Athens) surrendered to the Germans without incident. Local garrisons at Samos surrendered to the local Greek civil authorities, and those at Kos to a detachment of the British Royal Air Force which flew to and seized that island. The Italian forces on Krete and Rhodes, of 2 or 3 divisions, surrendered to the Germans.

A force of Italians in the Province of Venice was formed promptly on 9 September, and took as its mission the interruption of lines of communication to Germany. This force effected a junction with partisans from Slovenia and Croatia, and other Italians in Istria. The Germans managed to keep the main railroads open, but they have found it necessary to organize a special force to suppress what they call an insurrection. At date of writing the German offensive has just started.

By 11 September a German force, meeting no opposition, seized the entire coast of Liguria, including the important ports of Genoa and Spezia. It arrived at Spezia after the Italian fleet had sailed away to surrender to the Allies at Malta. Only minor ships, not fit to sail, were taken by the Germans. The flagship of the surrendering Italian fleet, the battleship *Roma*, was sunk by German air attack; the naval C-in-C went down with his ship.

A German force of 3 Panzer divisions appeared at Rome late on 10 September. After a token resistance the Italian garrison of 7 guard divisions, supposed to be the best-trained and -equipped force the kingdom had and which included two armored divisions, surrendered. This German force (with which is present the German commander for south Italy, Marshal von Kesselring) assures connection with Gen. Hube's troops in the Salerno area. So far as is now known, there are no other major German forces south of the line Spezia—Ancona, both of which are now held by German troops.

On 12 September Mussolini, ex-Italian Duce, who was in confinement at a hotel resort in Abruzzi Province, was recaptured by a daring German air raid which overpowered the Italian guard. He was taken to Germany, had an interview with Hitler, then returned to north Italy and reestablished a Fascist government with himself as the head. In this way the situation foreseen by Mr. Churchill on 18 August, and already referred to, has occurred in spite of all precautions. It is not yet possible to tell how much influence, if any, Mussolini still has in Italy. By 21 September he had installed lieutenants at important key points under German control.

Strong German reinforcements have been reported arriving in north Italy. There is no sign yet that the main body will go south of the line Spezia—Ancona. The German commander in this area is Gen. Rommel, well known as the energetic leader of the Axis forces in north Africa.

THE WAR IN RUSSIA (August 16 to September 23, 1943)

In the middle of August the portion of the line north of the Dvina River was comparatively inactive. No substantial change has since occurred there. The sectors south of the Dvina were the scene of a great battle which had started on July 5th, 1943. From north of Bryansk to south of Kharkov, in mid-August a gigantic Russian offensive was in progress. At Izyum, a new Russian offensive started on August 16th. Germany's armies were generally on the defensive.

At the end of August Premier Stalin stated that ". . . in this gigantic war more than 500 divisions are involved on both sides." Deducting from this figure the number of enemy divisions identified by the Russian Intelligence Service on 16 September as being in Russia (about 230), leaves the difference of "over 270 divisions" as the Russian strength. Perhaps it is not far from 300 divisions, or 30% more than the enemy has.

Prior to September 5th the Russian offensive was based on the expectation of meeting strenuous opposition at all points. On this date they judge that the Germans were abandoning Russia east of the Desna and Dnepr Rivers. After this date, consequently, the Russian offensives were multiplied and pushed without regard to complete preparations for attacking fortified lines.

It is now apparent that the German decision to withdraw their front in Russia was made just a month earlier. This, which followed a GHQ conference convened immediately after the fall of Mussolini, altered the strategical situation in Europe. Whether Hitler approved the recommendation of the conference or modified it is not yet known; neither is it known how far back the German retreat will go. Preparations for the withdrawal started about August 5th, but the full meaning of the movements involved did not become apparent to the Russians until considerably later.

This great retreat will be considered as follows:

<i>Sector</i>	<i>South Boundary</i>
North	Novozybkov—Dmitrovsk
North Central	Kremenchug—Sumy
South Central	Dnepropetrovsk—Lisichansk
South	Sea of Azov

NORTH SECTOR

On 16 August the line was

Velizh (German)—Yartsevo (G)—Dorogobuzh (G)—Spas Demensk (Russian)—Zhizdra (R)—Karachev (R)—Dmitrovsk (R).

This formed a shallow arc around Bryansk, from which the nearest Russians were 30 miles away. The main Russian attack at this date was from due east of Bryansk, through thick forests which favored the defensive. It was impossible to locate centers of resistance until they were encountered. Snipers, usually armed with machine guns, were posted in tree tops and were able to delay advances until they were found and destroyed. In three days, however, this advance gained 10 miles.

At the same time another attack was launched southwest from Zhizdra toward Dyatkovo. It too made some progress, but on 21 August it was heavily counterattacked. On this day the German artillery blasted gaps in the Russian lines through

which German armor soon advanced. It reached Russian rear areas. Without attempting to penetrate deeply, the German armor raised considerable trouble raiding in interior areas. The Russian High Command, rather than attempt to restore this situation, discontinued this particular offensive and ordered it replaced by another one further to their right, opposite Yelnya.

The new attack, started on the 23rd, met a very active defense against which it gained ground but slowly. German counterattacks were frequent. Those made with armor made temporary penetrations on the hit and run principle, disorganizing the Russian rear areas. Those made with infantry with tank and air support were against advancing Russian troops, after they had lost the protection of their artillery barrage and before they had consolidated new positions. All attacks by both sides were led by tanks and had strong air and artillery support.

Blocked again, the Russian High Command promptly organized still another offensive. This started on 26 August, east and southeast from Bryansk. It was preceded by a strong artillery preparation and an unusually strong air preparation. The left of this attack made progress.

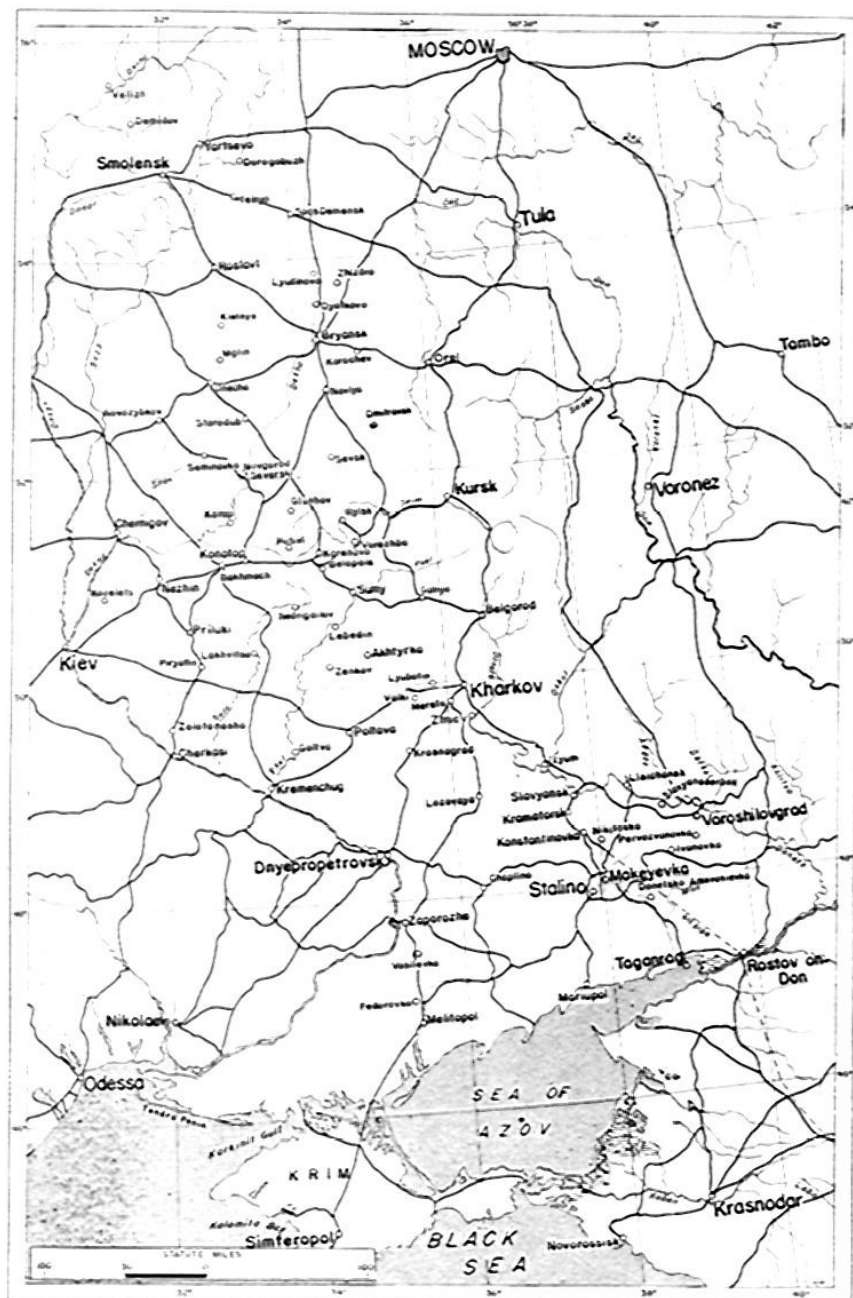
Still another offensive was then organized. This was opposite Dorogobuzh and was joined to the one already in progress against Yelnya for a combined front of 50 kilometers. The axis of this attack was nearly south.

Heavy fighting now continued for some days all along the front, with the Russians making slow gains. On 1 September Dorogobuzh was taken, while by 7 September the southern attack had arrived at Navlya. This attack was in dense forest country; to aid it the offensive was extended to the south.

In the vicinity of Bryansk the offensive was renewed; 45 miles north of there, Lyudinovo was taken on 2 September. On the 10th a strong Russian armored force broke through the German lines near Dorogobuzh, through gaps made by the artillery. It was immediately attacked by German armor waiting in reserve, which limited the gains the Russians had made and in some places restored the line as it had been before. At this time the Russian line east of Bryansk had made no progress for the past three weeks and was 20 miles away. Everywhere delays were caused by the extraordinary number of German mine fields, which required much time to clear.

By this time the Germans had completed the preliminary operations for their contemplated withdrawal. They evacuated the area east of Bryansk, retiring to west of the Desna River. This side is higher; it overlooks the east bank, where the railroad junctions and other utilities are located. At this time and place the Desna was about 1,500 feet wide. The town itself was evacuated several days later, the Russians entering it on the 17th. The next mission for these Russian forces was given as Roslavl, toward which they moved at once. The German withdrawal was now quite rapid, and considerable daily gains were made by the Russian forces.

On 15 September, in view of the Russian estimate of the situation made on the 5th which recognized a general enemy withdrawal, a major offensive was launched on the front Velizh—Yartsevo. This made the entire North Sector active. This new sector had been very strongly fortified by the Germans,



NORTH CENTRAL SECTOR

On 22 August the line was

Dmitrovsk (R)—Sevsk (G)—Rylsk (G)—Korenovo (R)—Sumy (G).

Nothing important occurred in this sector until the 26th. Then to aid the Russian offensive about to start toward Navlya, an offensive was simultaneously launched on the entire front from Sevsk to Sumy, with main effort in the north half. The main blow failed in its attack against Sevsk, but penetrations were made by Russian armor through artillery-blasted gaps both north and south of this center of resistance. Part of the Russian armor who broke through were caught before a German second line, were partly surrounded by German armor, and lost heavily. The Russian command thereupon abandoned the penetration idea and instead, utilizing gains that had been made, turned the troops in the wedge they held in the German lines. Two forces, one each to north and south of Sevsk, were turned inward toward each other, attacking Sevsk from opposite sides in conjunction with a frontal attack. After some hard fighting Sevsk was taken on the 27th, 700 prisoners being captured. The Germans were not yet ready to retire in this area, so for the next few days they made numerous attacks which held the Russians to the general vicinity of Sevsk. Further south the Russians gained.

The initial attack on Sumy had failed too. It was renewed on 1 September, and at the end of the day fresh divisions relieved the tired front line and continued the attack on during the night. These were again relieved by fresh troops at dawn. The dawn attack succeeded; Sumy fell.

Next day the Russians forced crossings over the Seim River at several places, and they reached the line Glukhov—Putivl—Vorozhba—Belopole, all inclusive. Vorozhba had been encircled, and one company of the German infantry garrisoning it surrendered.

Continuing north of the Seim River, the Russians reached a point 15 miles northwest of Konotop by the 7th (Konotop had been taken on the 6th). The Germans were now retreating faster; Bakhmach was taken after considerable street fighting on the 9th, at which date the line was

Novgorod Severski (G)—Korop (G)—Baturin (R)—Bakhmach (R)—Yuryevka (R)—Nedrigailov (R)—Sumy (R).

On 10 September, the Russians reached Lipovaya Dolina (50 miles southwest from Sumy) after advancing 15 miles within the day, apparently against little or no resistance. By

there being as many as six lines of resistance, all protected by mine fields and numerous obstacles. This Russian attack was continued day and night until, on the 19th, the last line of resistance was penetrated and both Velizh and Yartsevo were taken. The Germans now retired rapidly. Demidov was taken by the Russians on the 22nd, while the Germans evacuated Smolensk, their great northern stronghold, on the night following the 23rd; they also gave up Roslavl.

At this date the line in the North Sector was (all to Russia except Kletnya, doubtful):

Velizh—Demidov—Smolensk—Roslavl—Kletnya—Mglin—Unecha—Starodub.

This is from 0 in the north to 100 miles in the south in advance of the line a month earlier.

the 13th the line extended through Komarovka and Kruty, about 10 miles east of Nezhin. This Russian force engaged the Germans covering Nezhin; another, following down the left bank of the Desna River, passed around the German left, while Russian armor turned the German right. About 4 German divisions were caught, and lost very heavily. The Russians took 1,100 prisoners.

To relieve this situation the Germans, also on the 13th, started a counterattack on the axis Priluki—Nezhin, against the Russian right. A strong artillery preparation on a narrow front opened the way for an advance by armored divisions. This reached the Russian rear areas and ravaged around generally. It accomplished its mission of enabling the German main body to disengage itself, and then retired. The Germans abandoned Nezhin, which the Russians then entered on the 15th.

Now the Russians were advancing along the entire front of the sector. In many places there was not much resistance. A Russian column continuing down the left bank of the Desna arrived opposite Chernigov on the 18th, where the Germans offered strong resistance. Without allowing this to delay them, the Russian High Command detached a flank guard to reduce Chernigov while the main force continued on down the river toward Kiev. These troops arrived at Kozelets on the 20th and at Semipolki on the 22nd. Meanwhile the flank guard had been steadily attacking, and forced a crossing of the Desna into the suburbs of Chernigov; this place was entirely occupied by the 21st.

North of Chernigov the Russians pushed westward from Novgorod Severski and from south thereof. This advance gained rapidly, meeting but minor opposition.

By 23 September the line in the South Sector had been advanced to well beyond Priluki and Piryatin. It was evident to all that the Germans were withdrawing at a rapid rate to beyond the Dnepr River.

As this account closes, the line for this sector is

Starodub (R)—Seminovka (R)—Snov River—Desna River, with Russian bridgehead at Chernigov—Desna and Dnepr Rivers, with German bridgeheads at Kiev and Cherkasi—Zolotonosha (R)—Goltva (G).

The maximum advance in this sector during the period was nearly 200 miles, 2/3 being in the final two weeks.

SOUTH CENTRAL SECTOR

On 16 August the line was

Sumy (G)—Akhtyrka (G)—Kharkov (G)—Zmiev (G)—Donets River, with Russian bridgehead at Izyum—Lisichansk (G).

On the 16th the Russians launched a violent offensive from the Izyum bridgehead. They had concentrated there a large force of artillery and ammunition, and started off with an intense artillery preparation. Then came a tank attack followed by infantry. The German Intelligence Service had observed the preparations for this attack, so the Germans were ready. Heavy fighting developed, with the Russians making slow progress.

At the same time the Russians attacked Kharkov from the northeast, they being at that time only one kilometer away from the city on this side. Notwithstanding this advantage, these Russians received a serious set-back. They were counterattacked, unexpectedly, by strong German armor and artillery, and forced back a good many miles. Next day the

German armor proceeded to raid around the area, while the German attack was extended to the area just west of Kharkov. Here too it made progress. Both German attacks were continued during the 17th and 18th, with extremely heavy fighting which appears to have gone a good ways to accomplish the attrition which both sides claimed was one of their major missions. Russian tank losses during the three days' battle averaged 120 tanks a day.

This German offensive, which appeared serious at the time, was not pushed. It seems to have been another of the thrusts made to disengage main bodies on the retreat across the Dnepr. Not knowing this, the Russian High Command ordered the direct attack on Kharkov to be discontinued. In lieu thereof (as Kharkov now formed a salient within the Russian lines) two new offensives were directed across the base of the salient. One was to be southward from the line Sumy—Gotnya, the other northwest through Zmiev. The latter attack would have to advance through forests for a time, but elsewhere the terrain was favorable for the employment of armored forces and of artillery, being generally flat steppe with few obstacles; there were many fine orchards, cultivated fields, trees, and whitewashed thatched villages. These attacks started on 18 August, the day that the German attacks ended. On the first day both Sumy and Zmiev fell, and thereafter both attacks made fair gains. By the 20th the north attack was at Lebedin.

These battles, which may be called the Kharkov battle, were mainly based on artillery. Both sides used an enormous quantity of batteries. In the German attacks, the normal number of guns per kilometer of front varied between 125 and 160 pieces; they fired area shelling, which caused the Russians high losses but not so great as the Germans probably hoped for. The Russians employed between 180 and 190 pieces per kilometer of front; they usually fired at selected targets, using observation if available, otherwise maps. The Germans also employed numerous and deep mine belts: there were usually several belts 3 to 4 miles from each other.

From time to time the Russians launched armor with SP artillery to penetrate the German lines. Not infrequently they succeeded, but they soon became pinned down by the mine fields and German armored reserves which closed in around them. Occasionally, but rarely, the entire penetrating force was lost.

These battles gained ground for the Russians at a considerable expense in casualties. Kharkov was now nearly encircled, and during the night of August 21/22 the Germans evacuated the city. Before leaving they destroyed the power and water plants, railroad junctions, and other facilities.

Much encouraged by this gain, the Russians launched more armor. One of these attacks made by a tank brigade plus an artillery brigade broke through but was almost immediately surrounded and destroyed. This force is reported as having had 299 tanks and 248 guns (62 batteries). This gives a ratio of 5 guns to 6 tanks for Russian artillery accompanying a penetration. The German report shows 1,800 prisoners as having been taken.

The Germans also made armored attacks, but in line with their mission of covering a withdrawal they were more conservative. They did not try to make deep advances, but confined themselves to local objectives. After doing as much



damage as was possible within a limited time they withdrew before they could be encircled. In this campaign German tank losses have regularly been under half those of the Russians.

German counterattacks using infantry with tanks also occurred, sometimes fairly frequently. Their missions were specific—to disengage troops withdrawing, to obtain identifications, or seize suitable opportunities to inflict grave losses on enemy forces caught in unfavorable positions.

This severe battle continued until the 25th, with very heavy fighting around the town of Akhtyrka. This changed hands several times but finally came into Russian possession on the last day, at the same time as Zenkov, which was 10 miles beyond. Two days later the Russians were generally along the east side of the Psel River, across which the Germans had withdrawn.

On 29 August, the Russians made a strong attack toward Lubotin, a rail junction 10 miles west from Kharkov. For the artillery preparation about 250 guns to the mile were used. Their fire was mainly directed against selected narrow corridors through the enemy's front, which were most intensely shelled. Then the armored troops dashed through the blasted sectors, now become gaps in the enemy's lines. This armor went several kilometers into the rear areas. It was delayed crossing the Udi River, but this was accomplished to the northwest of Merefa. Just after it was over two German Panzer divisions, which had been in reserve, counterattacked. A great tank battle resulted, fought in a flat farm country at ranges of 800 to 1,800 yards. The Russian tanks were heavier and won the battle, but the Russian penetration ended right there.

This tank battle was renewed between the same organizations on 4 September, when the Russians

recommenced their attack. The new tank battle was near Merefa Junction, 15 miles southwest of Kharkov. The result was the same as before: the Russians won the tank battle, but their advance was held to moderate gains.

During the battles around Kharkov the Russian offensive near Izyum had been making slow but steady progress. Nearly every day a strong artillery preparation was followed by attacks by tanks and infantry. Occasionally attacks were by armor through gaps cleared out by the artillery. The daily gains were of a see-saw nature, but they pushed the line gradually forward. As the bridgehead was thus enlarged, the front of the offensive was extended. On 2 September the left arrived at Lisichansk, and on the 6th at Slavyansk.

The Germans were still not ready to withdraw. In the last days of August they attacked across the Pesel River and recaptured Zenkov, which they held until 7 September. After this date the Germans' resistance in this sector greatly declined, and they withdrew rapidly.

With much-reduced fighting, the Russians by 16 September reached the line Lokhvitsa—Valki—Lozovaya. On the 19th Krasnograd was passed. Poltava was evacuated by the Germans on the night 22/23 September, and occupied by the Russians on the following day. By this date the line was

Bieloserkovka (on Psel River) (R)—Poltava (R)—thence sharply south to near Dnepropetrovsk (G).

In this sector the Russian advance for the month considered varied from 70 miles in the north to 100 miles in the south. Most of this was made in the last two weeks, and did not involve heavy fighting.

SOUTH SECTOR

In mid-August the line was

Lisichansk (G)—Donets River to south of Slavyanoserbks (G)—Voroshilovgrad (R)—Pervozvanovka (R)—Ivanovka (G)—Mius River to Sea of Azov.

On 18 August the Russians started a major offensive from the vicinity of Kiubyshevo. The usual strong artillery preparation was fired and the attack was continued uninterruptedly day and night until the 21st, when Russian armor broke through. It was soon counterattacked by German armor, and a part of the Russians were crushed. The main body was able to support itself with the help of infantry divisions which had been rushed into the gap in rear of the armor. Against this resistance, in three days' very hard fighting it crossed the Mius River into territory outside of the German defenses. On the 23rd this armor was at and in the vicinity of Donetsko-Amvrosievka. The infantry divisions in rear had in the meanwhile turned on right and on left into line and were widening the gap in the German lines.

On 24 August a Russian force started south from Donetsko-Amvrosievka, keeping on the west side of the Mius River. It consisted of 4 armored brigades, 2 cavalry divisions, 3 infantry divisions, 1 artillery division, and 2 air divisions. Very strong opposition was met, but the Russians moved south

about 5 or 6 miles a day. When the Germans realized that this turning force could not be stopped they issued orders to abandon the south sector of their line along the Mius River, the first withdrawals starting on the 27th. On the 29th the last of the Germans went back from Taganrog, near the mouth of the Mius River. This was too late, for these forces were intercepted by the Russian armor moving slowly south. From 7 divisions, including 1 Panzer division, the Russians captured 5,100 prisoners and most of the materiel. This appears to have been the heaviest loss the Germans have had on the Russian front in this summer's campaign.

Now the Germans commenced to evacuate south Ukraina. This region contains great mineral and industrial areas, and its loss is a severe economic one. Due to demolitions it will not be immediately useful to Russia. The German retreat was covered by extensive mine fields and demolitions of lines of communication, coupled with energetic rear guards making frequent sorties against the pursuers in hit-and-run attacks.

On 4 September the Russians entered Nikitovka. On the 6th Kramatorsk and Konstantinovka were reached. The great steel city of Stalino fell on the 8th. On the 10th the Russians were at Mariupol.

On 10 September one of the German armored rear guards turned on the pursuers near Krasnoarmieskoye and, circling around, captured a division CP with its personnel. It then attacked the division from the rear and thoroughly scattered it. While this was going on leading Russian elements were at Chaplino, 30 miles further to the front. This illustrates the depth of the combat zone in modern open fighting.

Without serious fighting the Russians by 23 September had arrived on the line

Dnepropetrovsk (G)—Zaporozhe (G)—Vasilevka (G)—Fedorovka (G)—Melitopol (G).

The Russian advance in this sector has varied between 150 and 175 miles. At the end of this period the Germans had commenced to evacuate their beachhead in Kuban, which included the port of Novorossisk. At date of writing this evacuation had not been completed but appeared to be nearly so.

COMMENTS

1. *General Impression.* Consideration of the foregoing record indicates that until about 1 September the Germans strenuously resisted the Russian attacks. After that date the resistance was everywhere less, and over extensive sectors almost nonexistent.

It would seem that after the decision to withdraw had been reached on or about 4 or 5 August, the balance of the month was taken up with preparations for the retreat. This was accomplished without attracting the enemy's attention. The preparations being completed, the withdrawal when really started proceeded at a rather rapid rate.

2. *The New German Line of Resistance.* There is no information as to where this will be. Many think it will be the Dnepr River, but this seems to be pure guesswork. A river line is not a particularly good line of defense. The Russians were unable to defend the Dnepr line in 1941, and the Germans may not try it.

A withdrawal to beyond the Dnepr, now nearly completed, will uncover the land approaches to the Crimea. It does not necessarily indicate that the Crimea will be abandoned. The Russians held on to the Crimea for about 8 months after losing their land lines of communication thereto. The Germans may similarly hold.

3. *German Strengths.* On 30 June last, the Russians had identified 211 German divisions in Russia. Their estimate of 16 September shows 212 German divisions. There is no reason to doubt the accuracy of these figures. German divisions from Russia have been identified recently as arriving in north Italy and in the Balkans. Russia has identified on its front divisions just arrived from western Europe.

These bits of information indicate that divisions are changed on the Russian front, but that the total strength is being maintained at about the

recent usual figure. In addition to these German divisions, the Russians have identified 16 Finnish ones. The Germans have recently reported a Romanian division in their South Sector, in addition to 1 or 2 known to have been in Kuban. In all, Axis strength is about 230 divisions.

4. *Losses.* Nothing reliable is available as to this important factor. Both sides have "released" the following information as to their enemy's alleged losses.

TABLE I

Losses for period 5 July to 20 August			German report as to Russian losses	
Russian report as to German losses	Approximate per day	Killed and Wounded } Prisoners } Tanks } Guns } Trucks }	Total	Approximate per day
1,000,000	22,000		}	1,250,000
25,560	560	12,500		300
6,400	140	5,000		120
3,800	85	Not reported		
20,000	450			

On 6 September a new Russian estimate was made for the entire period 5 July to 5 September. No comparable German report is available.

TABLE II

Russian report as to German losses			
	Total 5 July-5 Sept.	Approximate per day, for period 20 Aug. to 5 Sept.	Total Increase since 20 Aug.
Killed	420,000	} 33,000	} 500,000
Wounded	1,080,000		
Prisoners	38,600	850	13,000
Tanks	9,441	200	3,041
Guns	7,930	270	4,130
Trucks	35,853	1,000	15,853

5. *Russian Strategy.* The Russians have shown considerable ingenuity in adapting themselves to new situations. When serious opposition has been encountered, they have not persisted in attacks which were not promising. They have abandoned them at once, and then immediately opened new attacks elsewhere.

On the long front of 700 miles or more, and with proper foresight in having plans, troops, and materiel ready, this rapid change of location for offensives has been advantageous. It requires a headquarters with a good imagination, ready to react instantly to sudden changes.

6. *Artillery.* The Germans have increased the amount of their artillery, but it is still below the Russian figures. German production appears to be still able to provide new guns in increasing numbers.

The artillery division is now normal on the Russian side. So are air divisions. Both are attached to task forces as necessary, to provide the necessary fire power to armor and infantry divisions. All together they form one whole.

Artillery divisions are normally charged with opening attacks. They are mobile, however, and can accompany armored troops in rapid advances.

7. *Rear Guards.* The old conception of having the rear guards occupy a suitable position from which they can compel the pursuing enemy to deploy for attack, after which they get away rapidly, is gone. Against motorized units positions may be turned within a matter of minutes.

Modern rear guards are composed largely of armored units—replacing the cavalry of previous ages. This modern rear guard does not occupy positions, but attacks the pursuer, or at least his leading elements. Taking advantage of mobility and of the terrain, the attacks may be delivered from any direction. Opportunity to penetrate deep into the pursuer's lines and disrupt his system of communication and supply, must be fully taken advantage of.

8. *Mine fields.* These are playing an important part in delaying pursuits. Ingenuity is required in locating the fields in order to facilitate counterattacks by one's own forces.

9. *Rear lines.* The Germans have been careful this summer to have rear lines sufficiently far back to be out of the area of the enemy's artillery preparation. Rear lines are covered by mine fields and other obstacles when available. Besides infantry and artillery, rear lines have armored troops. These endeavor to attack enemy penetrations by enclosing them between the front and rear lines. The probable location of the enemy's penetration can be determined by careful observation of his artillery fire.

Armored troops attacking between lines coordinate their attacks with the location of mine fields, and the troops posted in the outer and inner lines. It requires a high order of leadership to arrange for such counterattacks and deliver them at the proper place and time.

THE WAR AGAINST JAPAN (August 20 to September 20, 1943)

NEW GUINEA

By the beginning of this period a campaign had been initiated looking forward to the reduction of the Japanese base in the Salamaua—Lae area, which is at the head of Huon Gulf. This gulf is shaped like a 45° triangle, with Lae at the apex and Salamaua about 20 miles to the southeast. The enemy's next nearest important base was at Wewak, 300 miles to the northwest. A minor base of the enemy was the Alexis-hafen—Madang area, just about half way between Lae and Wewak. All these places are on the north coast of New Guinea.

At Salamaua and Lae the enemy's defenses included a series of fortified knolls and ridges. Cultivated plantations existed, and were separated from the few towns and each other by swamps and jungles. The interior of the country was high mountains. Much of the defenses were underground and interconnected. They were difficult to locate either from OPs or from the air. They were plentifully supplied with machine guns and mortars, and had some artillery. The enemy's strength, estimated as the remnants of 4 divisions, was believed to number some 20,000 men.

There was reason to believe that the enemy was depleted by sickness. Malaria is common in this territory; outsiders easily catch it unless carefully protected. Typhus and dysentery are common. These diseases naturally affected both sides, but the Americans and Australians believed that they had superior medical service and that they consequently were better off. The Japanese had beri-beri, a disabling disease due to a diet deficiency. Japanese meals were based mainly on rice; in this climate this was not satisfactory even for orientals.

Gen. MacArthur, commanding in the south Pacific, during the last half of August initiated a more vigorous campaign to quicken the elimination of the enemy-held Salamaua—Lae base. First was an effort to neutralize the supporting hostile base at Wewak, by a strong series of air attacks. On 17 August a massed attack was made. Out of 225 enemy planes identified from photographs as on the field when the bombing started, 120 were shown as destroyed—while the Allies lost only 3 planes. Next day the attack was renewed and 92 more enemy planes were destroyed on the ground. On the 21st a third attack resulted in a further enemy loss of 34 planes. This brought the enemy's total loss to 246, being more planes than he had when the attacks started; this is explained by the arrival of enemy air reinforcements.

Operations on the ground began on 19 August with an attack against Salamaua from the south. The navy cooperated by shelling objectives and enfilading the enemy's lines. This attack had strong artillery support, and was continued on the 20th. Progress was made, but it was slow. Continuing on, by the 22nd a ridge had been reached which overlooked the Salamaua airfield, which thereafter was unusable by the enemy. Coupled with the neutralization of the Wewak field it was believed that the enemy's air force would now be greatly hampered in its activities.

To maintain this condition new air attacks were made against Wewak on the 30th and 31st, resulting in the destruction of 37 more planes found on the field. On 2 September the Madang fields were heavily bombed (206 tons being dropped on them)

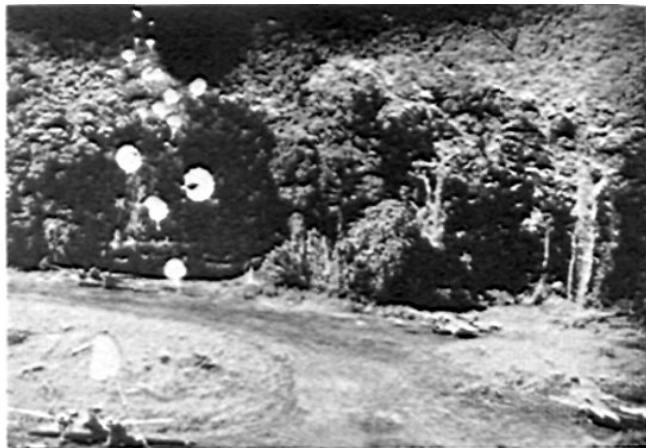
after which Wewak was raided again. Out of 35 enemy planes which intercepted, 12 were downed.

As it appeared that the capture of Salamaua by ground troops attacking from the south would be a slow operation, it was decided to invest the entire Salamaua—Lae area by new forces using two other possible lines of ground travel. In accordance with this plan a strong amphibious force was debarked on 5 September on the north shore of Huon Gulf, some distance beyond Lae. This landed at night, without opposition except from coast guard patrols. It then started an advance westward, as the Northeast Force, toward Lae.

Next day a parachute expeditionary force was dropped in the Markham Valley, west of Lae. This valley contains open country, and affords a practicable route to the coast toward Madang. With the two coast routes already blocked it was believed that all available routes overland into the enemy's stronghold were now closed and that the investment of the area was complete. The Markham Valley or West Force was supplied and reinforced by air. It met no resistance other than by minor forces.

A concentric advance against the enemy by the Northeast, South, and West Forces began to close in. Daily each made gains. The enemy remained on the defensive. It was noted





Parachute bombs land among dispersed Jap twin-motored planes on Dagua airdrome at Wewak. Parachutes slow the bombs so the bomber can escape their blast, and assure a proper position so fuzes will surely function.

that this was purely passive. Jungle and swamps caused more difficulties than did resistance. On 10 September the South Force's advance elements reached the Francisco River, just south of Salamaua. No enemy being observed, a report was made to that effect. Next morning they swam the river but found no enemy. The main body made a regular attack on the enemy's positions. These were heavily shelled by the artillery. When the infantry arrived the Japanese artillery was in position. So were a number of helmets on sticks, showing slightly above parapets—but no Japanese were observed.

On the 12th the three forces closed in. They entered Salamaua that day and Lae on the 17th. But the bird had flown. No enemy was found.

From statements of natives, the enemy started to evacuate his positions on 8 September. The natives observed a number sailing away in canoes, but were unable to explain what other means were used. At date of writing this has not been determined.

THE SOLOMON ISLANDS

When this period opens, our troops had previously taken Munda (on New Georgia Island), formerly a major enemy air base. He still had forces holding a restricted beachhead at Bairoko Harbor, 10 miles from Munda over unusually rough mountains and jungle.

Operations to reduce this remaining enemy post were pushed by land and by air. The enemy resisted savagely. Progress was slow, but the enemy must have realized that it was certain. On the morning of 27 August Bairoko was found abandoned. During the preceding night the Japanese had sailed away to adjacent Kolombangara Island.

About this time enemy activities on Santa Isabel Island ceased to be observed. The enemy had had a base in Rekata Bay in this island, but appears to have now completely

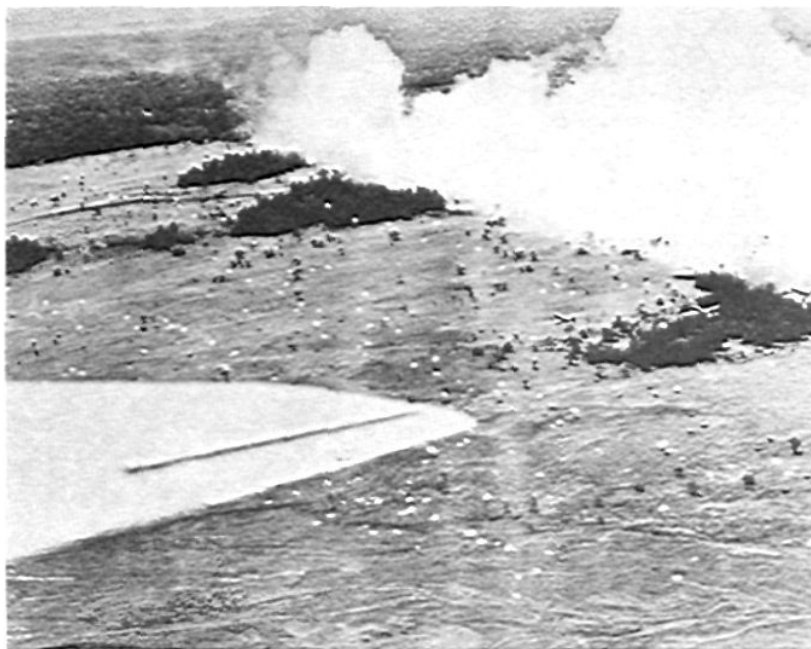
abandoned the entire area. His remaining hold on the Solomons is Bougainville Island, where the Japanese have large air bases at both the north and south ends, and which he apparently intends to defend. An advance base is on Kolombangara Island. As this is now practically surrounded by Allied bases, it is quite possible that the enemy will withdraw from here without waiting to be attacked.

In the meantime Kolombangara is being supplied by barges. Many are lost through the air and naval actions of the Allies, but enough seem to get through to maintain some kind of connection between Japanese forces.

THE SOUTH PACIFIC AIR WAR

American and Australian planes are gradually increasing their range of operations, without in any way neglecting targets at mid and short ranges. Main targets are enemy airfields and shipping, particularly barges. Raids include oil plants in Celebes and Borneo. Almost daily, by both day and night, a constant bombing of enemy bases in Timor, the Amboina Islands, New Britain, and New Guinea takes place.

All this air activity, and constant reports as to heavy enemy air losses against very slight losses of our own, would seem to point to a decline in the Japanese air strength. On the contrary, South Pacific reports are in agreement that the enemy's air forces are increasing and are now stronger than ever. The explanation to this seems to be that the enemy is constructing many more planes than had been imagined, and that he is training increased air personnel.



Australian paratroops took into the Markham Valley (west of Lae) light field artillery pieces designed wholly as a result of experience in the Owen Stanley campaign. These were all ready for action less than 3 hours after landing, even though the loads (weighing from 130 to 400 lbs. each) were scattered over wide distances in grass over 5 high. Strictly speaking, these were not paratroops—they were artillerymen who began this specialized training only 14 days before jumping into action. One of their lieutenants had never parachuted before; only 3 days before this aerial invasion he took the place of an officer who broke his ankle. U. S. paratroops also participated in Lae's investment, landing under cover of smoke laid by Boston bombers. Here some have landed, others are still in the air.

NORTH PACIFIC

At dawn on 1 September a naval task force (under Rear Admiral Pownall) attacked Marcus Island, an advance Japanese air base. Waves of planes followed one another, and appear to have devastated the island. One enemy trawler was sunk and 7 enemy planes were destroyed on the ground. We lost 3 planes.

On 13 September an air attack was made by Army planes on Paramushiru Island, the Japanese base in the north part of the Kurile Islands. This was successful but expensive. Besides bombing various facilities, our planes sank a cargo ship and damaged 3 others. Ten enemy fighters were reported as downed, out of 25 who intercepted. We lost 10 planes, all bombers. The distance from the nearest American base in the Aleutian Islands precluded having a fighter escort.

SOUTHEAST ASIA

On account of the monsoon season of constant rains, activities have been limited. There has been no change in the land front of Burma, and practically no enemy air activity other than reconnaissance. The Allies, however, have maintained a very active bombing campaign over Burma. Particular attention has been given to railroads and river communications. A great number of sampans (small native cargo boats resembling American canal boats) have been sunk or damaged.

A separate Southeast Asia Command was set up on 25 August for the "conduct of operations based on Ceylon and India against Japan. It will be an Allied command similar to that set up in North Africa." Lord Louis Mountbatten was appointed Supreme Allied Commander.

The frontier between India and Burma is jungle-covered mountains, deficient in roads. Stream lines are parallel to the frontier and normal to lines of invasion. Due to this condition an overland invasion would be constantly crossing either a mountain or a stream line. The difficulty of supplying large forces in such a country devoid of roads or any lines of communication extending in the desired direction, suggest that an invasion of Burma will probably be by sea.

Based on Ceylon and India, where large forces have been assembled, an amphibious expedition landed near Rangoon would have good lines of communication for a drive northward to open the Burma route. Such an advance would cut the enemy's lines of communication to Thailand and Malaya without exposing our own, as long as we retained control of the sea.

A preliminary operation might secure the Andaman and

Nicobar Islands as air bases. The nearest fields on these islands would be 300 miles from Rangoon, too far for fighters but not for bombers. If these are not taken the next nearest fields would be near Chittagong, 600 miles away.

An alternative to attacking Burma would be to attack Sumatra. This might be more dangerous to Japan, but it would defer the reopening of the Burma road to China.

CHINA

Our 14th Air Force, with headquarters at Chungking, has increased its activity by conducting frequent raids. Special attention has been given to the harbors of Haiphong, Canton, and Hong Kong, and to river transportation and utilities around Hankow.

According to reports from Chungking dated 1 September, the economic conditions of free China are steadily deteriorating. The Japanese blockade is stifling, and it is impossible to replace equipment which is rapidly wearing out. The Japanese are using the minimum force to cause the maximum paralysis of business and even of life.

In general, crops this year have been above average. In Honan there is a shortage of food, which is a standard condition for this province, but it is less than it was last year. In north China millet and wheat have been damaged by locusts for an estimated loss of 10%. In the vicinity of Tungting Lake, where the Chinese announced their great victory last May, there is a serious food shortage due to the destruction wrought by the enemy at that time. Were it possible to ship food from places where there is a surplus to where deficiencies exist, there would be enough for everybody. But the Japs hold key points of the transportation system. Another serious food shortage exists in Kwangtung. This is also a standard condition which normally was relieved by receipts of food by sea, which are now impracticable.

Prices are increasing extraordinarily. A keg of nails, worth \$5 two years ago, sold this spring for \$200. Food products have gone up from 90% to over 100% in the three months from May to July. Coal increased 40% in value.

Much illicit trade exists, perfectly known to and closely controlled by the Japanese.

The military situation of China is deteriorating. Due to food shortages many organizations are engaged in raising their own food. Communist organizations are showing increasing signs of discontent. In Shantung they are reported as engaging actively, but unofficially, against the regular China troops.

NOTICE OF ANNUAL MEETING, U. S. FIELD ARTILLERY ASSOCIATION

In compliance with Article VII, Section 1, of the Constitution, notice is hereby given that the Executive Council has fixed 5:30 P. M., Monday, December 13, 1943, as the time of the annual meeting of the Association to be held at the Army and Navy Club, 1627 Eye St., N. W., Washington, D. C.

The business to be disposed of will be the election of six members of the Executive Council (three Regular Army, two National Guard, and one Organized Reserve), and the transaction of such other business as may properly come before the meeting. Nominations may be made by proxy, or from the floor of the meeting.

COUNTERBATTERY:

Organizing For and Conducting It

1. COUNTERBATTERY FIRE. *a.* Counterbattery fire is delivered to neutralize or destroy hostile batteries in position. Normal gunnery technique is employed.

b. Intelligence agencies (terrestrial, air, and flash and sound ranging) constantly seek to locate hostile battery positions, observation, command posts, and ammunition dumps, and to keep track of the activity (firing, movement, reconnaissance, etc.) of hostile artillery.

2. CONTROL OF COUNTERBATTERY. The artillery officer of the echelon that is in contact is responsible for the control of counterbattery. For example, when decentralized control is effected by attachment of corps artillery means to a division or to divisions, the division artillery commander or commanders are responsible for the conduct of counterbattery within their respective zones of action. When centralized control is being employed, the corps artillery commander is responsible.

3. DECENTRALIZED CONTROL. Corps control of counterbattery, as a general policy, is the most efficient method. However, in mobile situations, and in the early stages of an operation, decentralization of counterbattery control to subordinate echelons is necessary. During a period of decentralization, corps should attach to a division: Additional headquarters, fire power, a flash and sound detachment, and counterbattery personnel from the corps artillery staff. An example of the technique of decentralization and of progressive centralization is contained in paragraph 18.

4. THE AVAILABLE MEANS. The corps artillery officer employs the following means for counterbattery:

a. The corps artillery, reinforced as necessary by the artillery with the divisions.

b. Supporting aviation.

c. The corps artillery staff.

5. THE CORPS ARTILLERY STAFF. *a. Organization.* The corps artillery staff has three principal staff sections: Intelligence, operations, and supply. The functions of the staff are considerable in number, magnitude, and complexity. The commander varies the organization and functions of his staff to meet the demands of the particular situation.

b. The intelligence section. (1) The mission of the S-2 section is to collect and evaluate information and to disseminate *timely* intelligence concerning artillery targets. Considerable additional intelligence of current value to G-2 is also collected and transmitted to that office without delay. A practical organization of the section provides a subsection for general intelligence activities and a subsection for counterbattery.

(2) The S-2, staff of the corps artillery commander, is the principal link in the chain of intelligence activities within the several field artillery echelons. He and his assistants must possess a thorough knowledge of the materiel, the organization, and the tactical employment of both hostile and friendly artillery.

c. The operations section. (1) The operations (S-3) section is primarily concerned with preparing detailed plans for the tactical organization and employment of the artillery with the corps, to include the movement and disposition of reinforcing artillery, and counterbattery. A practical organization provides one or more subsections for general tactical duties and a subsection for counterbattery.

(2) The counterbattery officer (asst S-3) is chief of the counterbattery subsection. He is responsible for the preparation of effective counterbattery plans and the instructions to implement them.

d. The counterbattery staff. (1) The counterbattery staff contains commissioned and enlisted personnel from the intelligence and the operations sections because counterbattery fire without evaluated intelligence is inefficient. The sections charged, respectively, with collecting and evaluating information, and with plans for the delivery of fire, should form a perfectly coordinated team.

(2) The organization must permit decentralization, by the attachment of counterbattery teams (S-2 and S-3 personnel) to subordinate

echelons during mobile situations. Such *attachment* is desirable for the following reasons:

(a) Members of the staff are trained both in their individual duties and in working together.

(b) The corps artillery officer, through his staff, is kept continuously familiar with the situation.

(c) Early and continuous functioning of the corps artillery staff will permit efficient, centralized control at short notice.

(d) The organic staff of the lower echelon is assisted by the specially trained technicians.

(3) Each individual is trained in his primary staff duty and in the duties of the other members of the staff. The need for training counterbattery personnel arises principally from the necessity for aggressiveness in collecting and evaluating information that is derived from multiple sources. An efficient counterbattery staff cannot be improvised. Failure to train the personnel will result in incorrect intelligence deductions and conclusions, in neutralization or destruction of our own batteries owing to premature assignment of missions that will expose friendly battery locations to an alert and trained enemy, in failure to execute remunerative missions, in the installation of extensive and useless systems of communication, in gross waste of ammunition, and in personal friction between the members of the staff and the commanders and staffs of executing units.

(4) Although the duty of training counterbattery staffs devolves primarily on corps artillery commanders, it is also the responsibility of all artillery commanders, above the battalion echelon, to be prepared to organize a counterbattery staff.

(5) (a) The figures set forth below provide what is considered to be the minimum of personnel and equipment for efficient operation. The figures do not provide for relief of personnel. The number of intangibles involved preclude giving a figure that will fit any and all situations.

(b) *Counterbattery team attached to a division.*

<i>Transportation</i>	<i>Personnel</i>
1 ¾-ton truck, WC	1 (2) officers, 1 draftsman, 2 clerks, 1 messenger (driver)

For a list of equipment see (d) below.

When a counterbattery team is attached to a division it should operate at the command post, as a unit, under the division artillery commander. Its purpose is to assist the staff of the unit to which attached in the conduct of counterbattery and to gain early information for corps, primarily concerning the location of hostile batteries.

When Counterbattery teams are functioning with each of two divisions during a mobile situation and the situation becomes static, the transition of counterbattery control from the divisions to corps or to a corps group is accomplished by either combining the short-base installations into long-base installations, or by setting up long-base installations with the remainder of the observation battalion. Continuous service to the troops is never interrupted. As soon as adequate communications are established, the teams in operation with the divisions are detached and revert to corps.

(c) *Counterbattery staff operating at a forward counterbattery center (FCBC) (par. 5d (9)).*

<i>Transportation</i>	<i>Personnel</i>
1 ¾-ton truck, WC	2 officers, 1 draftsman, 1 clerk, 1 messenger (driver)
1 ¾-ton truck, WC	2 officers, 1 draftsman, 1 clerk, 1 messenger (driver)
1 ¼-ton truck	2 switchboard operators, 1 messenger (driver)
1 ¾-ton truck, WC	3 radio operators w/radios, 1 messenger (driver)

(d) *Equipment for FCBC.*

- 1 Tent, command post
- 2 Telephones, EE-8
- 1 Switchboard, BD-72
- 1 DR-4 (2½ miles wire (light))
- 1 RL-27-B
- 1 SCR-284
- 1 SCR-608

Miscellaneous supplies (tracing paper, etc.)

NOTE: Items of equipment are carried in the vehicle with their respective operators.

(e) *Communication.* Rapid and positive communication is essential. Radio is the means initially. Wire is established as soon as practicable. To insure constant and rapid counterbattery communication, certain radio frequencies and wire circuits may have to be reserved for the use of the counterbattery staff and the executing units. The number of these means and the extent to which they are reserved are prescribed in the particular counterbattery plan.

(6) The following duties of a counterbattery staff illustrate corps control in a stabilized situation. It is presented as a *guide*. Modifications to meet a particular situation are made by the commander.

(a) Forms for the records referred to are found in par. 19.

(b) A minimum of records is maintained in mobile situations.

(7) *The S-2 (counterbattery) subsection.* The principal duties of this subsection are:

Study, evaluate, and interpret information of the hostile artillery.

Keep the intelligence officer and the counterbattery officer informed of the results of the evaluated intelligence.

Expedite the transmission of information and intelligence that is of current value to G-2.

Determine the degree of accuracy to be assigned to reports reference the location of enemy artillery.

Solve the tactical grouping of the hostile artillery.

Prepare so much of the daily S-2 bulletin as pertains to the hostile artillery.

Recommend zones of observation for the various intelligence agencies.

Recommend aerial photographic missions.

Examine enemy projectiles and fuzes to determine caliber and type and keep a check on all new developments.

Study and interpret aerial photographs.

File aerial photographs and keep the photo index.

Keep the photo key.

Keep the counterbattery journal, register, and enemy battery file.

Keep the (S-2) artillery situation map.

(8) *The S-3 (counterbattery) subsection.* The principal duties of this subsection are as follows:

Prepare the counterbattery plan and, when it is approved, issue the necessary instructions.

Keep the operations officer (S-3) informed as to the counterbattery situation.

Determine the special communication required for counterbattery.

Determine the amount of artillery required for primary and reinforcing counterbattery missions.

Prepare all prearranged counterbattery fire plans for the artillery with the corps.

Recommend position areas for certain counterbattery units.

Determine the amounts of ammunition required for counterbattery; the special types of ammunition required for specific missions; and the restrictions as to expenditures, if any.

Recommend the action to be taken to secure an improved accuracy of location of targets.

Recommend the method of adjusting fire on targets which are not accurately located, as for example to employ air observation, sound ranging, etc.

Keep the counterbattery chart.

Keep the record of the results of friendly counterbattery fire.

Keep the enemy artillery activity record.

(9) *The forward counterbattery center.* (a) When operating under the corps artillery commander or a corps group commander the counterbattery staff establishes the forward counterbattery center well forward and in a central location with respect to the units executing

counterbattery. Such a location saves time and reduces communication lines and their maintenance. The question of location is particularly important in a major operation owing to the extended front and the presence of large amounts of reinforcing artillery. A minimum of personnel may function at the corps artillery command post to keep the commander informed of the counterbattery situation and to collect information (from higher and adjacent headquarters), for the use of the staff at the forward counterbattery center.

(b) The forward counterbattery center will frequently be developed into the forward operations section of the corps artillery staff.

6. THE FIELD ARTILLERY OBSERVATION BATTALION is equipped to perform survey and to execute flash and sound ranging.

a. Flash ranging can locate hostile batteries by observation of flash, smoke, and dust; adjust friendly artillery by high burst or center of impact; and collect considerable general information of immediate value to G-2. Fog, rain, snow, and the lack of commanding observation may reduce its effectiveness.

b. Sound ranging can locate hostile batteries by sound and can adjust friendly artillery by sound methods. The capabilities of a sound-ranging unit are limited particularly by wind conditions.

7. AIR OBSERVATION FOR COUNTERBATTERY. Air observation that functions directly with the counterbattery elements is essential. It will frequently be the most effective, sometimes the only, kind of observation available for counterbattery. The observer can report targets; he can adjust fire rapidly; and he can often determine and report the effectiveness of fire. Air photographs, though not strictly air observation, are of particular value and will sometimes reveal which are actual and which are dummy positions. Air observation and aerial photography do not have to be executed from directly above the target. Vertical observation is desirable, but excellent results are obtained from within the friendly lines, both by observation and by oblique air photos. Air observers operating with artillery units give priority to observation of hostile artillery. A battery in position and firing is the most remunerative target for counterbattery fire; report of such a target is immediate. A firing unit is immediately assigned the mission so as to take advantage of the observer's ability to adjust the fire. When completed, the mission is reported direct to the counterbattery officer (par. 14b).

8. THE COUNTERBATTERY PLAN. a. The details of a counterbattery plan vary with the situation; the types and dispositions of the hostile artillery; the weapons and ammunition available; and, for an artillery preparation, the time available to the friendly artillery. During mobile situations hostile batteries are attacked when located; during static situations only those batteries that are executing particularly remunerative missions are attacked. This latter policy is frequently termed "The Sleeper Policy." Its aim is to create a false sense of security for the opposing artillery so that the batteries may not be moved prior to the preparation.

b. The following items are pertinent to all counterbattery plans:

(1) Designation of the units for primary or reinforcing counterbattery missions.

(2) Zones of fire.

(3) Special communication required.

(4) Specific allotments of kinds and quantities of ammunition for special missions (or when ammunition supply is limited).

(5) Definite assignment of means of observation (air, terrestrial, flash, or sound).

(6) Coordination with air bombardment plans.

c. In support of an attack, including any artillery preparation to be fired, the plan includes specific provisions, to the limit of the means available, for:

(1) Designation of specific artillery units in sufficient number to establish, at the beginning of the preparation, neutralization of known and suspected enemy batteries.

(2) Sufficient designated means to immediately attack such previously unlocated hostile batteries as open fire during the action.

(3) Designation of means to maintain adequate neutralization throughout the attack.

d. Details of the counterbattery plan for an artillery preparation:

(1) The first phase of the preparation seeks to gain ascendancy over the hostile artillery. To accomplish the mission it is usually necessary to reinforce the corps artillery during this period with division weapons.

(2) When more than one reinforced counterbattery phase is included in a preparation, the last reinforced phase should terminate not later than approximately two-thirds of the time period allotted to the preparation so that the division weapons are released for fire on the hostile forward areas.

(3) Prearranged fires (location and time) are employed to obtain the initial neutralization (FM 6-40) of located batteries.

(4) Maintenance of neutralization is obtained by the intermittent delivery of a fraction of the initial volume of fire, provided that a mass of fire is repeated at intervals. The responsibility for the maintenance of counterbattery should be fixed by the assignment of designated battalions.

(5) It is impossible to state an empirical formula for the amount of artillery required. In any particular situation the requirement is dependent on the number of batteries to be neutralized and on the weapons, ammunition, and time available to accomplish the mission. Calculations must include a factor that allows for attacking previously unlocated hostile batteries.

(6) The following method of preparing the plan will save time and reduce the probability of error:

(a) Mark with a pin the location of each enemy battery and of each battalion that will be included in the counterbattery plan.

(b) Assign a target number to each enemy battery.

(c) Place a rubber band about the pin that marks an enemy battery, stretch the band across the map in the direction of the executing battalions; by trial, select that battalion which will permit its succeeding missions to be executed by only range changes or range changes and the minimum deflection shifts. Connect the two pins by the band and leave in place.

(d) When all missions have been assigned, extract the necessary data for the plan of fire directly from the map.

9. ASSIGNMENT OF COUNTERBATTERY FIRE MISSIONS. *a Mobile situation.* Counterbattery fire missions are normally executed by those artillery units in general support that are included in the counterbattery plan. This statement should not be construed to mean that direct support or other units, on their own initiative and whether included in the counterbattery plan or not, do not execute counterbattery fire missions. Immediate neutralization is required by the fire unit which locates the hostile battery or that is most readily available when the intelligence justifies the mission. The counterbattery officer does not assign missions to units that are not included in the plan.

b. Static situation. (1) The counterbattery officer assigns routine counterbattery fire missions direct to battalions included in the counterbattery plan. The battalions selected are those that are displaced laterally with respect to the enemy battery. This selection has two distinct advantages:

(a) It secures at least a partial enfilade effect on the enemy battery.

(b) It may place the executing battalion beyond the counterbattery zone of responsibility of the headquarters for which the enemy battery is functioning. If this latter factor is attained (intelligence should always be sought as to the boundaries between hostile echelons of command) the

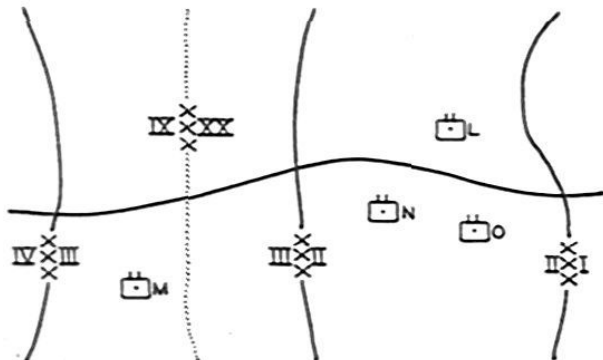


Figure 1. Assignment of counterbattery fire mission.

enemy will be required to request the units on his flank to search for the attacking battalion. In the general case the fire will have been accomplished before the enemy agencies in the proper zone of observation are alerted. This refinement is impracticable in a mobile situation.

(2) Fig. 1 illustrates the boundaries between the several Blue corps and between two Red corps.

L, enemy battery to be neutralized.

M, N, O battalions available to the counterbattery officer. Battalion M is selected.

10. TYPES OF WEAPONS. Normally both gun and howitzer units are included in the counterbattery plan. This combination of characteristics offers a flexible attack in both range and angle of impact. The type of weapon employed to accomplish a certain mission depends upon the range to the hostile battery, the type of enemy weapon, and the protection and defilade of its position. The more rapid rate of fire of light weapons generally compensates for their smaller projectiles when the hostile battery has little cover.

11. METHOD OF ATTACK. Neutralization, rather than fire for destruction, is the practical solution for the delivery of counterbattery fire. Neutralization is best established by delivering surprise fire in intense masses, employing at least a battalion on each hostile battery. Neutralization can be maintained by the intermittent fire of one or two platoons, reinforced at irregular intervals by massed fires. An accuracy of location in excess of "Q" (within 100 yds) does not, in the general case, justify the expenditure of ammunition (pars. 13 and 14).

12. AMMUNITION. Smoke shell (white phosphorous) mixed with high explosive is an excellent neutralizing agent; the hostile aiming stakes become indistinct or invisible; burning particles which cause severe casualties to personnel and general incendiary effect are spread over a considerable area; and if the hostile battery is using separate loading ammunition the powder is particularly vulnerable to the incendiary effect. When practicable, HE should be employed in the following priority: Time, ricochet, and quick fuze.

13. GRAPHIC LOCATION OF AN ENEMY BATTERY (Fig. 2). *a.* The location of an enemy battery is indicated graphically by the standard military symbol with the addition of a single line at right angles to the center of the base of the symbol. The intersection of the line with the base of the symbol marks the point designated as the location of the center of the battery.

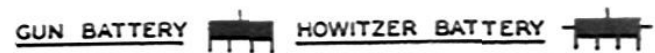


Figure 2. Graphic location of an enemy battery.

b. The type of gun or howitzer and the number of pieces is indicated to the left of the symbol; and the coordinates and the accuracy of the location to the right of the symbol. When any of the facts are unknown, a question mark is substituted. Several examples are given below.

(1) Hectametric coordinates:

Coordinate of point: 367.50-819.38.

The same location expressed in hectametric coordinates is: 7594.

This method may be employed when the map includes an area less than 10,000 yards square.

(2) Symbols: see Fig. 3.

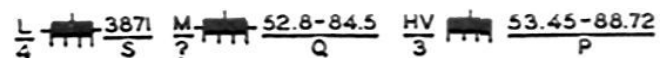


Figure 3. Examples of the graphic location of enemy batteries.

(3) Probable accuracy of location is indicated as follows:

P—Within 50 yards.

Q—Within 100 yards.

R—Within 150 yards.

S—More than 150 yards.

14. HOW TO REPORT THE LOCATION OF A TARGET AND THE TENTATIVE ACCURACY TO BE ASSIGNED THE LOCATION. *a.* A target is reported, when practicable, by coordinates.

b. Three types of reports and the tentative accuracy to be assigned by S-2 to each of the reported locations are illustrated below.

- (1) By an air observer:
 - (a) "Hostile Battery at 5791 (55.7-89.1)." Tentative accuracy R or Q, depending upon map used by air observer.
 - (b) "Hostile battery now firing at 5791 (55.7-89.1)." No degree of accuracy required if observer is to adjust fire ((2) below).
 - (c) The latter report is the most remunerative type for counterbattery fire. A firing unit should be immediately assigned to the observer.
 - (2) By a fire unit upon completion of a counterbattery mission:
 - (a) With air adjustment to include fire for effect: Report the deduced coordinates with a P accuracy.
 - (b) With air adjustment that was interrupted after obtaining a 200-yard range bracket: Report the deduced coordinates, with the following accuracies which are based upon the width of sheaf:

Firing Unit	Accuracy
105-mm or less caliber	Q
155-mm or greater caliber	R

(c) With an air adjustment which was not completed to include either of the conditions set forth above the judgment of the officer conducting the fire must govern.

(3) By a fire unit upon completion of a counterbattery mission (unobserved fire): Report the completion of the mission at the designated coordinates without change of accuracy.

15. EVALUATION OF INFORMATION. a. Each item of information received must be examined to determine: (1) The true reports from the false. The latter type of information may be due to one or more of many causes; as for example, incorrect recording or transmission of coordinates may place a real object in a false position. Or, an observer may report with accuracy a dummy position as an active battery; this places a false object in a real position.

(2) The degree of accuracy of location of the object reported after it has been established as having a probability of existence in the area reported.

b. Aids in evaluation. (1) A careful plot will give some confirmation and will assist in ruling out false reports. Assume that the position of a hostile battery as reported plots within the friendly lines or in a lake or swamp; this report is very probably false. Conversely, if the plot of a report appears reasonable some degree of confirmation may be assumed, but not with certainty.

(2) Each item must be weighed in respect to established intelligence criteria. The value of the latter depends upon the experience of the officer, his knowledge of the capabilities and limitations of each of his observing agencies, and the conditions under which the observation was made (such as the weather or day or night observation).

(3) Reports of air observers present a difficult problem in evaluation. Therefore the weight to be assigned individual reports will vary within wide limits. Some factors to be considered are:

- (a) The map available to the observer—a grid map will give relatively good accuracy, whereas other maps give only approximations.
- (b) The scale of the map.
- (c) The planimetric detail of the map.
- (d) The accuracy of the map.
- (e) The type of terrain.
- (f) The air observer's familiarity with the terrain.
- (g) The conditions under which the flight was made, such as weather, visibility, altitude, speed, and hostile interference.

(h) Experience shows that air observers normally report the location of more battery positions than the number of batteries which are actually present. This error occurs because the exact location of a battery position is difficult to determine and the observer is frequently influenced by observations that merely indicate the probability of a battery position. Personal conference with the pilot, following the flight, will frequently be of great assistance in evaluating his report.

(4) Mean errors that may be expected in the reports of trained troops operating under favorable conditions (these figures are a guide only):

- (a) Sound ranging—within 1½% of the range.

- (b) Flash ranging—short base—within 1% of the range.
—long base—within ¼% of the range.
- (c) Air observer—with a fire control map: 100 to 150 yards; with photomap: 25-50 yards.
- (5) To use the mean errors established, on the map:
 - (a) Describe circles of appropriate radii about the coordinates reported by the air observer and the sound-ranging unit.
 - (b) The area common to the two figures presents the most likely area in which to search for the reported battery (Fig. 4).

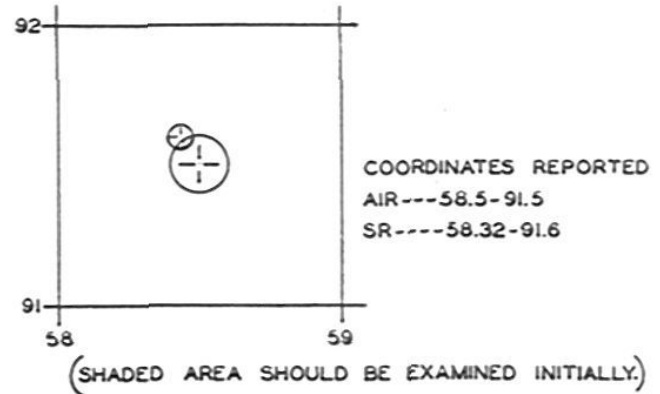


Figure 4. Composite plot of intelligence reports.

(6) Duplicate or similar reports may come from two or more agencies in close proximity to each other. This condition always raises the question whether all agencies are reporting the same target or whether multiple targets are present in the area. Each case must be handled on its own merits; however, the principle that follows will be found of value. When the conflicting coordinates are reported by the same agency, the probability is that each report refers to a separate target; when the conflicting coordinates are reported from different sources, the probability is that all reports refer to the same target.

16. ORGANIZATION OF THE FORWARD COUNTERBATTERY CENTER.

a. General. Ordinary intelligence messages received at the forward counterbattery center are processed for successive action from the chief clerk through the S-2 and S-3 personnel to the counterbattery officer. Thus the counterbattery officer receives as detailed a report as practicable upon which to base any decision. Urgent messages are given immediate priority.

b. Communication. (1) Wire. One switchboard and two telephones are required: One, each, for the chief of the S-2 subsection and the counterbattery officer.

(2) Radio. One SCR-284, one SCR-608.

c. Processing a message. It will be found convenient to employ a rubber stamp for impression on the back of the message blank, or (in lieu of a stamp) to attach a mimeograph form to each message. See Fig. 5 for a form for the stamp or mimeograph.

CB JOURNAL NO.

Register: S-2 Map: Plot Activity

Deductions:

Recommendations:

EB No. GP ACCURACY CB Chart

Action:

Result:

CB (office) Photo No.

Date:

Information:

Figure 5. Processing stamp.

This stamp or form precludes the necessity of duplicating messages, as it provides a space for notations by each group as it acts on the message.

17. RECORDS. a. The counterbattery journal (Fig. 10) is a means of chronologically recording the operations of the section. It includes entries as to the messages which are transmitted and received.

b. The counterbattery register (Fig. 11) consists of an ordinary blank book. A number of pages are allotted to each twenty-four

hour period. The space allotted this time period is subdivided into fifteen-minute periods. Every message is entered in the register in the time space to which the message REFERS. The register is a means of quickly linking together several messages which refer to the same enemy artillery activity but which may not be received at the same time. The entries in the register are more complete than those made in the journal. The register is a convenience; its maintenance should not retard the operations of the office.

c. *The enemy battery file* (Fig. 12). (1) The enemy battery file is a chronological record of information pertaining to a particular battery and of our ability to take counteraction against it.

(2) AN EFFORT TO COMPILE ALL THE DATA INCLUDED ON AN ENEMY BATTERY IS NORMALLY UNPRODUCTIVE DURING MOBILE OPERATIONS.

d. *The S-2 artillery situation map*. (1) The S-2 artillery situation map presents graphically the existing enemy artillery situation to include the front lines, enemy artillery positions and organization for combat, the enemy and our own observation means, and known enemy activity.

(2) All information is posted by means of standard military symbols. It may be desirable to employ different colors to indicate different calibers, etc.

(3) The volume of available information indicates when multiple overlays are required to depict the several items of intelligence.

e. *File—air photographs* (Fig. 13). (1) Aerial photographs are filed in envelopes. One envelope is prepared for each grid square and is identified by the coordinates of the grid intersections of the lower left corner of the grid square; for example, (54-89). If the volume of pictures relating to a single grid square will require more than one envelope, the additional ones may be given a subtitle, as (54-89), a). Enemy batteries located on individual prints are listed on the back of the photo.

(2) It is unnecessary to transcribe from the print the air-service photo numbers, as they may be obtained from the print at any time. The photos are indexed, V-1, V-2, O-1, O-2, etc. (Fig. 14). An assignment of blocks of numbers to the several areas of the map will offer simplification.

f. *The photo key* (Fig. 14) is a blank grid onto which is transcribed the location of the center of a photo, accompanied by the photo office number.

g. *The counterbattery chart*. (1) The counterbattery chart presents graphically the artillery situation of the enemy and of our own forces. Pertinent information includes front lines, battery positions, unit observation posts, sound-ranging and flash-ranging posts, command posts, zones of fire, organization for combat, areas subject to hostile artillery activity, and ready reference of counterbattery means.

(2) All information is posted by means of standard military symbols. It may be desirable to employ different colors to indicate different calibers, etc. The volume of available information indicates when multiple overlays are required.

h. *Enemy activity chart; enemy activity record* (Fig. 15). (1) The enemy activity chart can be posted on a blank grid. It indicates the locations on which enemy artillery fire has been delivered, and, when known, the enemy battery responsible.

(2) The enemy activity record possesses the advantage of taking up less space than the chart and, in addition, permits a means of recording information that is insufficiently complete to be posted on the chart—as, for example, when only the direction from which fire was received is known.

(3) The enemy activity chart and record are valuable aids in selecting the probable enemy batteries responsible for fire on a particular area, and thus assist in rapid counteraction. Likewise, they are valuable in preparing counterbattery fire plans as they provide the information as to which enemy batteries are most dangerous to any specific part of the front. Tentative position areas for reinforcing artillery should be selected from the chart and the record by noting the areas least subject to enemy fire.

18. A SITUATION TO ILLUSTRATE PROGRESSIVE CENTRALIZATION OF COUNTERBATTERY CONTROL. a. *The successive steps in effecting centralization are illustrated in the following diagrams. It is again emphasized that there can be no control without communication.*

- b. *The diagrams are schematic.*
- c. *General and special situation.* (1) Red and Blue are at war. (2) Red has invaded Blue territory with a force estimated as an army corps less one division. (3) The Blue I Corps is advancing to meet the invader. Formation: 1st Infantry Division, reinforced, is leading the advance with the 2d and 3d Infantry Divisions echeloned to the right (east) and left (west) rear, respectively. (4) Attachments: 1st Infantry Division. xxxxxxxxxxxx 101st Field Artillery Battalion (155-mm howitzer). Flash and sound detachment. Counterbattery personnel (staff-corps artillery commander).

- d. *Special situation continued.* (1) The 1st Infantry Division, reinforced, has made contact with Red and is developing the situation. All the artillery with the division has been committed. (2) The artillery wire system established is illustrated in Fig. 6.

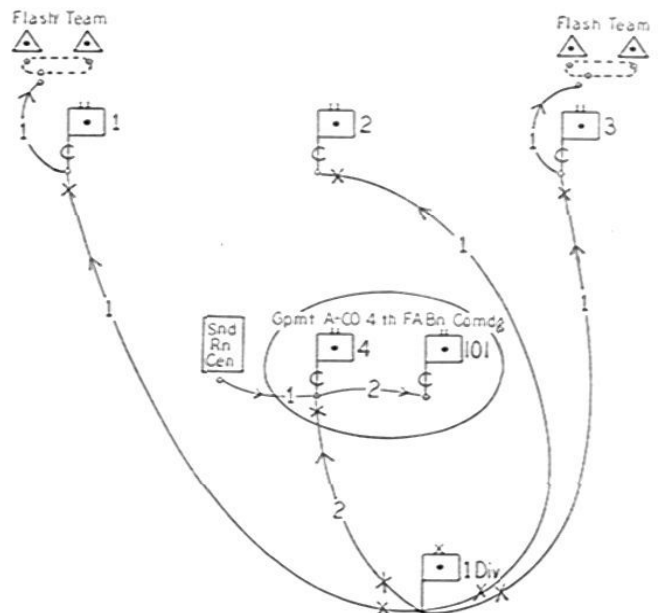


Figure 6. Wire circuits—counterbattery team attached to a division artillery, reinforced.

- (3) The artillery radio nets established are illustrated in Fig. 7.

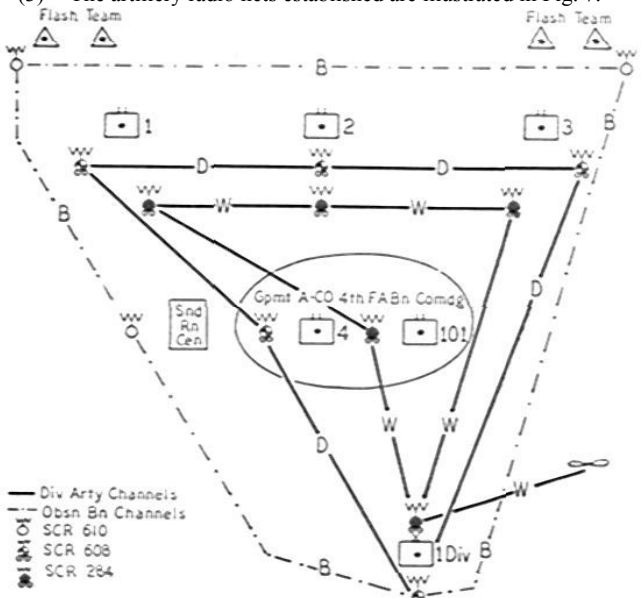


Figure 7. Radio nets—counterbattery team attached to a division artillery, reinforced.

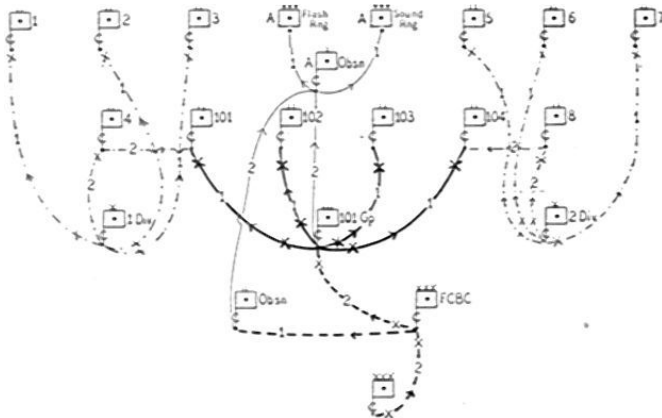


Figure 8. Wire circuits employed by corps in the execution of counterbattery.

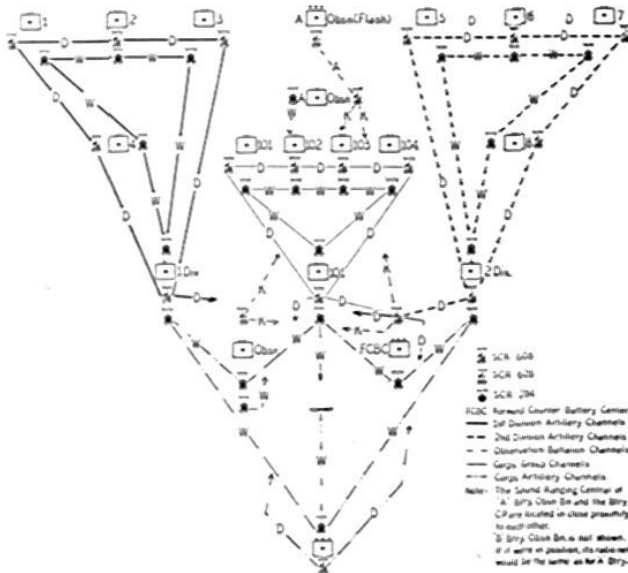


Figure 9. Radio nets employed by corps in the execution of counterbattery.

UNIT: VI Corps Arty.
 PERIOD: FROM (0900): (2 Dec 41)
 TO (0400): (3 Dec 41)

Entry No.	How Transmitted	Time Sent	Time Received	Source	Latest Message	Location of Enemy Unit	Action Taken (to)		Remarks (and cross references)
							Time	Nature	
1	Tp	0900	0750	2d Div Arty	Cont at 132.8-87.2; 6748 ltry M./how-16 rds. Dir 1st Co 2209	7	0910	Obs. Bn	
2	Ed	0915	0910	Air Obsn	AF: M./how	4491	0917	9th FA Bn	CB (4)
3	Tp	0940	0932	SK	L./how firing 6820-6825 2 how	5692	0945	9th FA Bn, SK	CB by SK
4	Magr	0920	0910	9th FA Bn	Range-CB adj	54.22-89.27			Neutralized (2)
5	Tp	1000	0905	SK	He. gun-Bn firing 6940-6950, 30 rds	52.1-52.4 59.4-59.1	1000	AF/obsn photo	
6	Magr	1000	0930	SK	9815-20 rds M./how-4 pieces	6291			(2) (4) (7)
7	Magr	1300	1240	5th Div	Cont at 135.6-83.2; 1239 Bn L./how, approx 60 rds. Bureau Co 2509	7	1315	Obsn Bn	V Corps Arty

NOTES: (a) The journal includes all messages received or transmitted, and all counterbattery missions conducted either as a result of current information received or previous intelligence.
 (b) Missions are given, if any, for fire or verification.
 EXPLANATION OF ENTRIES: No. 2.—The air observer reports via radio that an enemy battery (M./how) is firing from the vicinity of 4491 (hectometric coordinates). The mission was immediately assigned to the 9th FA Bn so as to take advantage of the air observer's ability to adjust the fire. Entry 4 refers to this mission, hence the cross reference.
 No. 3.—Sound ranging reports that two light howitzers were firing from 5692. The mission is assigned jointly to the observation battalion and the 9th FA Bn; adjustment to be executed by sound ranging.
 No. 5.—Sound ranging reports that heavy guns believed to be a battalion executed a ten-minute mission from 6940-6950 and transmits the location of two batteries. The AF was requested to observe the area and to make a photo.

Figure 10. The counterbattery journal.

2 Dec 1941

Time Period	Messages	Journal No.
0900 to 0915	AF: BF 4491 M./how-6810	2
0915 to 0930	SK: L./how 2 firing-5692-6825-6825 SK: M./how 4 firing-6291-6815-70 rds	3
0930 to 0945		
0945 to 0959		

Figure 11. The counterbattery register (a one-hour period is illustrated).

EB No.—54.22-89.27 (F) Cp. A
 Zone of Fire (approx) Co 2509 to Co 2609

Coldest Type: No. of pieces—150-man How (4)
 Priority for CB—9th FA Bn
 Capt. A
 20th FA Bn

Activity: Inf lgt.

OBSERVATION:
 AF—yes
 FLASH—no
 SOUND—yes

REMARKS:

EB No. w/ Auxiliary Assigned to Location	Gp	Cal and No. Guns	Comds Reported w/ Auxiliary Assigned to Location	Source	Chain, line of sight; No. of rounds	Observation (Tgt)	Journal Reference	Photo Taken (Date and No.)	Result
54.22-89.27 (F)	7	M./how-7	4491 (SK)	AS	2 Dec 0910, 7	7	2		
54.22-89.27 (F)	A	M./how-4	54.22-89.27 (F)	9th FA Bn	2 Dec 0915, 20 rds	7	6		CB
54.22-89.27 (F)	A	M./how-4	Furman, Co 2509	3 Div Arty	3 Dec 0920-0925, 30 rds		10		
54.22-89.27 (F)	A	M./how-4	54.22-89.27 (F)	AS-Photo	2 Dec 1000		7	2 Dec V20	Btry later 230 on ledge, 110 yd lateral x 15 yds in depth.
54.22-89.27 (F)	A	M./how-4	54.22-89.27 (F)	AS-Photo	2 Dec 1300				Btry moved NW on Kester St, dismounted in woods.

NOTES: (1) During outside situations missions will occur in the record. Several batteries may be included on a single sheet.
 (2) The enemy battery number (use coordinates only) and the group designation in the upper left hand corner should be printed as they best agree with the last column under Enemy Battery Number, and Group (columns 1 and 2).
 (3) Column 1 indicates the impression on the tentative accuracy of location of the battery owing to successive reports received.

Figure 12. Enemy battery file.

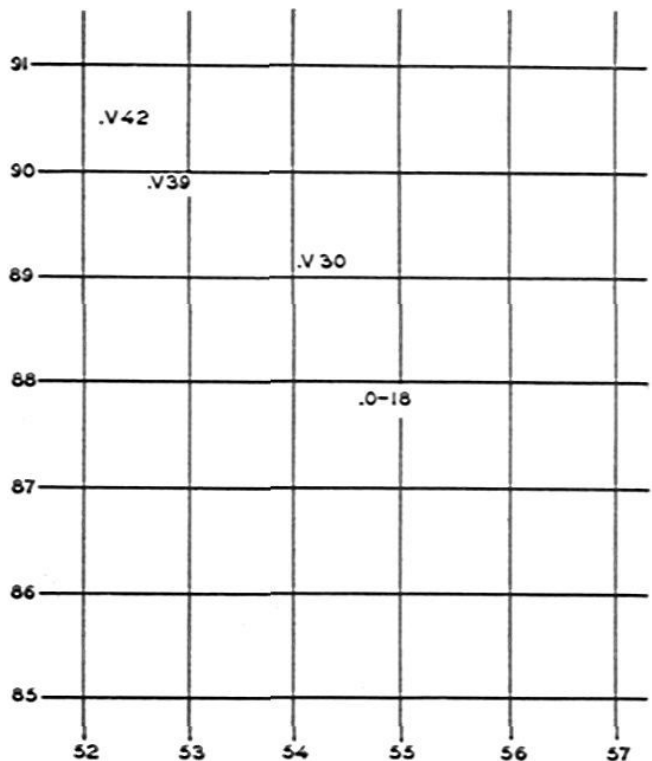



Figure 14. Photo key.

Photo File No.	Date and Hour	Area Covered	Scale	Information	Remarks
V30	2 Dec 1530		1:19950	EB 54.22-89.27	Btry faces SW from deep hedge—4 pieces. 110 yds lateral X 15 yds depth.

NOTES: 1. The spaces in the "Area Covered" column are square so as to represent the grid square. The portion of the grid square covered by the photo is shaded.

2. The photo file number only is necessary. If duplicates are required—the air service index numbers can be copied from the photo.

Figure 13. File—air photograph, grid square (54-89).

e. *Special situation continued.* (1) The remainder of the 101st Field Artillery Group has been committed to cover the development of the remainder of the corps. Pending the establishment of corps communication, a forward counterbattery center is established in the vicinity of the corps artillery group command post and conducts counterbattery under group control. The counterbattery teams attached

Area Shelled	Information	Journal No.	Enemy Unit			Remarks	
			Coord	Cal	Area or Group	Last Activity	Misc
53.8-87.2	16 rds: 0740 Ca 320	2 Dec 1	-----	155-mm how	-----	None previous	O b a n Bn

NOTE: Information includes known data as to the area shelled, number of rounds, time, type of target attacked, direction from which fire was received, new types of projectile or fuze, flash bearing, etc.

Figure 15. Enemy artillery activity record, grid square (53-87).

to the divisions continue to operate on their established bases until corps improves the installation. The 101st Field Artillery Battalion may revert to the control of the 101st Field Artillery Group.

(2) The artillery wire system established is illustrated in Fig. 8. All circuits previously established normally remain connected.

(3) The radio nets established are illustrated in Fig. 9.

19. FORMS AND RECORDS. These forms and records are referred to previously in par. 17.

IF I HAD TO DO IT OVER

By Lt. Col. Joseph R. Couch, FA

Many articles have been written to assist an officer in preparation for overseas movement. Possibly some of the material contained in this article is repetition. Even so, it may save some officers still in the U. S. some of the mistakes that many of us made in coming overseas.

An officer's personal and financial affairs are of great importance. If you have even a suspicion that you might take a boat ride soon, start now to "put your house in order."

Get your allotments started. I have found that for service in England and North Africa I needed only \$75 to \$100 per month, no more. Most officers that I know retained more than this and found it necessary to make changes after coming over. Correspondence is long and difficult. Errors creep in.

Notify your insurance companies, your bank, and your creditors of your change of address, or (better yet) arrange to have statements and bills sent to your wife, mother, or other relative. A bill that follows you halfway round the world may be long overdue before you can settle it.

If you have been putting off buying more insurance, changing your beneficiary, renewing your mortgage, or making your will, do them all now. Many of us waited too long.

Have photostatic copies made of your marriage certificate, your own birth certificate, and of the birth certificates of your dependents. Put these in a safe place. They may save your dependents long delays in collecting insurance and pensions and in settling your estate, should you become a casualty.

In the matter of equipment to carry, I will not attempt to give you a complete list. A good one appeared a few months ago in THE FIELD ARTILLERY JOURNAL. Others are published at intervals by division and corps headquarters.

Here are a few items that I would add. If they are already on your list you may regard them as doubly important:

(1) **A good map carrier.**

Make it waterproof with an acetate cover so that a map can be studied in a rainstorm or duststorm.

(2) **A fiber-backed notebook.**

This is for use in firing. Add to it sensing pad, ruled paper, small deflection fans and pins. Take anything else that you can think of to help with your shooting.

(3) **A travel alarm clock.**

This will help to get you up for those midnight guard inspections.

(4) **Extra insignia plus that for next higher rank.**

These are always hard to get.

(5) **Two toilet kits.**

A small one for your field bag, the second larger and more complete for your val-pack or suitcase.

(6) **A waterproof, shockproof wrist watch.**

You will not be able to give a watch good cleaning and repair service.

(7) **A good pair of sun glasses.**

You'll need 'em.

(8) **Two good lighters (if you are a smoker).**

Extra lighter fluid can be put to good use. It is ordinarily scarce among canteen supplies.

I would *not* take:

(1) **A foot locker.**

You'll store it with the QM sooner or later—probably sooner. It is easily possible to live from your val-pack, field bag, and bed roll. Do it from the start.

(2) **An over-abundance of soap, cigarettes, and shaving cream.**

They occupy valuable space in your luggage and are supplied in sufficient quantities by the Quartermaster.

(3) **Excess clothing.**

That which you take should be good, if possible new, but you can purchase replacements from the Quartermaster.

As a final note on equipment I will add my voice to that of others who say that a good sleeping bag and air mattress are priceless.

Do a bit of planning now for that possible overseas move. You will have reason many times to be thankful that you did.

RAG MINE

Examples have been reported of the enemy slipping a rag containing a small package of gunpowder between the gas line and exhaust pipe of unguarded motor vehicles. During the African campaign, one jeep driver, noticing a bright light coming from under the hood, found a rag and threw it out. It exploded on the road.

—Army Air Forces

A SUMMARY OF TUNISIA

By Capt. Woodrow M. Smith, FA

Our landing at Oran was fairly uneventful. After a short lay-over near Oran we marched straight east. Our marching ended when we reached the Pichon area in Tunisia. The situation was so urgently in favor of a German breakthrough that we were thrown into action before we had time to get over the riding cramps.

THE ACTIONS

For seven days straight we did nothing but stay on the defensive. Defend all day, reconnoiter to the rear, and move each night — that was the menu for the first hectic week. Finally we made a stand at Sbiba. They hit us with everything, but we didn't move a lick. The German called off his horses when he could no longer advance.

Throughout our defensive action I was constantly impressed by the rapidity with which the enemy followed our delaying actions. On several occasions we very carefully pulled out at night, marched at least 15 miles to the rear, and took up a new line of defense. Each time the German had found us by morning and had made plans for a morning attack. The German really knows all the tricks.

After Sbiba the tide turned for us. We attacked at Fondouk and ran into plenty of trouble. The infantry couldn't budge, so we let the German taste some real barrages. Prisoners taken by our infantry admitted that they just could not stand such artillery. Needless to say, we were delighted to find our strength.

From Fondouk we moved on to Sidi Nsir and took part in the action around Hill 609. Observation was non-existent at first, so we used our Cubs to full advantage. Our OP was up for seven hours the first day amid all kinds of trouble from the "Mess-ups." The air observers located so many targets that we could hardly haul in ammo fast enough to "Wilco" on all missions. Believe me, it was a shooter's paradise—with FO methods ruling the roost. We shot every imaginable mission, including plenty of counterbattery. In this action we shot off of survey to be close on the first round—the observer moved them in from there. Smoke was indispensable when observers were confused by other people's shooting. Again the German prisoners had nothing but admiration and respect for Yankee artillery fire.

After this action we moved toward Tebourba for our final action. The German here again demonstrated his ability to occupy key terrain features. His defenses were so arranged that we were forced to occupy a "football field set-up" with the Boche as spectators. In spite of the inherent difficulties the logistics involved demanded a daylight occupation. We marched into position, mind you, in closed column (100 yards between vehicles, roughly) and in plain view of the German. We tramped on it plenty over the last 800 yards, because it sure wasn't healthy to loiter. Total damage: 1 jeep. It was just too lucky to be true!

Once into position we shot our Cub into the air and went right to work on the German. We discovered that he had been using AT weapons on us during the occupation. In a very short time we sure made it rough on the guns that had caused us all the anxiety. During the rest of that action we shot nothing but time shell. It works wonders on stubborn defenders—makes them feel naked in their foxholes.

After several days the action just stopped—our recon elements just couldn't find any Germans anywhere! The resistance had folded up in Tunisia all at once. We had been in action continuously for three months. It surely was a wonderful education. What did we learn?

THE LESSONS

From the Boche

The German is a superb artilleryman. His one-round adjustments were always catching us with our necks out.

He doesn't use an air OP, or at least none of us ever saw one around.

His guns are invariably in the open and damn well camouflaged.

His time fire is the best punch he has. The German does very little barrage shooting—most of his artillery fires are observed and are short and sweet.

He likes to use his AT guns on counterbattery work. We found some of his AT guns right up with his infantry. The 88 is OK, but it isn't the obstacle that the periodicals would have you believe. The gun is so cumbersome and has such a flat trajectory that they get 'way back to do any good. We could hear those 88 size cannonballs coming for miles. Furthermore, when our Cub went up to look for their guns, the 88s always kept plenty quiet.

Last but not least we found that the German was just as confused as we were when the plans go haywire. Get him out in the open or disrupt his careful plans, and the game is won.

Our Side of the Picture

We had great luck with forward OPs. It's a tough racket but it sure produces results. You just "gotta" get out with the doughboys or you never know where the lines are. We put enough of our forward boys out so that all sections of our sector were under observation.

The Cub was invaluable. It works like a charm.

Our transportation is far superior to that of our enemy.

We surveyed ourselves in in every position—on two occasions the survey was completed at night.

Our FDC set-up works like a charm too. It surely is the answer.*

Enemy tankers are full of respect for artillery batteries. They wouldn't think of crossing swords with us.

Wire is still the answer. We always put it in to LnOs and all.

Fox-holes are wonderful things. It's amazing how soon the men found that out!

Last of all I sure am glad that I'm an artilleryman. It's really a "super" branch.

*Capt. Smith served with a battalion of the 34th Inf Div Artv. Each battery maintained a CP near its gun position at all times, organized for preparation and conduct of fire by both observed and unobserved methods. A salient feature of this CP is a firing chart which as nearly as possible duplicates that of the battalion. Thus there can be a system of *decentralized* preparation and conduct of fire, but one which permits *quick* adjustment and fire for effect by individual batteries or *rapid* concentrations by battalion—whichever is desired.—Ed.

COMBAT AVIATION AND FIELD ARTILLERY

By Maj. Roy C. Flannagan, Inf.

Although for many years combat as well as reconnaissance aviation was understood largely in terms of cavalry, and as recently as the campaigns in Poland and in France the then redoubtable German Stukas slashed at their targets like raiding dragoons, ground commanders recently have begun to think of aviation predominantly in terms of field artillery. Allied bombing operations now are far beyond the limiting category of raids. They have become integral and often decisive factors of campaigns and battles. Their purpose no longer is merely to harass but to knock out the enemy.

The tendency to call bombardment aviation "artillery" is deplored by airmen, but the fact remains that some of the most spectacular and successful missions of the Tactical Air Force in Tunisia and Sicily were artillery missions, and some of the most effective were flown in close support of ground troops on the battlefield. Similar experience has been reported from the Southwest Pacific. Regardless of the doctrine indicating the vital special functions of air power, flyers as well as artillerymen can benefit by comparing the new arm with the old. Such a comparison reflects credit upon both, and it clears a path for cooperative action in future, greater campaigns.

While an airplane and a field piece are as widely different as a horse and a half-track, they both deliver explosives with the same effect against similar targets. As supporting weapons they often have identical or overlapping missions. Likewise both have highly elastic fires, for concentrations of bombs can be shifted from one target to another with the same freedom as are concentrations of shells. The machinery for the control of air fires also is similar to that of the older arm, and it is operated through a special channel of communications like that of the field artillery. Support aviation sends to the supported unit an air support party with a function similar to that of the artillery liaison party, and requests for fires are processed through a control party which conducts what an artilleryman would call a fire direction center. In some situations, also, combat aviation may use forward observers on the ground, as well as aerial observers, during action against battlefield targets.

In any academic comparison of artillery and combat aviation, however, it always must be remembered that *close* support only occasionally may be a priority mission for the airmen. The flyers have a multitude of tasks which often thrust the supporting role far down the list. To begin with, the tactical air force of a theater must wage an aerial war in order to gain control of the air above the scene of ground action. Thereafter, it may be employed to reinforce the heavy bombers in strategic attacks against distant targets, or used against enemy installations upon the edges of the battlefield remote from the point of contact between the opposing armies. For days or



AAF attacking enemy positions at Maknassy and Mezzouna.

weeks ground troops may see but little of their air striking power—and even then it may be committed in front of the critical effort only.

Other factors restricting the employment of combat aviation in artillery roles include the natural physical limitations of aircraft, dependence upon good weather, need for elaborate supply and airdrome installations, the fragility of the planes, and their reduced effectiveness at night. Artillery is firmly wedded to other ground arms; it is tough enough to accompany them anywhere and fight at any time. Aviation, on the other hand, is a fair-weather companion who, for all his frightful effectiveness as a destroyer, can function only on certain favorable occasions. The limitations of air power must always be kept in mind and, if necessary, operations of whole armies (when dependent upon air support) must begin only when conditions enable combat aviation to operate with maximum effect.

Be all this as it may, aviation has been employed frequently to supplement artillery and other ground fires, and in coming months it may be so used upon many another occasion. In Tunisia combat aviation worked like close support artillery in front of Montgomery and Anderson's armies and helped to beat paths through deep defensive zones. Previously at Sevastopol and Leningrad, air fires strengthened other fires against deployed troops and strong points in the path of the advance.

It is well, therefore, for artillerymen to give our rapidly developing doctrine of combat air support careful consideration so that adequate coordination of striking power can be obtained under all circumstances.

On the basis of recent experience airmen believe that their role in a tactical operation should be in three phases:

Maj. Flannagan has written one of the clearest accounts of the role of combat aviation that has come our way. He knows both sides of the picture, air and ground. In the last war he was rated a pursuit pilot. For 15 years a reserve officer in the air corps, he subsequently became an infantry officer. Maj. Flannagan is now on duty in the Air Support Branch of a G-3 Section.

Phase 1: Neutralization of the enemy air force, to secure air superiority in the theater of operation. This will call for an "air war" in which hostile aviation will be assailed in the air and at the airdromes. This aerial campaign will support the ground troops by keeping many enemy aircraft from operating against them.

Phase 2: Attack against enemy supply installations, transportation, and reinforcements, to isolate the enemy front at the point of critical contact. This is a vital supporting role since it tends to destroy the ability of the enemy's ground forces to continue fighting by depriving them of ammunition, food, and reserves. This mission resembles that of long range artillery.

Phase 3: Close support at the critical point on the battlefield. This is the mission which resembles and parallels that of artillery in close support.

Obviously if Phases 1 and 2 of the air action are completely successful, the ground troops may be able to advance readily without close air support. Nevertheless, experience has shown that battlefield support frequently is desirable and necessary. The additional fire power provided by a large concentration of aircraft tends to speed up the action and make victory more economical.

In the execution of Phases 2 and 3, air action must be closely coordinated with that of artillery and timed for the best effect. In some situations artillery smoke shells may be used to point out or mark certain targets for aviation. At El Hamma in Tunisia, artillery marked the bomb line of the supporting airplanes, which dropped their explosives ahead of the barrage, and on one occasion a target was pointed out by a line of high burst smoke shells. In some situations artillery observers and observers from air support parties may cooperate, and special communications may be established for an exchange of information between artillery and aviation.

In the coordination of air and artillery fires upon obstacles in the path of the ground troops, a commander normally will request aviation to bomb those targets which artillery fires cannot reach, or those which require the massed effect of all available fire power. In the timing of the air fires, an important factor, he must make sure that they properly supplement other available weapons, and that the supported troops will be able to take prompt advantage of the neutralization effect of the fires by moving quickly into the battered enemy positions as the bombardment ceases.

In most situations the principal air-artillery fires will be planned in advance, and a thorough understanding will be reached between the air and the artillery commanders upon the basic mission and upon joint action in view of all predictable eventualities. The plan will include the areas in which air and artillery fires initially will be massed, including bomb safety lines and provisions for special air-ground signals. In some situations arrangements can be made for use of artillery bursts to designate targets against which combined action may be necessary, as was done in Tunisia. Security measures may include plans for action against enemy aircraft which may break through our fighter screen to make sorties against ground elements, including batteries.

In capitalizing the elasticity of aviation particular attention will be paid to planning air missions against targets of opportunity—targets which suddenly appear as obstacles to the advance. Normally pre-planned mission orders will include instructions for action against targets of opportunity that are spotted from the air. For instance, a flight leader who sees an enemy armored

battalion huddling in ambush ready to attack the flank of our advancing infantry would give it a priority determined in advance; probably he would hit it as soon as he sees it. However, targets of opportunity *spotted from the ground* are more difficult to handle because they require speedy ground-to-air communication during the confusion of battle.

Suppose, for example, the main effort consists of a rapid advance in three columns through an area believed to be lightly held by the enemy. The two flank columns proceed according to plan but the center is held up by an enemy position on a formidable land mass. Artillery available for fires against the hill is insufficient to reduce the target quickly, so it is necessary to bring reinforcing air action against it.

Under ordinary conditions such a target would be reported by the leading battalion through its ordinary channels of communication to division with request for fire support. The division commander thereupon would consult his artillery commander and his air support party officer, and, deciding it is a proper objective for supporting aviation as well as artillery, would send in a request for air support through the air officer. This request thereupon would be considered by the air support control officer, air support commander, and the army commander, weighed in its relationship to similar requests from other divisions engaged at the time. The order for the mission would then go to the airdrome and the mission would be flown.

Meanwhile it would be necessary to issue orders by which the leading elements of all three advancing columns would identify their forward positions to our aircraft at the proper time. Establishment of a special bomb line would be required so that supporting aviation would not strike friendly troops. Identification of ground troops by prearranged means (such as display of panels or use of colored smoke) must be coordinated with the arrival of the planes.

All of this would take several hours. Arrangements therefore generally are made whereby air missions against ground-observed targets of opportunity can be processed quickly, like those of artillery units. This can be accomplished by having a representative of the air commander well forward, with radio equipment with which he can transmit mission requests direct from forward elements to the airdrome and to aircraft in flight. In such a role the air commander's representative serves simultaneously as party officer, control officer, and spokesman of the air commander. Like an artillery liaison officer, he can bring previously authorized air fires upon a target in a few minutes, from planes in readiness on air alert. If action from air alert is not feasible, the air officer can call the airdrome and obtain support within the hour. Pending arrival of the planes the ground troops, by laying panels pointing to the target and designating their own positions, can arrange to give the airmen any necessary guidance.

These "call missions" against targets of opportunity resemble similar artillery missions, but the time, space, and communications factors make them much more difficult for aviation than for artillery. Under ideal circumstances a spokesman for the air commander can share a forward observation post, observe the air target on the ground and the arriving aircraft overhead, and with his radio equipment aim the planes like guns. In one situation in the Southwest Pacific cannon-armed fighter planes were used against machine gun crews emplaced

in the cliffs along the shore. The pilots put one gun after another out of action by precise individual marksmanship with their airplane cannon and machine guns. In Tunisia waves of attack planes were directed at German battery positions in the path of the ground forces. Planes were numerous enough for action against individual artillery pieces on some occasions, and enemy gun crews were forced to remain in their foxholes for a considerable period.

In most situations, however, call missions involve diversion of aircraft from more promising pre-planned operations against large targets, the extensive employment of planes on air alert (a most uneconomical procedure under most circumstances), and a short circuiting of the control system (which often is undesirable). Furthermore, the employment of combat planes against targets close enough to friendly troops for terrestrial observation often can mean accidental casualties to friendly troops. Even if the cooperating pilots can see ground panels and colored smoke signals which mark the position of forward units and point out the target area during the attack, they have difficulty with their safety limits during a rapidly moving ground situation. Very close-in missions generally require simultaneous action by aviation and artillery in the same target area; airmen sometimes are directed against a target which is successfully engaged by shellfire before they complete their bombing run.

Therefore, a commander, though he must train his air-ground team extensively and carefully in the execution of call-type missions because of the difficulty of close-in air support, will avoid the necessity of such operations whenever possible. He will use call-type close-in air missions perhaps as rarely as he would use 240-mm howitzers against pillboxes in the enemy's front lines. Always he will try to make advance preparation for all the work he expects his aircraft to do within artillery range of the ground troops, so that numerous calls against air targets of opportunity will be unnecessary.

Experience with supporting tactical aviation in North Africa confirmed a lesson which field artillerymen learned under Bonaparte—the necessity for avoiding piecemeal use of fires, and for employing concentrations of power. The Germans used airplanes in close support of many small units along the front, but only for a short while did the Allied theater commander try this system. After 18 February 1943, tactical air power was concentrated and, in the words of one noted airman, "used like a single fist rather than a handful of fingers." The fist knocked the Germans out of the sky, and thereafter helped the artillery and infantry neutralize and penetrate critical portions of the defenses of Tunisia.

This policy deprived some divisions along the front of combat air support during periods when they wanted it badly. However, application of the principle of massed fires in front of the main effort stabbed the enemy successively at vital points and helped effect the annihilation of a large Axis army within a short time.

Incidentally, the preliminary beating given to the enemy's air force and neutralization of his airdrome area by bombardment not only enabled the Eighteenth Army Group to maneuver without serious molestation from the Luftwaffe, but aided the effective and continuous employment of artillery observation planes.

Can combat aviation be used in lieu of field artillery? In a critical situation when suitable artillery is scarce, aircraft can lend close support to small units. But a vast number of planes must be used upon a small area to develop the power of a single artillery battalion, and sustained support is difficult because of the time required for the planes to return to base, reload, and re-enter the action. Furthermore, such employment calls for a perfection in accuracy and in air-ground communications that is rarely attainable during combat. In the early days on Sicily bomb lines were kept ten miles ahead of the leading elements of the fast-moving infantry and armor. The danger of bombing localities occupied by friendly troops was always present due to difficulties of maintaining communications between advanced ground units in Sicily and aviation based in North Africa.

A commander who is tempted to employ combat aviation extensively as field artillery on the battlefield must not only remember the ordinary limitations of this arm, but he must consider its vulnerability to ground fire (including that of small arms). In operating against deployed troops, combat planes must fly low in order to make their weapons effective. Trained infantry and field artillery units can put a \$100,000 airplane out of commission for days even though their bullets may not cause a crash. It is rare indeed when a fighter-bomber can emerge from a ground strafing mission without holes in it; in fact, American troops damaged so many Stukas in North Africa that these once formidable screaming divers were rendered obsolete. In some situations weapons as fragile as aircraft can be expended on the battlefield with profit, but always the responsible commander must do so with the future in mind. If he may need those airplanes later for missions beyond the capabilities of field artillery, he manifestly would be unwise to risk them upon work which he can do with his guns.

If artillerymen who sometimes have argued with comrades of the air forces about the close kinship between aerial and terrestrial bombardment were given command of combat aviation, it is likely that they would use them very much as did our airmen in North Africa. Certainly artillerymen would appreciate the necessity for counter-air force action resembling counterbattery fire, and in accordance with field artillery doctrine they undoubtedly would apply the principle of mass in employment of their air fires and capitalize to the maximum on the elasticity of such fires. In addition, it is probable that they would exercise economy of force by employing their combat aviation only at critical points upon target areas which could not be covered adequately by field artillery.

WARNING

Be sure we have your correct rank, name, branch, and serial number, your organization and your correct A.P.O. number and city. All except serial number are required for the Post Office Department to accept overseas mail—and including it gives added assurance of prompt and proper delivery. If you are in this country, your postal district number (if any) is essential.

938th FIELD ARTILLERY BATTALION MARCH

Words by LT. COL. MELVILLE B. COBURN; Music by C.W.O. WALTER M. OSZCZAKIEWICZ

Tempo di Marcia

1. (To next strain) *Fine* (To Trio)

ff

mf

1. *marcato* *marcato*

2. *ff*

D.S. al Fine poi Trio

Detailed description: This is a piano score for a march. It consists of six systems of music, each with a treble and bass staff. The first system is marked 'Tempo di Marcia' and 'ff'. The second system continues the main theme. The third system includes a first ending bracketed '1. (To next strain) Fine (To Trio)' and is marked 'ff'. The fourth system features a 7/8 time signature and 'mf'. The fifth system has a first ending bracketed '1.' and is marked 'marcato'. The sixth system has a second ending bracketed '2.' and is marked 'ff'. The score concludes with the instruction 'D.S. al Fine poi Trio'.

TRIO

Heave! heave! men, with all your might, Keep those caissons rolling up and down the line. Heave!

heave! men, we're in the fight; So shove those shells home with a ram, boys, ram! Throw 'em in-to place.

shoot like men from hell! Work un-til the sweat rolls down your back! Then, heave! heave! men, with all your

might; And shove those shells home with a ram, boys, ram!

mf *cresc. poco a poco*

ff



Germans call their AT guns PAK, meaning Panzer Abwehr Kanone. This 37-mm piece, which was towed by the burned-out truck, is of the type developed around 1934, proved in the Spanish Civil War, and sold throughout the world for foreign exchange. Our own 37 is patterned after this one.

PAK 38, the 5-cm model, is powerful, accurate, and dangerous. It will successfully penetrate 2½" of homogeneous armor at 1,000 yards. Four types of ammunition are provided: AP-HE, AP-HE (capped), HE (PD fuzed), and arrowhead (PAK 40, a special projectile containing no HE but with a tungsten-carbide case capable of difficult penetrations of heavier homo or face-hardened armor at closer ranges); all these rounds have tracer, except the normal HE.



PAK 40, 75-mm in caliber, looks like an overgrown 50-mm PAK 38, with its tubular split trail, double shield, extremely low silhouette, etc. Its enormous powder chamber extends practically to the shield, to accommodate the large propellant required to give a muzzle velocity of around 3,000 f/s. Much manufacturing time and cost are saved by leaving unimportant exterior surfaces rough, rather than machining them.

PAK VARIANTS

By

Lt. Col. G. B. Jarrett, Ord.



As is often mentioned, Germans are adept at adapting foreign materiel to their own use; here is some proof. A standard French 75-mm gun (fitted with a muzzle brake) has been mounted on a PAK 38 (5-cm AT) carriage. This combination is called the PAK 97-39. This one seems to use standard ammunition, but in many cases foreign guns have been rechambered for higher muzzle velocities.



As tanks became more heavily armored the effective range of the little 37-mm shell (see bottom of photo) became shorter and shorter. Germany has pushed her 37-mm PAK right back to the forefront, however, by adopting a bulbous hollow-charge Stielgranate which is projected by a blank charge. Terminal velocity is of practically no importance, so effectiveness is limited only by (1) accuracy (the ability to hit the target with this somewhat unwieldy projectile) and (2) the explosive power of the particular grenade that is used.

The TEAM on New Georgia

By An Infantry Battalion Commander

Extracted from a letter to Maj. Gen. Robert M. Danford, U.S.A., Ret.

Because of your recent letter I began using the artillery as though it were part of my battalion's weapons, rather than something far detached and intangible which was controlled mostly by higher headquarters. Once working along this line of thought, I was somewhat surprised by the fact that in general I could get very quickly almost any amount of artillery support I desired in pretty nearly any spot that I wanted covered. It wasn't a case of getting just one battery: I could get a battalion, or two battalions if need be. Of course, there were times when difficulties arose, and times when things didn't click quite as I had planned—but those times were in the minority and must be expected in any series of operations.

In that you were the Army's most recent Chief of Field Artillery, I feel quite justified in writing you about the use of artillery, its effectiveness, its problems, and its methods of supporting fires in the Munda campaign. Of course, I speak only as an infantry officer who is somewhat ignorant of many artillery technicalities and whose observations were concerned far more with where the shells were landing than with where they were starting from.

In the first place, I'll repeat even more emphatically what I said in one of my recent letters. The infantry would never have reached "first base" much less "home" in this campaign, had it not been for the artillery support. No amount of air support or naval gunfire support could have replaced the artillery. Air superiority, of course, meant everything in the initial stages of the campaign, and subsequently saved us probable crippling damages to troops, equipment, and supplies by Japanese air-strikes as the campaign progressed. It did a splendid job of softening up Jap rear areas and preventing an influx of Jap reinforcements, as did our naval barrages and naval sea-actions. Neither air nor navy, however, could give the ground troops, fighting for every yard of land, the close, blasting support that was needed to break the successive networks of invisible Jap pill-boxes that infested New Georgia. Nor could the navy or air-arm give us the short-notice support nor the morale-cracking continuous support that we got from the artillery.

This was borne out quite well by comments made by our few Jap prisoners. They said the naval shelling and air bombings were awesome, but didn't cause many casualties and they didn't mind them so much because they knew they would end soon. But the artillery would keep up so long, and they could never tell when or where it was coming. It caused most casualties.

Here is one of the outstanding artillery incidents. During the earlier stages of the Munda campaign the Division CP was quite far behind the established front, more or less waiting, I believe, for the consolidation of a new beachhead to permit it to move up. The Division security at the time consisted of about one platoon of combat troops. That night the Division CP was attacked by a large and well-equipped Jap force of from one to two hundred men. The combat platoon drove off the initial attack and an artillery officer in the CP got busy on the telephones. Without previous data he called for a volley



Cocoanut sprouts, cocoanuts, and logs camouflage Jap pill-boxes so they thoroughly blend into the terrain. Themselves hard to locate, their embrasures and entrances are well-nigh undiscoverable. Flamethrowers, however, both "peel" them off and can take care of their defenders.

somewhere in the vicinity of the CP. Then by the sound of the exploding shells he adjusted a tight box barrage around the CP that shook the hills. The Japs, who were setting up mortars around the outskirts of the CP and preparing another attack, were slaughtered and driven off for good. No other efforts by large scale raiding parties on the rear areas were made during the campaign.

SCHEDULED DEFENSIVE FIRES

At night, infiltration through the front lines was held much in check by scheduled defensive fires. These fires were put down close to the front lines (from 75 to 150 yards beyond the foxholes!) and were fired in volleys at odd moments so many times an hour throughout the night.

Such fine adjustment, however, was only possible when the base line ran pretty nearly parallel to the front lines so that dispersion from deflection was the principal factor. The fact that for a long time all artillery support came from outlying small islands rather than from the mainland gave us this unusual base line for quite a while.

The men of my battalion loved those defensive fires—and loved them *close*, after they apparently received no short rounds. They weren't satisfied with the adjustment until some splinters, at least, would fly over their holes. In fact, on one occasion some splinters drifted into the battalion CP 75 yards behind the front lines.

At night I'd lie in my foxhole with three telephones to keep me entertained. One was a field telephone to the regimental switchboard, another was a sound-power phone (the jewel of all small-unit combat communications!) to a line connecting the CPs of the three rifle companies and of the battalion mortar platoon, and the third a sound-power phone to my artillery liaison officer's hole a few yards away. All conversations over these phones were conducted strictly in whispers because of Jap infiltrators around and sometimes in the various CPs. The sound of a voice might attract a grenade or serve as a guide for a little Jap knee mortar fire.

Anyway, I'd not infrequently get a whispered call from a company commander such as "We can hear some wood choppin' and jabberin' going on out in front of us. Also sounds like digging." When I'd ask for an accurate location of these



Jap pill-boxes are connected by intricate trench systems. This one was on New Guinea, but is typical of all Jap jungle installations.

sounds the answer might be, "About 150 to 200 yards in front of my company's right flank." Thereupon I'd pick up my liaison phone and ask for three volleys on concentration 312 (one of the defensive fires adjusted that afternoon) plus 100 yards, left 50 yards—all of which would, I hoped, land the shells in the desired spot. The liaison officer would then contact FDC on a direct line, and request the fire. In about two minutes I'd get the message "On the way" from the liaison officer, and almost simultaneously hear the ominous rush of shells passing overhead on their downward journey. Then the distant rumble of the guns would reach me, and immediately the crash! crash! crash! of the first volley striking. Almost before the sound of that volley ceased echoing, the shells of the second would be rushing overhead—then the third.

As the final echo died away I'd call the company commander and ask, "How did that sound?" More often than not he'd come back with "Sounded just right—on the very spot, I think. All the choppin' and jabberin' and diggin' has stopped." Whereupon I'd report "Mission accomplished" to the liaison officer, then call regiment to give a brief report of the incident. Such things occurred almost every night.

ANTI-JAP ACTIONS

And now for the most important thing—a combination of a long-sighted view of this Pacific war and a close-up view of the yard-by-yard methods the ground troops must use in fighting their part of it.

First, I believe the thing that will actually break Japan is the destruction of her sea power and merchant marine, possibly supplemented by the intense bombing of her cities and manufacturing centers. But before the final effective destruction of her war and merchant ships can take place, and long before a sustained bombing of her homeland can begin, many island bases must be won from her to give our fleet ground-based air coverage and forward naval bases.

Most, if not all, of these islands and areas which must be won from the Japs are jungle covered. So it boils down to the fact that time and time again we must fight the Jap in the jungle, with him on the defensive and ourselves on the offensive. I haven't seen a great deal of this sort of combat yet, but I've seen enough both at Guadalcanal and at New Georgia to feel certain that the Jap type of defense in the jungle is pretty characteristic and will remain so throughout. All reports and descriptions of the fighting in New Guinea and Burma bear out the same thing.

Main features of this Jap defensive fighting in jungle areas consist of:

(1) Pill-boxes dug into the ground, roofed with heavy logs and earth almost flush with the surrounding terrain. These pill-boxes always have automatic weapons, and are mutually supporting. They are invulnerable to small-arms fire, hand grenades, or antitank grenades. Only a direct hit by an artillery shell will knock them out. They are further protected by riflemen in the spider-trap type foxholes, and by snipers in trees.

(2) The almost complete invisibility that jungle camouflage gives an immobile soldier or installation.

(3) The Jap code of manning their positions until they are killed—and that means absolutely and definitely killed.

It is true that the same jungle foliage offers the attacker a good deal of cover, but the mere fact that the attacker must *move* gives the immobile and invisible defender all the advantage. It particularly suits the Jap rifleman, whom I honestly believe would seldom hit a target at one or two hundred yards but who need seldom miss at the 10 to 30 yards characteristic of jungle fighting. On the automatic weapons, which the Japs use in great abundance, the question of marksmanship has little influence: it's merely a matter of the weapon's pointing in the general direction, to mow down any targets in its cone of fire.

TYPES OF ATTACK

To my knowledge, three methods (and only three methods) have thus far been used successfully to break organized Jap defensive positions in the jungle.

The first method, eventually used to clean up Guadalcanal, was to cut off a series of pockets of Jap resistance and starve them into impotence. That proved very suitable to Guadalcanal, where the Japs defended the low, jungle-covered ravines and our troops utilized the high ground on a series of treeless ridges. This method is long and difficult. It involves tough supply problems, suitable terrain, and time. It was not applicable to the Munda campaign because of the tactical situation, the absence of any treeless ridges, and the fact that here the Japs preferred to defend the high ground anyway.

The second method is to use light tanks against the Jap strong points. It was successfully used once in the final stages of the Guadalcanal campaign, and several times in this one. Here the terrain lent itself pretty well to the use of tanks—that is, for what one could expect of jungle terrain. The facts that the ground consists of little mud and much coral, and that the jungle is comparatively thin near the coastal area, made possible the use of these vehicles. Add to that the fact that the Japs were pretty feeble on antitank weapons—which probably won't be the case as time goes on. [Recent reports show that Jap AT weapons are effective.—Ed.]

Last, and probably the most dependable, is the method used to some extent on Guadalcanal and twice here, very successfully. It involved exactly what you wrote me: "Blast them, smash them, hit them as hard as you can with your artillery, and then mop up the mess with your infantry."

From the beginning, my battalion fought frontally (with the coast on one flank and other units on the right) against Jap strong points which had been prepared months before. We had plenty of artillery support—but here is the joker, and it always is the joker in this type of warfare. The Japs were *always* occupying pill-boxes from 30 to 50 yards beyond our own front lines. If they didn't have enough ready-made pillboxes that close, they built 'em overnight. (That's one of the things which the strict law of immobility, which all our troops obey after dark, permits the Japs to get away with. It's a

law which says "anything that moves after dark is a Jap," and which has been followed universally since fighting began on Guadalcanal. It has great advantage in neutralizing Jap infiltrators, but it also gives them utter freedom of movement in all areas that our troops don't actually occupy.)

Well, an artillery preparation involving several batteries firing many rounds with great rapidity would not permit the center of impact to be closer than two or three hundred yards from our front line. Nor could mortar fire be brought close enough to knock out any of the pill-boxes directly opposing us.

Several attacks were tried with the best we could get from this sort of preparation. All failed and all were costly. The close-in and untouched pill-boxes with their hidden protecting riflemen were death on advancing infantry. So there was just one thing to do.

It doesn't sound like sound tactics, perhaps, but it seems a sure-fire method when applicable. We smoked the enemy positions, made a quick withdrawal of 100 to 150 yards, and brought the artillery and battalion mortars right down smack on the enemy's most forward pill-boxes. After a thunderous dose of that, we got up and waltzed right through the strong point for a gain of seven or eight hundred yards *without a casualty*.

Still tougher was the next strong point we came up against. Two attacks with light tanks failed, first because of one well-placed Jap antitank gun, and second because of mechanical troubles. So the withdrawal plan was tried again. This time we withdrew as secretly as possible without using smoke. Machine guns were set up with fields of fire to mow down any Japs that might try to close in on our withdrawal. Then, due to several elements (one being a base line almost perpendicular to our front lines), we had to begin by making an artillery adjustment on the forward pill-boxes.

JAP TRICKERY

And here the Japs pulled an old trick on us which they frequently use and which we *must* learn to recognize. As the second volley for adjustment was fired, the Japs put one 77-mm howitzer shell just behind the lines of the unit on our right. The artillery liaison officer and I, who were together during this adjustment, saw the four 105-mm shells strike near the desired target area—but the unit on our right insisted they had received a dangerous "short" in their lines. FDC stopped the adjustment and I sent an officer to the spot where the "short" had struck. I told him to inquire if the smoke from the explosion was black (that's a characteristic of the Jap howitzer shell which I had observed when several of them visited our battalion CP one time); the 105-mm shell smoke is bluish. Well, the witnesses allowed as how the smoke *was* blackish, and furthermore the officer found the Jap fuze.

So we got straightened out and adjustment was begun again. Immediately the Japs put one round behind the lines of a unit far over on our right. I could hear their blasted little gun go off just after our guns fired! Well, by the time this unit hollered to the FDC another volley was on the way and another Jap round also. Our shells were now all hitting right in the target area, but the unit on the far right was jumping up and down, saying they would have to withdraw from their positions if we didn't stop putting shorts in their lines. So the harassed FDC cancelled all firing, but with approximately eight artillery shells which landed directly in the target area, plus a goodly barrage of 81- and 60-mm mortar fire, we again waltzed through the Jap defenses, receiving very little opposition.



This New Guinea dug-out was well shot into before personal inspections were made. A single searing flame can do the job more certainly and in less time.

There is no question that if artillery and mortars can be brought to bear on precisely the correct area, these Jap defenses that are so murderous to infantry can be broken time and again with little cost in life. But there are many times when such use of artillery or even mortars is greatly limited by many factors. A few are: difficulty in determining the exact positions of our lines, communication, time to get artillery to the necessary positions to clear the massive overhead growth to permit high-angle firing; also, the withdrawal of our troops is often a complicated maneuver.

FLAME-THROWERS EFFECTIVE

My belief in the unfailing effect of putting flaming gasoline on Jap fortifications is not based entirely on fancy. Radio news broadcasts on the Munda campaign spoke of flame-throwers being used for the first time. Well, my battalion was the first to use them in an effort to accomplish the very purpose I've been talking about. We used a battery of eight of them. The men, all volunteers, with rifle protection crawled some 15 yards out into the thick undergrowth beyond the front lines—that is as far as they could hope to get without being knocked off by hidden Jap riflemen or machine gun fire.

Of course, flame-throwers' range is limited and so is their time of burning, so they were not sufficiently effective for my purpose. They did, however, burn away swaths of undergrowth wherever they lit for a brief interval, and by luck happened to denude of its camouflage one pill-box which was subsequently knocked out. But they did give a fair and convincing demonstration of what the possibilities are.

Another proof of the pudding occurred when—after 15 fragmentation grenades were thrown at, on, and around a located pill-box but fazed its yellow occupants not the slightest—one thermite grenade landing on top of the target drove the Japs out with many squeals. Well-placed rifle shots then terminated both Japs and squeals. The answer was, apparently, that the very hot liquid thermite dripped through the log roof and made the pill-boxes untenable.

In later stages of the campaign, flame-throwers were merely used to assist grenadiers in cleaning out all pill-boxes presumably knocked out in our advances. Quite often dead Japs in them would only be playing dead, waiting for a chance to open up again.

Division Artillery in the Battle of New Georgia

(JULY 24—AUGUST 5, 1943)

By Lt. Col. Howard F. Haines, FA

Conditions encountered on New Georgia are believed typical of South Pacific island warfare, and necessitate some changes in the *application* of the principles learned in training, chiefly in transport and the occupation of position. The established principles themselves are sound, as to both employment and techniques of artillery fire. The only things you really must forget are the carefully worked out loading tables, and who rides in what car. You will be cut considerably on your motor equipment, and its use will be further limited by mud, sand, and the lack of roads.

You will go to the combat area, not by a road march with graphs, markers, etc., but in LSTs or LCTs, large power barges holding from a battery to half a battalion with transport and ammunition. You need a bulldozer as first vehicle off upon landing to prepare the beach so that the other vehicles can land, and to cut a road to get the vehicles away from the beach. Details and parties move by a combination of landing boat, barge, jeep, truck, and on foot.

Ammunition is brought in by barge. We found that the best way to resupply was by dividing the trucks between the dump and the battery positions. Keep those at the dump loaded; run them on the barges and exchange with empties waiting at the battalion landing. Often every vehicle must be overloaded considerably; with the short hauls involved and careful maintenance they take it in stride.

One thing you need not worry about: digging in. Make every man dig a hole as soon as he hits the beach. He'll thank God for it at the first bombing attack, and dig in automatically wherever he is from then on—and add logs over the top as soon as he gets the chance.

TERRAIN

The New Georgia terrain presents a unique problem in the employment of artillery, as its forest density is approached in the States only in certain parts of Louisiana encountered during maneuvers. The real problems in placing accurate fire close to the troops could not be adequately brought out there. Due to the ban on firing live ammunition except on cleared ranges, the emphasis was on movement rather than fire, and thus on the presence of roads and landmarks.

New Georgia is densely covered with tall trees, making ground observation impossible for more than a few yards. OPs in treetops show nothing but more treetops, and those on hills (like the one on Roviana Island and Bibilo Hill) were worthless except for observation of cleared areas like the airport or places already thinned out by previous artillery fire. Air observation, while most effective on shoreline and open targets, was equally helpless in the jungle.

As there were no known landmarks or roads in the direction of advance, and few trails (exact location unknown), orientation and location were extremely difficult.

Battery positions within the boundaries of the supported infantry were unavailable without considerable clearing, which would have taken a great deal of time and prematurely given

away the plan of attack and advertised the positions to the Jap



In the Rendova landing, infantrymen pitched in to help unload 105-mm ammunition from Higgins landing boats.

air force.

Survey, both for horizontal and for vertical control, was a serious problem because of the narrow, twisting, muddy trails and the uneven ground, which required many short traverses.

PLAN OF EMPLOYMENT

As this was a corps operation, artillery was held under the control of the Division Artillery Commander with all coordinated attacks handled through the Corps Artillery Officer. Except during coordinated artillery preparations under corps or division orders, all light battalions were in direct support and always available for call missions. The medium battalion was in general support and was used extensively to reinforce the lights for harassing fires, using both chart coordinates and air observation on trails and known or suspected Jap gun positions, bivouac areas, and areas of activity.

As one light battalion did not arrive until five days after the attack of the division, the medium battalion was used in direct support of one of the infantry regiments during an important part of the battle. Liaison sections and forward observers were drawn from other light battalions until the arrival, before the rest of the battalion, of its liaison officers and FOs. Calls for fire were handled through the division artillery FDC, and timely and accurate fire delivered. In most cases communication was by telephone direct from the forward observer, relayed and controlled by an officer at the division artillery FDC. When possible, fire missions were parted through the FDC switchboard. At times as high as three relays were required, using telephone and radio, without appreciable loss of time.

Artillery fire was habitually observed. Whenever possible it was laid down by battalion, except for night harassing fires which were by battery. Wherever the target warranted, missions were executed at maximum density and reinforced by one or more additional battalions.

FIRE DIRECTION

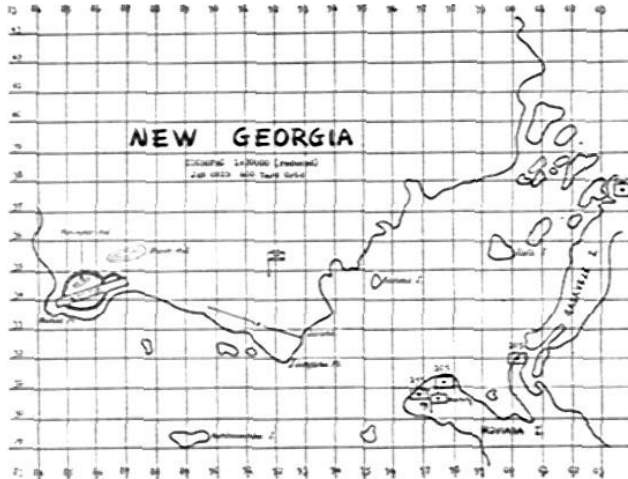
Fire direction by both battalion and Division Artillery followed

standard Fort Sill procedure. Battalion targets were designated by coordinates or by reference to previous concentrations. Observed fire, except for base point registration, was conducted by forward observation methods, usually starting with a round of smoke. Division Artillery targets were habitually designated by chart or adjusted coordinates and fired on time schedule, at command, or when ready, as the situation and the desire for surprise dictated. Frequent use was made of conference calls on direct lines from Division Artillery to the battalion FDCs.

Standard rates of fire were one battalion concentration every three minutes of three volleys for the lights and two for the mediums. This meant delivery at the hourly rate of 12 tons of high explosives from the 105s and 24 tons from the 155s.

POSITIONS

Due to terrain difficulties, the Division Artillery Commander placed the field artillery battalions on small islands east and southeast of the objectives (see sketch). This necessitated water



lines of communication, boat transportation of officers and liaison, survey, and communication parties, and the laying of underwater cable, but eliminated the necessity of constructing roads, clearing positions and fields of fire, maintaining more difficult wire lines, and traveling over muddy jungle trails. It also allowed FDCs, switchboards, and gun crews to operate freely day and night without interference by snipers and raiding parties, and required the use of only small beach patrols instead of the relatively large close-in security details which would have been a serious drain on manpower.

Ranges varied from a minimum of 5,000 yards to a maximum of 12,000 yards for the furthest battalion to the west coastline beyond the last objective. All fires of each battalion were within transfer limits for deflection, and within 2,000 yards of the base point for range.

Direction of fire with respect to direction of advance of the supported infantry varied from axial to a maximum deviation of 600 mils.

It is believed that the advantages of the positions occupied greatly outweighed their disadvantages.

OBSERVATION

Forward observers were used to a maximum. Often these were liaison officers with infantry battalions, due to the fact that infantry battalion commanders were usually with their

advanced elements on account of the lack of observation from the rear.

Location in the jungle was extremely difficult. Many times infantry units were located by artillery fire. A round of smoke would be called for in front of the estimated position, all observers (both artillery and infantry) cautioned to watch for it, and then the fire was repeated one round at a time, shifting and pulling back in small jumps until sensed 200 or 300 yards directly in front. Location would be determined by the plot of the final round.

Initial sensings were frequently by sound, sometimes requiring a battery volley of HE after it was determined that the trial round of smoke was in a safe location. This was particularly difficult, as sound reverberates in the jungle and seems to come from false directions and distances, and differs between night and day, rainy and clear weather. Shells bursting in the tops of tall trees sound quite different from those reaching the ground, and may in fact vary in range over 100 yards due to the slope of fall. These factors made the work of the forward observers most difficult, and led infantry commanders to feel at times that fire was falling closer to them than was actually the case.

Forward observers and liaison officers stayed with, fought with, and became a part of the infantry battalions, going through the campaign with them without relief and then frequently being sent into combat with another battalion when their own was temporarily inactive.

One liaison officer was cut off and ambushed, and lost his vehicle, radio, and equipment.

A captain and a lieutenant, with a small observation party, were adjusting fire from the beach in front of advanced infantry elements, on a party of Japs who had escaped to a small island offshore. Cut off by seven Japs, they shot their way out and killed all seven.

One forward observer killed a Jap with a hand grenade.

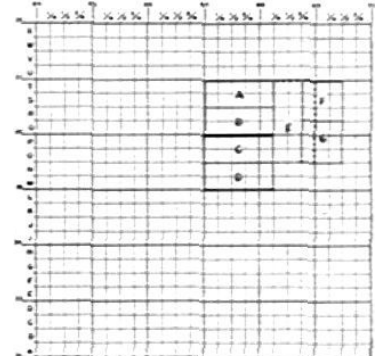
Another was walking down a trail beside a sergeant. The sergeant fell with a bullet through his head. The lieutenant whipped around, and with his "Tommy Gun" killed the three Japs who had fired on them.

Air observation was excellent. Artillery officers, detached from their battalions for this purpose, flew low over the target area, drawing fire and then adjusting on it. One air observer was shot down on two occasions, once not being rescued until the following day; each time he immediately resumed his duties with deadly effect.

FIRING CHART

The CICOPAC photomap, a semi-controlled air photo composite of approximately 1/20,000 scale and gridded with the JAN system of grid lines approximately 600 yards apart, was used with excellent results.

Targets were designated by the standard method, or more often by a letter code developed by our Corps



Arty G-3, which was superimposed upon it (page 847). Squares were 150 by 150 yards in size, and were designated by their lower right-hand corner, as (86³/₄-Q). Blocks of squares were easily and quickly identified as "M, N, O, P from 85 to 86." Light battalions covered one square with a battalion concentration fired at center range, mediums four squares by firing $\frac{1}{2}$ c apart.

While this photomap is quite inaccurate when large areas are considered, it is excellent within the rather restricted limits of the target area. Direction was established by locating the base point and base piece by inspection, and using the connecting ray. Distance was taken as the adjusted elevation back-plotted along this ray, as in constructing an observed fire chart. Batteries were then laid and base deflection recorded, making the *K* zero for both range and deflection.

Weather was noted and metro messages run every three hours for a 24-hour period, with periodic checks for several days. Wind velocities were very low and direction practically constant. Daily temperatures and density cycles were almost constant, showing a variation of from 1% to 2% in density, and approximately 10° in temperature of air and powder. This enabled a constant weather correction of 9 yards per thousand to be applied between midday and afternoon adjustments, and night fires for effect. Daytime variations were nil.

PHOTO-INTERPRETATION

This service, and its identification or artillery targets, were excellent. Targets marked by this section on the large-scale photos were restituted to the photomap firing chart and fired on with great accuracy, as indicated by air observation and a subsequent investigation of the ground.

SURVEY

Survey operations were a problem due to the nature of the terrain. Position area survey and connection with the target area were completed promptly, but soon found to be valueless due to the inaccuracy of the map. Battalions therefore located themselves from the base point by inspection and back-plotting, as described above. An initial point was then established on Laiana Beach by the Division Artillery team and carried forward to the center of the division area. Three traverses were run from there, one into each regimental area.

One ran into a party of Japs and had to be discontinued, but disclosed the fact that the regiment had been cut off. Had it been possible to continue it, much of the trouble experienced in definitely locating elements of this regiment would have been eliminated. The other two went as far as the forward OPs in the front lines. They were most useful, and carried out without casualties, although a lieutenant acting in the dangerous capacity of the front sight man was fired upon and pinned to the ground by a Jap machine gun.

When using a photomap of this kind, survey control must be started from inspection as near the target area as possible. Survey is extremely valuable in establishing vertical control, locating artillery observers, OPs, and front line infantry elements.

COMMUNICATION

Communication presented a problem of land and underwater lines. The latter were accomplished by laying a cable from a landing boat, and once in required no further maintenance; over three miles of such cable were laid. A considerable

amount of W-110 wire was also laid under water, which helped immeasurably at first but soon shorted out.

Land laying and maintenance were complicated by the muddy trails and the tearing out of lines by bulldozers cutting roads, the clearing out of trees to which wires were attached, and the passing of troops.

Remote control radio was very satisfactory. Wire, as

usual, was the mainstay.

A new and very satisfactory innovation in the division artillery FDC communications was developed. A separate 6-drop switchboard was installed in the FDC. Into it was brought a line from each battalion which was connected with its own phone—all four labeled and mounted on a 6-foot board at the top of the map table. Another line came from the regular board and was connected to one of the two S-3 phones. Another line went to the OP.

In this way each phone could be used separately or any desired combination of party calls established. One operator on the board answered all calls, took routine messages, called the officer wanted, and told him which phone to answer.

All or any number of battalions involved were partied for instructions and massed fires. The OP or liaison officer at the front would spot a target, and be partied direct to the battalion assigned the mission without interfering with the direct lines to the others, and the FDC officer could check the progress of the mission at any time without interrupting it.

This system has been adopted as SOP.

ANTI-AIRCRAFT

Battalion areas were protected by both 20-mm and .50-cal. AA guns in mutually supporting positions around the area. The 20-mm is heavy, but an excellent weapon.

There were not many cases of low-flying planes which presented suitable targets, but those that did strafe or dive-bomb the positions suffered heavily for their pains. Three were shot down by artillery crews. The percentage brought down to total possible targets was extremely high.

EFFECT OF ARTILLERY FIRE

A visit to the areas on which fires were massed and reports of the infantry leave no doubt as to the effect of massed artillery fire as used by both divisions in this campaign.



Munda airfield was built with mission-topped Kokengolo Hill in its center. In the background is nearby Bibilo Hill.

Sufficient tonnage must be poured into an area to thin out treetops for maximum penetration, get as many hits as possible on installations, and above all incapacitate the enemy or greatly reduce his combat efficiency by shock.

An examination of enemy dugouts and gun positions dug deep into the ground or heavily built of coral rock indicates that little actual destruction of positions may be expected. Several cases were observed of large craters apparently caused by very heavy air bombs within ten feet of rock dugouts or gun positions without causing their destruction. The concussion and shock, however, must have been terrific.

Artillery fire is believed to be most effective if properly massed, fired close to friendly infantry, and followed up immediately.

Night harassing fires at moderate rates of expenditure are also believed to have been most effective in denying the enemy rest and the free use of his back areas and lines of communications.

AMMUNITION

In general, materiel and ammunition performed satisfactorily. There were fewer erratic rounds than had been expected from the dispersion table and results of training fire.

Both fuze quick and delay were used in approximately equal proportion when firing into the jungle. The relatively high rate of duds noted in previous firing when using fuze delay with the 155s was not observed here, though a considerable number of duds (particularly 155s) were noted when going through heavily shelled areas. It is felt, however, that the continued use of fuze delay, except where the ground below is swampy, is warranted due to its increased penetration into the jungle.

The total ammunition fired during the period July 25 to August 5, inclusive, amounted to 750 tons. The greatest expenditure by one battalion in any 24-hour period was 2,563 rounds.

Seventeen missions were assigned by corps, including preparations and night fires. Fifty-six missions were assigned

to battalions from division FDC, in addition to the above. Fifteen direct support missions were fired through Division Artillery FDC, most of them by the medium artillery prior to the arrival of the light battalion. The balance of the ammunition was fired by the light battalions through their own liaison officers and forward observers, in direct support of their infantry regiments.

To gain maximum effect we fired 105-mm volleys within 200 yards of our infantry.

JAPANESE COUNTER-MEASURES

Japanese artillery fire, while at times annoying, was entirely ineffective. Although they had 75-mm high-velocity guns in several locations near the airport, and observation from Kokengolo Hill and at times from the air, no more than one gun was ever fired at a time and no serious attempt at counterbattery seems to have been made.

Their most effective counter-measure seems to have been the firing of mortars and artillery by single piece inside our lines when our artillery was firing to give the impression that our own fire was falling short. This was definitely proved in many instances, and unfortunately at times accomplished its purpose when our artillery was ordered to suspend firing. It must be guarded against carefully.

The Jap is clever. He even fired three rounds when he thought we were going to continue our practice of firing concentrations of three volleys, and on one occasion changed to smoke when we did and we sensed two rounds when only one round had been fired.

On the first preparation rockets were sent up all along the line, all one color, then another group, until the enemy hit upon our signal for lifting fire. Firing was promptly stopped, and as communications with the front lines were out, all pieces were checked and firing resumed. The rockets immediately reappeared, then stopped when firing continued. It was later found that no rockets at all had been fired by our infantry.

GRASSHOPPER VS. GOLIATH

By Maj. Edward A. Raymond, FA

Here's one on air observation, reminiscent of one of my Dad's bear stories.

It was in a mountainous coastal sector in Sicily. The sound of enormous explosions came from behind a high ridge held by the Axis. The American artillery commander was puzzled, and sent up an air OP. The plane flew out to sea, beyond effective automatic weapons range, and looked up the terrain corridor behind the ridge. The observer saw some German 105-mm howitzers, adjusted fire, and a two-battalion concentration obliterated the Nazi battery, but the heavy sounds were still unexplained.

The observer examined the corridor at length. He finally determined

that a tunnel on the far side of the valley was protecting a huge railway gun, which the Germans ran a little way out on the tracks to fire and withdrew again to load. A leisurely precision adjustment was made on the tracks in front of the tunnel, using a gun from each of three battalions. The plane flew away. The Americans waited, pieces converged, lanyards in hand. Ten minutes went by—twenty—half an hour. The Germans finally concluded that our shoot was over, repaired the tracks, and fired another enormous round. For the Americans, that was the prearranged signal: that meant "Fire!" Instantly a three-battalion concentration lit in there and Baby Bertha ceased to be.

You should have seen the mess!

The American soldier is mechanically minded. A good mechanic is a thrifty mechanic: he respects his machinery and tools, and makes them last. By such careful practices he actually helps shorten the war.

Survey on Guadalcanal

By Maj. James J. A. Kelker, FA

This is written in the hope that it may be of some help to those officers who may yet have to face the problems of survey in the South and Southwest Pacific. Let it be understood that survey as taught at Fort Sill is basically sound, and that the following description is merely an application of these principles to a particular situation—a situation that will repeat itself throughout the Pacific Areas.

In July of 1942, our Navy flew a set of pictures of the area now known as Henderson Field, and as far west as Kokumbona, on Guadalcanal Island of the Solomon Group. From these pictures a mosaic was made and traced, and a grid superimposed thereon. This was the map available to the Marines when they landed upon the island in August, 1942.

Using this map to shoot their artillery, the Marines soon discovered that they had practically no deflection correction while shooting to the south but that the correction became appreciable when shooting to the west and the east. The Marines tied in this gridded map to a "Master Origin" at the southwest corner of the bomber strip on Henderson Field, to which the map grid was referred. A direction (obtained from the Navy) was carried throughout their survey, which consisted of some five "origins" which are comparable to the points "A" as taught at Fort Sill. Their artillery battalions were tied to these points. These origins had been located by an open traverse, and referred to their map. This was the situation that obtained at the time elements of the Americal Division arrived on Guadalcanal to relieve the Marines.

In the South or Southwest Pacific areas there are no maps available upon which to base a survey. There are Admiralty Charts that will tell you how deep is the water in which you will drown if you should be so unfortunate as to be sunk near such-and-such shore; these charts will give you an idea of a particular shoreline, but "inboard" they are perfectly blank. Next, you will have become a member of "The Ancient Order of Shellbacks" before arriving, and you will find that Polaris (the "North Star") is no longer visible. It is true that various other constellations are visible, but it is very doubtful that you will have a Nautical Almanac with you, so that's out. Then too, it seems that the great majority of the islands in the South and Southwest Pacific have various ore deposits that make any needle reading quite dubious; all needles will be found to be balanced for the Northern Hemisphere; it therefore becomes obvious that the needle should be discarded if any appreciable degree of accuracy is desired.

Upon arrival at Guadalcanal with a copy of the gridded Marine map, which had by that time undergone its third tracing, we contacted the Marine Survey Officer and with him made a reconnaissance of the work done by the Marines. With this information a survey plan was conceived and submitted to

The author went overseas early in 1942, and was with the Americal Division Artillery S-2 from the time of its organization until after the cessation of hostilities on Guadalcanal Island in February, 1943. He thus trained the Americal Division Artillery Survey Platoon and gives most of the credit for its superb performance on Guadalcanal to Lt. Franklin I. Neubauer, who became its Survey Officer, and to S/Sgt. Victor P. Bordelon, Platoon Chief.



The area from Kokumbona to Cape Esperance. This can be oriented by reference to pages 562 (August), 737, or 742-3 (October) of this JOURNAL for 1943. Terrain of this type is found throughout the islands of the Southwest Pacific.

Col. Henry C. Demuth, Americal Division Artillery Commander, who added the information that it would be necessary for us to furnish control points for radio stations of the Signal Corps, establish points upon the shoreline from which destroyers shelling the Japanese held shoreline could obtain a "fix" at night, and be prepared to furnish control to any army forces that might arrive to assist us in the destruction of the Japanese. As the plan presented was adaptable to fulfill these requirements, it was approved and put into operation.

The Master Origin established by the Marines was accepted, and the same coordinates assigned it in order to use the map prepared by the Marines as long as possible and to take advantage of the survey work done by the Marines. This origin was marked by driving an empty 105-mm shell case in the ground at this point. The same direction line was assumed, and marked by a second 105-mm case. The bearing assigned to this direction line by the Marines was accepted, and it was decided that all survey would be by the use of plate angles and that all bearings or azimuths would be figured trigonometrically from this Master Direction Line. Division Artillery

Tassafaronga Point, from the sea. This is the general area of the Battle of the Bonagi River; for a sketch, see page 744 of this JOURNAL for October, 1943. Note the many destroyed Japanese landing barges along the beach. For comparison, remember that the coconut palms shown are approximately 75' tall.



Survey numbers were assigned to these two points, and this Master Origin and Master Direction Line became the control for the entire survey by Army forces on Guadalcanal.

This direction line was then carefully measured to form a short-base from which the survey was carried forward from ridge line to ridge line. Simultaneously, a transit traverse was carried forward along the coastal road so that each of the Marine origins was brought into the closed net of the Americal Division Artillery Survey. The survey was then carried forward using short-base methods entirely. The third angle of each triangle was invariably measured as an additional check on the survey accuracy as soon as the third angle position was reached by the survey party. Short-base methods were used throughout, regardless of the size of the "target-angle," in order to maintain as high a degree of accuracy throughout the survey as possible.



Point Cruz from the sea. This was the seaward end of the American lines shortly after the Army relieved the Marines on Guadalcanal. Vertical views of this area appear on page 562 (August) and 737 (October) of this JOURNAL for 1943.

All Division Artillery Survey points were marked by driving empty 105-mm shell cases into the ground over the various points. The bases of the shell cases were then painted yellow and the Division Artillery Survey number painted thereon in red, so that points were readily identified. This same system of marking points was used by some of the battalions, but using other contrasting colors. Vertical control was carried from sea-level to all points trigonometrically by measuring vertical angles from each end of the base line to the third point. This check on the new elevation proved quite satisfactory. Elevations were checked back to sea-level at intervals as the survey net progressed.

When the Americal Division Artillery survey reached Point Cruz, to the west of Henderson Field, it was discovered that in the compilation of the original map mosaic or in the tracing thereof, an error of some 1200 yards had been introduced; in other words, Point Cruz was shown on the Marine map 1200 yards north of its actual location, thus causing the deflection errors mentioned above.

Artillery OPs were accurately located and survey was carried into the infantry front lines, often under mortar and small arms fire. By accurately locating artillery OPs it was possible for the artillery observer to set up his BC scope over the marked shell case on the OP, and by sighting another Division Artillery Survey point definitely orient his instrument with the artillery survey net. Thus it was possible for the observer to send a

definite azimuth and distance from the OP to any target; this could be definitely plotted on the grid chart at FDC and taken under fire, with the only variable being the distance from the OP to the target. This method was found to be extremely accurate in use on Guadalcanal. You may ask, "Why not short-base the target?" The answer is that many targets could be seen from only one OP. Observation was generally poor due to the nature of the terrain.

In order to make information available to all battalions at the earliest possible moment and to eliminate the inaccuracies inherent in any reproduced map, it was decided to designate the position of the Master Coordinate position on a 1/20,000 grid sheet and have each battalion so spot this position and keep a grid sheet map up-to-date for firing. All battalions cooperated, with Division Artillery acting as a clearing house for all survey information so that it was possible to make immediately available to each battalion the work of Division Artillery and of all battalions.

When a battalion moved to a new location, Division Artillery showed the battalion survey officer the two Division Artillery survey points most readily accessible to the new position. The battalion survey officer could then set up over one point and sight the other, and be both oriented and established with elevation. By occupying each station in turn it was possible for the battalion survey officer to use the two Division Artillery points as the ends of a base line for short-base methods of survey to his battalion position.

When the 25th Division arrived upon the island, its artillery survey officer tied into the survey net of the Americal Division Artillery and carried the survey to the south flank and forward along the path of the 25th Division. Due to the splendid cooperation between the two division artillery survey organizations (there was no Corps Survey available on the island) it was possible at the time of a certain attack for the commander of the artillery of one division to ask for the support of the artillery of the other division by simply sending the coordinates of the position upon which the fire was desired.

Due to a lack of the necessary equipment and the necessity of flying photo missions in light planes in this unfavorable area, photo results were not all that could be expected from an artillery viewpoint. Photo restitution was consequently very difficult, and the results unfavorable in most instances. Small photo verticals were furnished, however, and some few obliques. These were given to the forward observers and served as a medium whereby FOs could relay targets back to the FDC where the information was transposed to the survey grid and the target taken under fire.

Division Artillery Survey was carried some 26 miles to the west of Henderson Field, and was later extended 20 miles east of the field by the 25th Division. Liaison between the two Division Artillery Survey organizations was continuous, so that work of each was immediately available to both.

This system proved to be both simple and flexible, and readily adaptable to all demands made upon it. In fact, it grew from furnishing one division with artillery survey control, to the furnishing of the survey control that would normally be furnished by Corps Survey Personnel.

In conclusion the thought might well be taken that the artillery in any original operation establish some such system that can readily be expanded when additional troops enter the operations.



Locating and Adjusting Fire on Water-Borne Targets

By Capt. Frank E. Ribbel, FA

The procedure outlined here is based upon elevated OPs and an accurate survey.

When a target is observed, the observer measures the angle from the battalion reference point to the target, measures the angle of site, and reports target to the Fire Direction Center. For example, "Fire Mission, Reference Point Right 1085, Si—31, Landing Boats, Will Adjust."

Battalion S-3 acknowledges the mission by replying: "Battalion Able, Ladder."

Upon receipt of the fire mission the Horizontal Control Operator measures the angle RP-OP-T on the firing chart, using range-deflection fan. The Vertical Control Operator tells H.C.O. the OT range with which H.C.O. plots the position of the target. H.C.O. then announces initial data to both the adjusting battery and the following batteries.

V.C.O. has precomputed angle-of-site tables for OPs and gun positions, which tables enable him to determine quickly the OT distance by which H.C.O. plots the location of the target. Angles of site of the batteries are determined for all ranges and charges, so when the computers call for them they are given promptly.

When H.C.O. has given all the data to the computers, he sends to the observer the following: GT distance, OT distance, and angle T. The adjusting computer sends to the observer both the c and the initial elevation (to the nearest 5 mils), after his initial data has been sent to the battery. The observer decides how he will conduct his fire, and determines his own factors.

To continue the example: H.C.O. to observer: "GT: 5000, OT: 7500, T is 300;" adjusting computer to battery: "Ch 5, Fuze Quick, Base Deflection Right 170, Ladder 300, 310, 320, 330"; adjusting computer to observer: " c is 10, initial elevation is 320."

"Ladder" fire is used for adjustment to speed bracketing of the target. There should be little error in direction, but the

range error may be considerable. No. 1 piece is given a quadrant elevation 2- c 's below that to the plotted point, No. 2 one 1- c below, No. 3 the quadrant elevation to the plotted point, and No. 4 an elevation 1- c above it. As the rounds are fired the observer is told their elevations, rather than "No. 1 on the way," etc. He selects the round nearest the target and gives the command for fire for effect.

To continue the example: F.D.C. reports: "300 on the way, 310 on the way, 320 on the way, 330 on the way, rounds complete." The observer senses 300 as short, 310 short, 320 over, 330 over; sensing direction from No. 3 as 10 left he commands: "Right 10, battery 4 rounds, 315." Adjusting computer to battery: "Right 10, battery 4 rounds, 315."

The computers of the other batteries know both c and initial elevation for the adjusting battery, so when the command for fire for effect is given they send their batteries the deflection corrections, determine the difference in c 's between the initial elevation and the adjusted elevation, and apply it to the quadrant elevations for their batteries.

To continue the example: these other computers know that the adjusting battery's initial elevation is 320 and the c is 10. Fire for effect was begun at 315, indicating a decrease of $\frac{1}{2}c$ from the initial elevation. The initial elevation for "B" is 340, its c is 15, so "B" computer commands "Right 10, battery 4 rounds, 332" and reports to the observer when the battery is firing. "C" computer follows the same procedure.

If the observer is unable to select an elevation for effect during the ladder fire because of errors in direction or range or both, he will give the commands to correct the direction or range, command "Ladder," and select the elevation at which he wants the fire started. For example, the observer senses 300 over, 310 over, 320 over, 330 over, 50 left. He commands: "Right 50, Ladder, 260." The ladder is fired as above. The FDC procedure is the same in making the necessary adjustments for changes in the c 's.

At the command, "Ladder, 300, 310, 320, 330," the Battery Executive commands: "Ladder; No. 1, 300; No. 2, 310; No. 3, 320; No. 4, 330." When the battery is ready he commands, "No. 1, Fire," and reports "300 on the way;" after a five-second interval, No. 2, Fire," and reports "310 on the way." Nos. 3 and 4 are fired in a like manner.

During fire for effect the observer makes necessary changes in direction and range and continues fire until the mission has been accomplished.

We have used this method of adjustment and Fire Direction Center procedure on land targets also, and found it successful.

Capt. Ribbel's method appears to have a definite application for stationary or slow-moving targets. For landing boats or other fast-moving craft, direct fire is indicated; if this is impossible, a barrage should be used. When speed is desired normal indirect fire, wherein the observer works directly with the firing battery rather than through the FDC, is preferable—but even this would probably be too slow against landing operations.

Capt. Ribbel's suggestion for obtaining the initial range by angle of site is excellent, providing the OP is located sufficiently high to provide uniformly large angles of site. The OP should be selected as close to the shore as possible, both for the foregoing reason and also because range estimation is extremely difficult over water.

ROUTES INTO EUROPE

A Study in Terrain

PART VI — NORWAY

By Col. Conrad H. Lanza

Its mountain chain is Norway's dominant physical feature. Starting at the North Cape, for the first 200 miles the mountains parallel the coast, but do not exceed 3,000 to 4,000 feet altitude. This section, in high latitudes, is extremely cold, with snow in every month of the year; it is sparsely settled and devoid of lines of communications, and contains no objectives of military importance. There is one exception—airfields constructed by the enemy, from which he can raid ships and convoys passing north of the North Cape.

At Narvik is a depression in the mountains through which an electric railroad extends into Sweden. In winter this railroad carries a heavy ore traffic to Narvik, from where it goes by ship (at present) to Germany. At this point Norway is only 6 miles wide from the Swedish boundary to the head of Ofoten Fjord.

From the vicinity of Narvik the mountain chain extends southward some 400 miles to the Trondheim depression. Along this stretch the summits are substantially along the boundary, and rise to heights of over 6,000 feet. Norway averages about 60 miles wide in this sector. The Trondheim depression combines a fjord which extends inland from the sea for a distance of over 100 miles in an airline, with a lowering of the opposite mountains to a pass of 4,000 feet elevation, through which another railroad and a road extend eastward into Sweden.

At this point the mountain chain turns toward the southwest, leaving the Swedish boundary and generally following the coast. This section of the mountains is the highest and most savage in Norway. Peaks rise to above 8,000 feet. There are numerous glaciers (the largest having an area of 580 square miles), much snow, thick forests on lower altitudes. The mountains here form a serious military obstacle and are crossed by but few lines of communication. This part is known as the Dovre Mountains, and separates all that part of Norway which is north of the Trondheim depression, or along the seacoast north from Stavanger, from the south and southeast sections. All lines of communication connecting these two natural parts of Norway are defiles and will be hard to capture if defended.

Throughout their entire length the mountains are steep on the west side, and often precipitous. As they are always close to the coast, any invasion north of Stavanger will be immediately confronted with the problem of crossing them. On the east side the mountains decline in a more or less regular and gentle slope, although this may be cut up by valleys and minor hills. North of the Trondheim depression this east slope is entirely within Sweden. South of that depression Norway widens out, and as the mountains recede from the Swedish boundary the east slope lies partly within south Norway.

That part of Norway which lies south and southeast of the Dovre Mts. contains about two-thirds of the population and most of the industries and farms. It is the nation's center of activity, and is well served by a net of roads and railroads. Its

climate is milder. Its center is Oslo, the capital of the state, from which all important trunk roads radiate. Here are the headquarters of the enemy, and nearby are his supply depots.

From Oslo the enemy's line of communications for combat traffic is by sea to Denmark. A large part of this passage can be made inside Swedish waters. For non-combat traffic, including personnel on leave or furlough and supplies of a non-military character, rail facilities through Sweden were until recently used to Malmo or Tralleborg, thence by ferry to Denmark or Germany. Air communication is also available. Sea transportation is had direct from Denmark or Germany to Norwegian west coast ports.

Although rail and railroad communication is available to the Germans for movements from bases in south Norway to the north, much of this traffic habitually moves by sea. From Stavanger all the way to the North Cape, with two short exceptions, there is a sheltered sea passage between the coast and a chain of remarkable islands parallel to the coast. These islands number about 150,000; they are close to the mainland, sometimes with only narrow passageways between. The route is well marked, and perfectly safe and available regardless of the weather. The enemy sweeps the channel for mines and regularly patrols it with his planes.

In addition to supplying enemy bases along west Norway, this channel is the route for convoys to and from Petsamo on the Arctic Ocean, a base for supplying the north end of the long Russian front. Ore traffic from Narvik uses this passage, which is indeed a busy one. From bases in the British Isles the R.A.F. from time to time raids this inland channel, but it has had serious losses as the enemy guards this important line of sea communication very closely.

South of the Trondheim depression there are three lines of communication, each with a railroad and a road, across the Dovre Mts. They all start from Oslo and extend respectively to the ports of Bergen, Andalsnes, and Trondheim. Between Stavanger and Trondheim there is neither road nor railroad along the coast. Above Trondheim, the enemy has extended some previously built short lines to form a through motor road and railroad to the north, which now are open to the vicinity of Saltdal and are being extended to Narvik. A branch line extends to the port of Namsos.

All along the west coast are fjords (estuaries of the sea), which extend inland and are a peculiarity of Norway. They differ from the ordinary estuary by having a comparatively shallow entrance over a rock sill. Once over this the water deepens rapidly, so that the fjords are rock basins filled with sea water. They extend inland for distances as great as 180 miles. Their sides are usually precipitous and may rise thousands of feet almost vertically. Where the walls recede from the water front there may be small beaches and fishing towns



where landings are practicable, but there is generally no communication inland from these places. Except on very rare occasions the fjords never freeze over. They afford shelter to vessels, but the water is usually so deep that there is but limited anchorage. Where there are ports, they are open all the year round.

Invasions of Norway may be made either at west coast ports or in the south part of the country. Seizure of the west coast ports will interfere with the enemy's economic system, but will not affect his hold on the rest of Norway. Invasion, followed by seizure of south Norway, will cut the enemy's lines of communication to all parts of Norway beyond and lead to their eventual fall. The south is the important area. It is also the most difficult to seize.

According to information given by the Germans themselves on June 28th of this year, there were 10 German divisions stationed in Norway. Their distribution was not stated. At least 6 divisions and possibly more are in south Norway, and can within two days be concentrated anywhere within that area. The west coast ports are held by detached forces, which can not quickly reinforce each other. Aid from the main body in south Norway can be forwarded by air or by motor transportation. Rail transport is limited in capacity and is probably reserved for supply of ordinary articles, such as what

we call Class I supplies. The German forces at west coast ports normally number about 3 divisions, plus special troops for coast defense and airdromes. It would be possible for Germany to bring additional divisions over from Denmark, especially if the sea passage were open; if not, air transport can be used. To provide for this possibility, equipment for several divisions is probably stored in Norway so it will not have to be brought over at the last moment.

WEST COAST PORTS OF NORWAY

For convenience, some northern ports will be included here.

Kirkenes is on the south side of Varanger Fjord. Formerly it was of no importance, but now (in connection with Petsamo, close by in Finland) has become an enemy base for supplying his north section of the long Russian front. It also affords shelter for German light naval forces, including submarines, raiding in the Arctic Ocean. Its harbor is some distance up a narrow branch of the fjord, and therefore difficult to reach by a marine expedition. The surrounding country is generally flat and barren, so it would be possible for an amphibious expedition to land to the east or west of the enemy's base. Approaches from either side are covered by river lines which would presumably be defended. This port has a railhead at Kemijarvi, 250 miles to the south, but the difficulties of supply from this base appear to be great, since the enemy uses the sea route. On the same Varanger Fjord are Vardo and Vadso. These are exposed to the sea, and could be shelled by naval vessels. For this reason, although these were more important ports, the enemy has moved his activities to Kirkenes.

Hammerfest, about 60 miles southwest of the North Cape, is the most northerly port in Europe— $70^{\circ} 40'$ North Latitude, or about the same as the north coast of Alaska. It is about 670 miles from Trondheim by sea. There are two entrances from the sea, on either side of a large island which shelters Hammerfest from possible shelling by direct naval action. There is no available information as to the enemy's defenses, but it would be possible to block approach from the sea by suitable coastal batteries. The enemy has airfields in the vicinity, valuable to him as affording bases for raiding and reconnoitering over the Arctic Ocean. As an important fishing station, this place is valuable to the enemy. Notwithstanding its high latitude Hammerfest is not very cold in winter, the mean temperature for January being only 31°F. , so military operations are practicable all the year round. The temperature declines rapidly toward the interior, winter going as low as -60°F. and with great quantities of snow.

Tromso is a small town valuable to the enemy as a source of fish, sea, and whale oil. It is separated from the sea by Kvaloy Island, with channels around each end. It lies south of Hammerfest, but has colder winters. In the vicinity is considerable forest where the enemy might conceal billets. About a year ago one battalion of infantry was reported as stationed here; there is no information as to the size of the present garrison.

An overland route and an interior sea channel are available to the base at Narvik. If available, reinforcements could be sent to Tromso.

Both Tromso and Hammerfest have a considerable period in winter when there is no sun, and in summer, when there is no night.

Narvik is a wholly modern town, completed in 1903 with the opening of the railroad into Sweden. It is located on the Ofoten Fjord, about 100 miles long, with good positions for coastal batteries. This fjord in turn opens into the Vest Fjord, which separates the high Lofoten Islands from the mainland. The railroad into Narvik was intended primarily for shipment of ore. The most modern types of loading docks were constructed, but were practically destroyed during the course of the 1940 fighting. Since June of that year the enemy has had undisputed possession of the entire Narvik area. Notwithstanding the high latitude—69° N.—there are a considerable number of farms in the surrounding country. As the water is deep close to shore, it is possible to load ships by bringing them close in to improvised quays in lieu of the destroyed piers.

The enemy has had a corps headquarters at Narvik, with 2 or 3 divisions under it. This corps is believed to control all of Norway north of Narvik and as far south as Mosjoen, inclusive, some 250 miles away in an air line. The infantry battalion at Tromso is presumably detached from this corps. Other detachments are at Saltdal, Mo, and Mosjoen to the south, leaving somewhat more than one division at Narvik. There is now overland communication to all of the places mentioned, although the new motor road north of Saltdal is not yet reported open. Near Narvik is one airfield and probably two.

The enemy uses the railroad for non-combat purposes. Personnel not armed, and commissary, clothing, and similar supplies arrived through Sweden. Through trains to Stockholm take two nights and a day to cover 980 miles. Ordnance, ammunition, and similar supplies, and troops under arms, were not moved by this route.

Saltdal, a very small port, just now is the railhead and motor road head for north Norway. Railroad and road construction material are handled temporarily through this port. A temporary trail is open to Narvik, and troops from there are garrisoned here.

The sea entrance to Saltdal is at the mouth of Salt Fjord, with the small town of Bodo on the north side. Bodo is the ordinary port of call for coast steamers, but at present appears to be occupied only by enemy administrative personnel. From Bodo to Saltdal the fjord channel is blocked by two islands, with three channels between and around them. Through these there are remarkable rushes of water, varying in direction with the tide. It is only practicable to go through these channels at certain hours, and then only in medium ships and with great care. As it is relatively easy to install batteries covering this difficult water passage, it must be presumed that the enemy has done so. Once past, there is clear navigation for 50 miles to the head of the fjord.

Mo is a port 50 miles up the Ranen Fjord. Not quite so far up is the port of Hemnes. The railroad passes through both of



Codfish are a principal product of the Lofoten Islands, scene of a major British commando raid some time ago. Racks appear below, as well as framing the rugged landscape of Sorvaagen, typical of northern Norway. Small fishing boats like those shown here have inestimably aided both the Norwegians and their allies.

these towns, so their seizure would cut the enemy's line of communications to the north. Hemnes has large warehouses and is suitable for a small base. Mo is a center for shipping iron ore, which before the war went to England but is now at the disposition of the enemy. In addition to the iron, the enemy derives some timber from this vicinity.

Like other ports further north, the difficulty of seizing them lies in the narrow and defended sea approaches. Landings for foot troops can be made at isolated places along this coast—but the enemy could reinforce his present small garrisons more quickly by his improved means of land communication than foot troops so landed could reach the heads of the fjords, where the enemy bases are. Landing and attacking by use of parachute troops is practicable. Due to the mountainous nature of the country and its close proximity to water, losses through dropped men falling into the sea or on inaccessible mountain spots would have to be allowed for.

Mosjoen is another port on the railroad and road which the enemy has placed in operation parallel to the west coast of Norway. A branch road extends to the Swedish frontier. Mosjoen is reached by sea up the Vefsen Fjord, with two sea entrances as usual. There are no important resources at this place. Its sole value for invasion purposes would be the opportunity of interrupting the enemy's north-south communications.

Namsos, a small village which is the center of a farm community, is about 28 miles up Namsen Fiord, the banks of which are well wooded and afford concealment for batteries. Only a detachment of enemy troops appear to be normally at this place. It is about 100 miles by land from Trondheim, another important enemy base with which it has sea, rail, and railroad communication.

A British expedition landed at Namsos in April, 1940, with the mission of proceeding overland southward to Trondheim. At that time Namsos was not occupied by the enemy, and the initial landing was unopposed. The troops were able to advance

to the vicinity of Steinkjer, 20 miles inland, where a meeting engagement occurred with the German troops. This expedition failed. The cause was the absence of airfields by the British, with the result that the enemy's planes bombed the base at Namsos practically out of existence. The space at Namsos between the mountains and the waters of the fjord is narrow, and it was impossible to distribute stores over a wide space. Consequently great destruction occurred from hostile bombing. The single route of supply southward from Namsos is in a valley, which is a defile, and here again bombing destroyed bridges and loads and inflicted serious casualties among the troops. This experience illustrates the difficulty of invading Norway through the west ports. The landing areas are small, there are no airfields available in the vicinity for our own air forces to use, and all routes into the interior are narrow defiles, easily obstructed and defended. The campaign of Namsos should be carefully studied in connection with future invasion attempts, as it well illustrates the difficulties encountered by landings on the west Norwegian coast.

Trondheim is a major enemy base. It is a city of about 60,000 people, 60 miles up Trondheim Fjord. Just opposite the city is the islet of Munkholm which, strongly fortified, directly covers the city from a naval attack. Other permanent fortifications constructed by the Norwegians are on the land side, particularly the fortified hill of Christiansen which defends the



The Romsdal is just above the head of the fjord at Andalsnes, 1940 embarkation point for British troops when forced to withdraw from Norway. Far below can clearly be seen the road and railroad leading to the interior of western Norway. Fighting through such valleys requires stamina: over such cliffs and heights, the utmost of physical vigor.

approaches to the city from the east.

The city has two rail lines to Oslo (one being narrow-gauge), a railroad across the Trondheim gap in the mountains into Sweden, and the railroad extending into the north country. Good motor roads extend north, east, and south, although only secondary roads and trails lead southward close to the coast. Roads and railroads out of the city lead by steep grades up narrow, canyon-like valleys which have been prepared for defense. Both railroads and the road to the south follow the Gula valley as far as Storen, 30 miles away, where the narrow-gauge line diverges toward the east; on this road are copper mines which are important to the enemy. The other railroad and the road from Storen lead to Dombas, where they join the routes from Andalsnes to Oslo. The railroads to Sweden and the north are combined for 10 miles eastward from Trondheim to the village of Hell, where they diverge. This line lies along the banks of the fjord.

The city lies mostly on a peninsula extending out into the fjord. It has good wharves and warehouses and makes a good base. There are machine shops and ship yards. Timber, paper from wood pulp, fish, and fish products are produced. Besides copper, iron pyrites are mined. The locality is of economic importance to the enemy.

In 1940 the British attempted to capture this port indirectly. Landings were made to the north at Namsos and to the south at Andalsnes, with a view to making a pincer attack on Trondheim. Although neither landing was opposed, the enemy (who was already in Trondheim) was able to delay both expeditions by employing relatively small forces in defensive actions in the single narrow defiles by which Trondheim could be reached overland. The same difficulty will arise if a new attack is made. At present the enemy is maintaining about a division around Trondheim, with detached forces for observation and delaying actions at Namsos and Andalsnes. Special coast guard man works defending entrances to the fjords. Air fields are in the interior.

Andalsnes, 40 miles from the sea up Romsdal Fjord, is a small port, with road and railroad to Oslo which connect at Dombas, 60 miles away, with lines from Trondheim. Between Andalsnes and the Trondheim—Dombas road lies one of the highest and roughest parts of the Dovre Mts. On the south side of the line from Andalsnes to Dombas are the very highest parts of these mountains, with the greatest ice fields and glaciers in all Norway. The route from Andalsnes to Dombas and thence on toward Oslo goes through a series of defiles flanked by wild mountains, known here as the Romsdal and beyond as the Gudbrandsdalen. Noted for their beauty, to advance up these heights against opposition is a difficult military operation. In 1940, without opposition, the British advanced to beyond Dombas; this expedition failed for the same reasons as that of Namsos: the enemy bombed the base to destruction, and so bombed the defile with its numerous bridges and steep grades that it was impracticable to maintain supplies for the troops at the front.

Along the shores of Romsdal Fjord are numerous villages which could be used by an invasion expedition, provided water communication along the fjord can be maintained. As far as is known the enemy maintains but a small force at Andalsnes, plus special troops to defend the entrance to the fjord.

Bergen is another major enemy base. It is 20 miles from

the sea up By Fjord. An excellent harbor, it is entirely suitable for a military or naval base. Airfields are available in the vicinity. Rainfall in this area is rather heavy, consequently the forest growth is quite dense and affords considerable cover on the slopes of hills which border the fjord on all sides. Bergen is of economic importance to the enemy. It is an important fishing center. The surrounding country furnishes copper, hides, agricultural products, timber, wood pulp and paper. Textile mills and shipyards are in the city. Good wharves and warehouses are available.

The enemy maintains coast defense forces, a naval establishment and depot, and about one division in this vicinity. The entrance to the harbor is covered by permanent forts erected by Norway. In 1940 the then British Admiral in command in the North Sea offered to sail in with his Battle Fleet and seize this important city. He believed that, although he might lose some vessels, he would be able to capture the place. This plan was disapproved by higher authority and never tried. The Germans now having had time to recondition the forts and add new works, such a movement at this date would be yet more doubtful of success.

There are possibilities of landing 10 to 15 miles south of Bergen, along the north side of Bjerne Fjord, there being practicable lines of communication from there to Bergen, with two possible routes of advance.

The road and railroad from Bergen lead inland. At first they follow the fjord, in some places overhanging the water on the cliff sides. In the first 65 miles are 52 tunnels. In the next 36 miles the railroad rises 4,000 feet to Myrdal, where there is a tunnel over a mile long. Along this part of the line very deep snow is to be expected from October to April, both inclusive. The road and railroad from Bergen to Oslo are not adjacent. For long distances they are separated from each other by difficult mountain country.

There is a "land" route from Bergen across country to Andalsnes. Although called a "land" route, it involves crossing several fjords and lakes. Boats are always required over the fords, and (except when frozen over) over the lakes. Between water traverses the road is a secondary one over wild mountains and not suitable for large forces.

The distance from the Shetland Islands to Bergen is only slightly over 200 miles. It would be possible from those islands to provide air cover for invasion forces in this part of Norway. This section is the nearest to any present Allied-held air base.

NORWAY'S SOUTH COAST

The southwest end of Norway, particularly the section from *Stavanger* to *Lindenes* (which includes *Jaeren*), affords the best prospects for an invasion of Norway, if made independently of other military operations.

Jaeren is a 30-mile stretch of coast which is neither high nor precipitous. It is flat and open, and can be used by invasion parties for landings. The remainder of this coast has a number of beaches. Back of the coast are numerous peat bogs, which form obstacles; however, there are passages between them.

East from *Sogndal* is a series of stream lines, averaging 5 miles apart and flowing in a generally southward direction into the sea. Any one will afford a good position for defense.

An invasion in this area, which includes *Stavanger* on the north, will have its left flank protected by *Bokn Fjord*, on the south side of which *Stavanger* lies. The right flank will be



Norway's southwestern coast is bold and rugged too, although the mountains are somewhat lower and more rounded than a bit farther north. Kragero is a typical coast village, built right on the shore.

protected by one of the stream lines to be selected in advance. The larger the invasion force, the further east this line must be.

This stretch of coast is 300 miles from the nearest Allied air fields in Scotland, which is three times as far away as the enemy's airfields. This is a handicap, but it will have to be overcome.

Stavanger is a good port, and will be needed as a base. Its approach from the sea is covered by a fortified island. It may be better to land south of the city on the open coast, then attack it from the rear. The island fort may then be reduced by an assault covered by artillery emplaced on the mainland and by air bombardment. It is essential that *Stavanger* be secured as early as possible. There are a road and a railroad extending south from *Stavanger* and paralleling the coast. The railroad would probably be at first unuseable due to the enemy's removing or destroying the rolling stock.

The only line of communications which the enemy has overland to *Stavanger* is by this road and railroad along the coast. Of 6 divisions which the enemy has in south Norway, any force in *Stavanger* is liable to be cut off by an invasion landing between that city and *Lindenes*. It is doubtful whether he would risk a major detachment in this area; it is more probable that he would make his initial defense along one of the stream lines to the east. This might well be in the valley of the *Otra*, extending northward from *Kristiansand* and known in its upper reaches as the *Setesdal*. Advance lines of defense to the west are available to the enemy.

An invasion might not meet much opposition to a landing in *Jaeren* or for some distance southeast thereof, and might be able to establish a good sized beachhead without much opposition other than from the air. It would then be possible to construct air fields for Allied use to assist in a further advance into the heart of Norway.

An advance toward *Oslo* from southwest Norway will involve the attack of a succession of river lines, practically perpendicular to the coast and only a few miles apart. Some of these are fjords at their mouths, all have steep banks and are considerable obstacles. Like most river lines, they can be crossed if sufficient artillery and air support is provided. As the advance progresses the mountains recede from the south coast and there is a greater choice of crossing points.

An advance once started can be supplemented by additional landings on the north side of the Skagerrak, provided the sea passage is open. Unless Denmark has first been occupied it is doubtful whether this would be the case. If Denmark has been occupied landings can be made direct from the sea, in rear of any line of defense the enemy may choose to defend.

There are several good ports on the north side of the Skagerrak, including Kristiansand, Arendal, Brevik, and Larvik. Without holding Denmark and its airfields, these ports could hardly be used even if captured. Still, Stavanger can be made to suffice as a base. Egersund, 48 miles south of Stavanger, is available as a sub-base. Like Stavanger, it is protected by an island fort on its sea side; its reduction can be undertaken as for Stavanger, by landing to the flanks and attacking it from the rear after having first isolated it.

While the enemy has only about 6 divisions in south Norway, at least one or two can be brought from the north within two days. By that time an invasion force must expect to be confronted with some 8 Axis divisions. This would indicate that the minimum invasion force must be not less than this. It may then expect to be able to hold the beachhead against enemy attack until heavy equipment is landed and organization has been perfected for an advance inland.

If the enemy falls back toward Oslo, better lines of defense become available—but they become longer and can be held only if additional divisions are brought from the mainland. Excellent lines extend northwestward from the vicinity of Brevik, starting with the fjord and continuing through lakes and narrow valleys to the mountains. This line would be some 90 miles long and would cover all lines of communication to Bergen and north Norway. About 15 divisions would be required to man this front, and this could not be safely done unless at least 5 more divisions were in reserve. To provide this number of troops would call for 14 divisions more than are now in Norway.

Just now it might be practicable for Germany to furnish this number of divisions from the GHQ reserve. Later this may not be the case, and in this event an invasion force can push forward with greater certainty of overcoming the limited forces which the enemy now has in the Scandinavia peninsula.

There is always the possibility that Sweden may join the Allies. The Swedes have an excellent army, and could place 20 divisions in the field. If half of this number appeared east of Oslo the German position would be seriously endangered.

Norway, in its war preparations, looked upon Sweden as its probable enemy. By treaty the Swedish-Norwegian frontier had all fortifications on both sides of the frontier removed for a zone averaging 10 miles wide, known as the Neutral Zone. There has been no information so far that the Germans have violated the treaty by erecting any military works in the forbidden area; it could therefore be crossed.

Should Sweden intervene, the Germans have a good line of defense along the Glomma River to Lake Mjosa, behind which to defend Oslo. The Swedes are in a position to march directly on Narvik and Trondheim also. To protect against this danger, at least 2 German divisions will probably be retained to watch toward the east.

Parachute troops may be used to aid an invasion. If they can be dropped near key bridges and defiles they may have a serious effect on enemy movements. For example, in an invasion of the Jaeren coast parachute troops might be used to interrupt the rail and road lines connecting that sector with Oslo. If Swedish air fields become available for the use of the Allies, the situation of the German forces in Norway would be precarious.

CONCLUSION

Norway is of considerable value to the Axis for strategic and economic reasons. It affords several naval bases where submarines may refit and from which they raid the sea lanes to northern Russian ports. It affords air bases from which the same sea lanes can be attacked by planes from far northern fields.

A more important military advantage is that the north flank of Germany is covered against any invasion from the north, unless the Allies first undertake a campaign to recover Norway—which is bound to take time, men, and means. Sweden is cut off from easy connection with any Power other than one connected with the Axis.

From an economic standpoint the Axis has complete control of the resources of Norway. These are not inconsiderable, and include some copper and nickel, timber, and fish. There has recently been a movement of German industries to Norway. This is part of the scheme to decentralize the former big plants, found to be too vulnerable to attack from the air, by transforming them into a multiplicity of small plants scattered as widely as possible. Some of these are now in production in Norway.

Some Norwegian labor has gone to Germany. It may be unwilling and furnished only by necessity of having food for families, but it benefits the Axis, even if to a less extent than free labor would.

These advantages the Axis has at the expense of maintaining in the country 10 divisions, plus special troops and administrative personnel. Together these may amount to 200,000 men. This is a considerable force. It represents, however, only about 10% of the active German army outside of Russia, or 3% of the total German (not Axis) strength. It is possible to take worn divisions out of line in Russia and station them in Norway for a period of months for rest, reorganization, and (incidentally) garrison duty. Provided but one or two divisions were changed at the same time, the presence of these troops in Norway, as long as there is no invasion, would not be a drain on German military strength.

The advantage of holding Norway is so substantial to the Axis, and particularly to Germany, that it must be expected that a strong fight will be made to retain it. The Allies have a choice. They may invade Norway and force the German army there into active warfare, which would probably require strong reinforcements to be sent to their aid. The alternative is to invade Europe elsewhere to such an extent that the Axis will no longer be able to spare even 10 divisions (or less) to hold Norway, and will be obliged to withdraw them to resist a greater danger on the continent of Europe.

WAR'S COST

In operations in Sicily we lost 13% of all the 155-mm howitzers we landed, 46% of all 57-mm guns, 36% of the motor carriages for our 75-mm guns, 22% of the carriages for our 105-mm howitzers, and 54% of the carriages for our 37-mm guns. We also lost 7% of our light tanks, 8% of our medium tanks. We lost nearly 13% of our 37-mm guns.

With materiel consumed at this rate in battle, every effort to conserve must be made in garrison and in training. Preventive maintenance is all-important, and salvage must be intelligently handled. War's unavoidable cost is so high that we must not jeopardize natural resources, nor further mortgage our future, by permitting any avoidable waste. This watchful saving is a job for every officer and every man—including you.

Communication Principles and Procedures

By Lt. Col. R. R. Mace, FA

COMMUNICATION MEANS

Personnel of all field artillery organizations must be trained in the use of all available communication means. Appropriate alternative means must always be immediately available.

Every possible means of communication available in any unit must be exploited to the fullest extent. If restrictions are not placed on the use of communication means (radio silence, for example) all means must be established and verified to insure instant use in case other more desirable means fail. For example, when a howitzer battery occupies position, visual communication should be established (subject only to terrain restrictions) as soon as the observation post and battery position are selected. Visual should be followed by radio (or vice versa) and finally by wire, each in its turn suspending operation with the installation of the other. Each means must be verified and the commander assured that if one means of communication fails, the next best means may be placed in operation instantly. The visual operator at the observation post must know *by actual verification* that if wire and radio communication with the battery position become inoperative he can reestablish visual communication immediately by standing at a certain point (on a certain rock or in front of a certain tree), from where his signals can be read by the visual operator at the battery position and from where he can read that operator's signals. This same principle applies to all field artillery units and to all means of communication.

COMMUNICATION TRAINING

Besides the specialist duty for which each individual is trained, all personnel of headquarters batteries and firing battery details must receive basic communication training which will qualify them to perform the following:

Telephone installation and operation. This includes test of a telephone to insure it will work satisfactorily, installation on a wire circuit, and operation to include calling, answering, and transmitting of an oral message.

Duties of wiremen. This includes installation and maintenance of field wire circuits to include precautions in installation and procedure for searching out trouble on a wire circuit, and repair.

Voice radio operation. This includes field operation of voice radio sets, use of proper radio procedure, and an appreciation of radio discipline and radio security.

Visual Signaling, Semaphore. At least sixty characters per minute should be required.

Duties of messengers. This includes information the messenger must seek from the dispatcher, the procedure he will follow and precautions he will take while traveling to the designated addressee, when delivering the message, and during the return trip. He must be capable of delivering a ten-word oral message.

Map reading. This includes symbols and other information found on military maps, following a route by reference to a map, air-photo, or photo-map, relation of ground form to corresponding terrain on a map, air-photo, or photomap,

Author's Note

This writing does not enunciate new principles or procedures in communication. No attempt is made to cover all the principles and procedures dealing with communication. It consists of a compilation of precautions and desirable procedures most frequently overlooked or neglected in connection with communication training and practice, and includes pertinent instructions issued by Army Ground Forces in weekly directives. An organization which conducts its training to emphasize the principles and procedures enunciated herein to make them practically automatic by all personnel, will have solved to a great extent the communication difficulties which arise so frequently.

location of a point on a map, air-photo, or photomap, and use of coordinates. Use of a compass should be included.

Vehicle operation. This includes sufficient instruction to permit any individual to take over the duty of truckdriver if the assigned driver becomes a casualty or is overcome by fatigue.

Route marking. This includes the various means of marking a route and should qualify every man to perform the duty satisfactorily.

Knowledge of military words. This includes spelling, pronunciation, and general meaning of words frequently encountered in field artillery units. This training can be accomplished by devoting ten minutes each morning to a review of those words previously discussed, and five minutes to five new words. The following is a partial list of appropriate words:

accompany	conventional	harassing	preparation
acknowledge	cooperate	hostile	protractor
adjusted	coordinates	identification	pyrotechnic
alternate	corrected	immediately	recoil
ammunition	counterattack	incendiary	reconnaissance
antiaircraft	counterbattery	installation	reconnoiter
anti-mechanized	counter-recoil	instructions	reference
antitank	defense	intelligence	refilling
armored	defensive	interdict	registration
auxiliary	defilade	junction	replenish
azimuth	deflection	kilocycles	reserve
barrage	demolition	liaison	resistance
bombardment	deployment	maximum	retaliation
boundary	development	meteorological	sector
bracket	displace	minimum	submitted
caliber	distribution	mission	successive
camouflage	echelon	munitions	supplies
chlorinated	effective	muzzle	system
circuit	elevation	negative	telegraph
circulation	emergency	neutralize	telescope
command post	emplacement	observation	terrestrial
compass	entanglements	panoramic	transient
computed	establish	parallel	transmission
concentration	executive	percussion	utilize
contaminated	expenditure	persistent	verification
contingent	formation	prearranged	vicinity
continuous	frequency	preliminary	visual

COMMAND POSTS AND COMMAND POST PROCEDURE

Field artillery command posts should be located adjacent to supported infantry command posts provided subordinate units can be properly controlled from that location using the communication facilities available. When an artillery command

post cannot be located adjacent to the supported infantry command post, the artillery commander (or a staff officer, when the commander must be elsewhere) should remain at the infantry post. Reliable communication must be maintained between the two command posts. Reconnaissance for general command post areas and for the detailed disposition of the different elements that make up the command post must be thorough and complete. Where possible such reconnaissance

should be made in company with the representative of the supported unit commander in order to secure coordination of effort and to arrange the elements of both command posts for maximum efficiency and mutual local security. Security of both command posts is increased by placing them well forward where infantry elements, organized in depth, will afford protection from enemy infiltrations and air attack. In selecting the general location for the command post and in disposing



Figure 1

BATTALION CP INSTALLATIONS

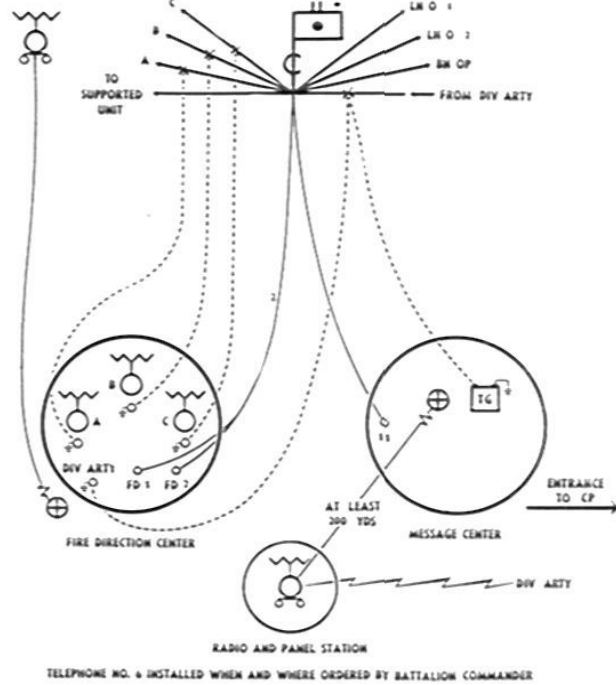


Figure 2



Figure 3

DIV ARTY (GROUP) CP INSTALLATIONS

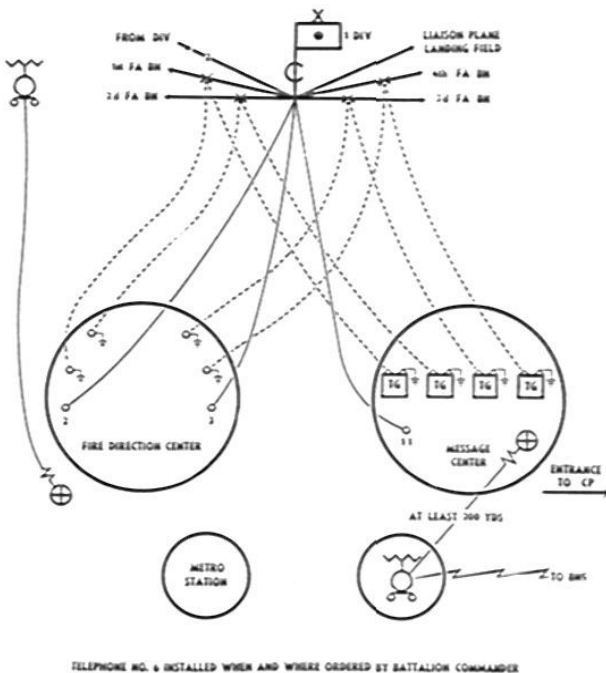


Figure 4

the different elements therein, consideration must be given to the following desirable characteristics, arranged in order of their relative importance:

- Control of subordinate units.
- Proximity to the command post of the supported unit.
- Concealment from air and ground observation.
- Protection from enemy air bombardment and artillery fire.
- Distance from road junctions and other areas likely to draw enemy fire.
- Nearness to a road net suitable for rapid movement of messengers and staff officers.
- Quiet for the personnel and protection from the elements for personnel and equipment.

When natural protection is not available, special trenches and foxholes must be dug for protection of personnel and equipment.

Typical dispositions of personnel in battalion and division artillery command posts are illustrated in Figures 1 and 3. Usual communication facilities in those posts are shown schematically in Figures 2 and 4. Equipment should be placed at the installation which normally uses it, or with the individual most closely allied with it.

As soon as the organization of a command post is decided, foxholes and special trenches must be dug to protect personnel and equipment. All possible personnel including officers should dig fast and deep. Covering mats for foxholes and special trenches to protect personnel against shells bursting in the air must be constructed.

As soon as a command post is established, arrangements for relief of personnel must be placed in effect.

The use of flashlights during night exercises must be prohibited except when under canvas or other positive concealment, and in extreme emergencies. Smoking at night under blackout conditions must be prohibited.

Traffic around a command post must be carefully controlled. Vehicles must be kept out of the operating area of the command post. Vehicular radios should be operated by remote control.

The location of a unit command post must be reported to superior and subordinate units as soon as selected.

Command post tentage should be set up at dusk and taken down at dawn unless orders are given to the contrary.

In displacement by echelon, or when a new command post is being established, a copy of the authorized codes and ciphers should be taken to the new installation or command post.

A command post must not be closed out in one location without prior notice to higher and lower commanders.

All personnel must be familiar with their duties when sound signals indicating mechanized or aircraft attacks are heard. Training must be sufficiently thorough to make the actions of each individual automatic.

GENERAL COMMUNICATION PROCEDURE

All officers must be thoroughly trained in the use of communication facilities. They must know how to operate voice radio sets, must be familiar with the principles and methods taught to enlisted personnel, and must follow those teachings.

All officers must know the capabilities and limitations of the communication equipment and must use that knowledge to secure maximum benefits and avoid difficulties.

All personnel of howitzer (or gun) battery details and headquarters batteries must be trained in visual signaling,

including semaphore, pyrotechnics, and signal lamps. In addition, all radio personnel of headquarters batteries must be trained in the use of panels. All possibilities of visual communication must be exploited. Visual stations should be established and visual communication verified even though other more desirable means are available; as soon as it has been verified, visual stations should be marked, all visual personnel advised of stations' exact positions, and the personnel then assigned to other duties. Personnel at observation posts should maintain constant vigilance to the front for visual signals; visual signals observed must be reported immediately to proper authority. Visual stations must be concealed from enemy observation; visual communication from rear to front must be used with caution.

When selecting position and command post areas, consideration must be given to the capabilities and limitations of communication equipment. Command posts must be located so as to permit the commander to control his units *with the communication facilities available*. *Short wire circuits require less time to install, operate more efficiently, and require less time and personnel to maintain than long wire circuits. Reliable radio communication can be assured only by keeping the operating range well within the range prescribed for each radio set.*

The commanding officer must prescribe in definite terms the communication to be installed. Instructions should include the type of wire installation, radio plan, and any special instructions required, and should be based on appropriate recommendations by the communication officer.

Communication officers must prepare plans in advance regarding the exact changes in radio frequencies (channels) which will be made in the event enemy jamming is encountered. For this purpose only those frequencies assigned to any unit in the current index to Signal Operation Instructions are available as alternate frequencies for that unit.

The prearranged message form (or voice code pad M-218) should be prepared by each communication officer prior to an operation. It should include geographical locations in the expected area and prearranged messages which can be anticipated for that particular operation. Copies of the prearranged message form should be distributed to all officers and key NCO's. The prearranged message form must be changed frequently to insure secrecy (one issue for a twenty-four hour period of operation will usually be sufficient). When any individual is in imminent danger of capture, he must destroy the prearranged message form. If it is known that a prearranged message form has been captured by the enemy an immediate report must be made to the commander, who must cause a new issue to be made. When a new prearranged message form is issued the old form must be collected and turned in to the communication officer, who will account for all copies and then destroy them.

Meteorological messages should be transmitted to battalions as soon as prepared. They should be transmitted by telegraph or (if telegraph is overloaded or inoperative) by the command and air-ground radio net.

Written messages should be submitted to the message center in sufficient quantity to provide one more copy than there are addressees. Message centers should not be directed how to send a message.

Communication equipment is difficult to obtain and almost impossible to replace. All personnel must observe the greatest care in the operation and maintenance of communication equipment, including wire.

Communication equipment turned in for repair should be tagged to indicate the probable trouble.

WIRE COMMUNICATION PROCEDURE

Wire communication of any magnitude should not be attempted until contact has been gained and definite operations are contemplated. Prior to that time, reliance should be placed on messenger service, both motor and airplane; radio may be used if it is not restricted.

Traffic diagrams should be prepared promptly by all switchboard operators, and unit designation strips properly marked with telephone directory designations.

A telephone with test clips should be available at each switching central for use in testing and servicing wire circuits. Wire-laying vehicles should not be driven directly up to a switching central or other installation, either at the initial point or at the terminal point. The vehicle should be headed in a proper direction and placed some distance from the switchboard under cover, and the wire pulled to the switchboard by hand.

Telephone, telegraph, and switchboard equipment, and all reels of wire should be tested prior to an operation.

Reconnaissance for wire routes should precede the actual installation whenever possible. Every effort should be made to select routes which will expedite installation, keep the circuits as short as possible, secure the best protection for the wire, and favor recovery. If a desirable wire route passes through a swamp, or closely wooded area impassable to a wire truck, the wire should be laid by hand. If a wire circuit must be laid along a road initially, that wire circuit should be supplemented by a circuit laid cross-country as soon as practicable.

Wire must be tied, tagged, and connected to switchboard or telephone at the initial point. Information included on wire tags must be confidential. A wire tagging code should be used.

In laying wire, every effort must be made to avoid roads, road junctions, and other military objectives. Whenever a road must be used, personnel must follow the vehicle and place the wire well off the road.

Wire must be laid with sufficient slack so that an individual may pick up the wire and raise it overhead without pulling from either end.

Wire circuits must be tied in to some firm object wherever the wire route changes direction, and at least once every 500 yards. At the terminus of a wire circuit, it should be securely tied, tagged, and tested back to the initial point before being turned over to the proper personnel. If proper personnel are not present, the NCO in charge of laying the circuit should call back to the initial point, report the fact, and request further instructions; if he is instructed to proceed with other installations or return to the initial point, he should leave a wireman with a telephone on the end of the wire to be sure the proper personnel receive it.

During installation of a wire circuit, that part which has been laid should be tested back to the initial point at the end of each mile of wire. If satisfactory communication is not obtained, the wire personnel should correct the fault in the wire already laid before proceeding further. Each time a test is completed a report should be made as to the number of miles of wire installed.

In splicing W-110 field wire only the standard splice (seizing wire) should be used. In splicing W-130 or W-150 field wire only the splice prescribed for that wire in FM24-5 should be used.

When a wire vehicle must be stopped for any reason, it should be so placed as to be concealed from air observation.

The personnel of a wire truck must service a wire circuit satisfactorily during installation to insure its continuous operation

ORGANIZATION

RADIO SET REPAIR DATA SHEET

SET SCR.	SERIAL NO.	SET ASSIGNMENT
DATE INSPECTED	TROUBLES FOUND	ACTION TAKEN
		DATE SET RETURNED TO DUTY

Figure 5

Radio Set Inspection

Inspected by: _____

Inspected at: _____

Date of Inspection: _____

Items checked in Table 2 refer to defective malfunctions.

1	2	3	4
VEHICLE DISASSEMBLY	Wiring connections (loose), (stranded)	Wiring coils (loose), (not properly installed), (not anchored to vehicle)	Antenna (not base), (no system), (defective counterpoise), (not anchored to vehicle)
ANTENNA	Antenna (not base), (no system), (defective counterpoise), (not anchored to vehicle)	SWITCH (See Table 2)	ALTERNATOR (Transm., (See. 17, 20, 21, defective), (See. not calibrated), (See. not tracking))
VEHICLE ELECTRICAL	Vehicle electrical (See. 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100)	SWITCH (See Table 2)	ALTERNATOR (Transm., (See. 17, 20, 21, defective), (See. not calibrated), (See. not tracking))

Figure 6

until complete servicing can be done. Wire servicing is never complete—it is an unending task.

Wire circuits in a command post should be buried or placed overhead as soon as practicable after communication is established.

To insure the maintenance of a wire reserve, recovery of field wire must commence as soon as it has been determined that a circuit is no longer required. When wire is recovered, only the prescribed splice should be made each time the wire is joined. Wire should be guided on to the reels smoothly and snugly. The two ends of each reel of wire should be prepared for future splicing (staggered and prepared for splicing) at the time the wire is recovered.

The primary use of telephone communication (except for fire direction and conduct of fire) is for personal conversation between staff officers and commanders. Message center personnel should not transmit written messages by telephone unless specifically ordered to do so by the commander. If other facilities are overloaded or unavailable, message center personnel should return a written message to the writer who may convey the information to the addressee by personal conversation.

Ground-return telephone (simplex) communication is not secret. It must not be used for the transmission of secret information, but only for conduct of fire.

Ground-return telegraph (simplex) communication may be considered secret under conditions in which it normally is used by field artillery. Messages may be transmitted in clear text. Telegraph communication is the fastest and most accurate means of transmitting written messages for any except very short distances. Telegraph communication is established

between division artillery (or group) headquarters and battalion headquarters as soon as wire circuits are installed.

When a telephone is removed from a wire circuit, the operator should

Notify distant operator that he is disconnecting the telephone.

Disconnect wire circuit from telephone terminals.

Remove batteries.

Place handset in case and close case.

Prepare wire for splicing.

Telephone operation must follow proper procedure. Directory names and numbers must be used in initiating and answering calls.

All reels of wire turned in to any organization or activity for credit must be properly tagged as to serviceability, type of wire, and designation of unit.

Line route maps must be prepared by communication officers as soon as wire communication is completed. A copy of the line route map must be forwarded to the next higher headquarters immediately.

RADIO COMMUNICATION PROCEDURE

Radio equipment, its transportation, and its personnel should be loaded as directed in current loading charts. Remote control units must accompany all radio sets. Operation of radio sets by use of dry batteries should be resorted to only when vehicular operation is impractical.

Commanders must establish a definite system of maintenance of radio sets whereby all radio sets are inspected by the radio repairman regularly and an accurate historical record maintained on each set. Suggested historical record and inspection forms are shown in Figures 5, 6, 7, and 8.

RECORD OF RADIO MAINTENANCE INSPECTION _____, 1943

REVENDED TO: Commander Officer _____

SUBJECT: Radio Set Inspection _____ Col. 2 _____ Col. 3 _____ Col. 4 _____

Type SCR 600/MS Trans. # _____ Sec. _____ sec. _____

Date of Inspection _____ by Sec. _____ Place _____

Items checked in columns 2, 3, or 4 are defective.

	1	2	3	4
VEHICULAR BATTERY (Voltage too high, low)				
CABLE (Connections loose) (Corroded) (Broken) (Not soldered properly) (Not supported properly) (Not properly installed)				
VEHICULAR MOUNTING (Not properly installed) (Bolts missing) (Shock Absorbers)				
ANTENNA (Wrong length) (Mounting) (Feed System) (Winding, Wasta defective)				
ANTENNA COUPLING				
SET CASE (Screws missing) (Threads stripped)				
CRYSTALS (Spare missing)				
VARIABLE CAPACITORS (Blades bent, shorted)				
PISTON SWITCHES (Mechanism) (Gears not properly meshed) (Switches)				
COMPONENTS (Missing) (shorting to _____) (Defective)				
FUSES (Damaged) (burned out) (wrong type) (Spare)				
RELAYS (Fitted) (Set working freely) (Blades sprung)				
DYNAMOTORS (Screws, tie wire mixer) (Commutators dirty) (Brushes defect.) (Improper lubrication)				
TUNING (Adjustment defect.) (Not in accordance with SOI)				
ALIGNMENT (S.F. defective) (Discriminator defective) (A.P.O. defective) (Not tracking) (Not calibrated)				
TUBES (Burned out) (Low emission) (Spare)				
METER (Needs high, low) (Damaged) (Wastefulness crossed) (Thermocouple)				
MICROPHONE				
HEADSET				
SPARKER				
INDUCTION SUPPLY SYSTEM (Noisy) (Very noisy)				
REMARKS:				
Signature: _____				

Figure 7

RECORD OF RADIO MAINTENANCE INSPECTION _____, 1943

REVENDED TO: Commander Officer _____

SUBJECT: Radio Set Inspection _____

Type SCR 600/MS # _____ PE 117 C # _____ CS 79 C # _____

Date of Inspection _____ by section # _____ Place _____

Items checked in column 1 are O.K. Those in column 2 are defective.

	1	2
VEHICULAR BATTERY (Voltage too high, low)		
CABLE (Connections loose) (Corroded) (Broken) (Not soldered properly) (Not supported properly) (Not properly installed)		
VEHICULAR MOUNTING (Not properly installed) (Bolts missing) (Shock Absorbers)		
ANTENNA (Wrong length) (Mounting) (Feed System) (Winding, Wasta defective)		
ANTENNA COUPLING		
SET CASE (Screws loose) (Screws missing) (Authorized modification not made, not properly made)		
OUTPUT (Receiver low, distorted) (Transmitter low)		
POWER SUPPLIES Vehicular battery (Voltage too high, too low) PE 117-C (output low) (Voltage regulation poor) (Components) (Spare) CS 79 C (No. 30, low plate, fil. voltage) (No. 40) Internal battery (too low)		
COMPONENT PARTS Fuse (blown) (wrong value) Variable condensers (Motors loose, binding, shorting) Meter (damaged, reads high, low)		
ALIGNMENT (I.F., Discriminator defective)		
TUNING (not in accordance with SOI) (off)		
GENERALIZATION (poor)		
TUBES (burned out) (low emission) (bad contacts in socket)		
HEADSET, MICROPHONE, MOUNTING		
IS 15 (missing) (defective)		
SPARE PARTS (missing) (defective)		
REMARKS:		
Signature: _____		

Figure 8

Radio sets should be checked for proper operation prior to an operation. This work should include the following:

Check all batteries and replace those that are low.

Tune or check the tuning of each radio set.

Check the operation of the set by communicating with another set over a distance of at least one mile, transmitting and receiving on all frequencies set up for the operation.

To secure best transmission range from radio sets the following precautions should be observed:

a. Install radio set so antenna is clear of trees, transmission lines, reinforced concrete, and other material objects which absorb radio waves.

b. Antennas of vehicular radios provide best transmission range when they are in a vertical position. When transmission difficulties are encountered, antenna should be released from its tied-down position.

c. When transmission difficulties are encountered, radio sets should be moved to higher ground and operated by remote control.

The command and air-ground radio set (SCR-284) must be established at least 200 yards and not more than 500 yards from the other elements of a command post. Personnel on duty at this radio station establish the panel ground and the pick-up station as soon as radio communication is established. Panel identification numbers should be laid out on the ground and the panels then folded up and camouflaged, ready for immediate display.

As soon as telegraph communication is established between two headquarters, transmissions in the command and air-ground radio net should cease, and the receivers of radio sets in

that net be used to monitor other traffic; in case telegraph fails that radio net should be reestablished immediately. Receivers of these radio sets should not be closed down except on orders of higher headquarters.

Radio operators must be equipped with pencil, message book, several log sheets, and a copy of the authenticator code. They must memorize the call signs and channels pertaining to their nets and be familiar with their procedure when various methods of displacement are ordered.

Radio operators must be thoroughly conversant with voice radio procedure, and comply with the provisions of FM 24-9 at all times. Unnecessary "call ups," requests for readability, and other procedure messages must be eliminated except when absolutely required.

Radio operators must be trained to copy radio messages through static and interference.

When radio jamming occurs, commanders must notify superior and subordinate units and attempt to locate the source of the jamming.

Radio silence should be imposed when secrecy is essential to success and surprise is possible. Radio silence means that radio stations do not transmit except in emergencies. All stations listen (keep receivers turned on) during periods of radio silence unless otherwise ordered.

Messages transmitted by radio must be cryptographed except when the urgency of the message precludes taking the time to cryptograph it, and the information cannot be used by the enemy in time to be of value to him. Any commander or staff officer who orders or who himself sends a message "in the clear" will be held responsible for such action.

Lt. Galvao's battery of Brazil's 7th Pack Artillery Battalion is marching along a typical second class Brazilian road. BC Detail heads the column; its large-wheeled cart carries communication equipment. Thatch of native roofs is often applied over corrugated iron, to form an insulating layer. →



Brazil's pack artillery is armed with the 75-mm Schneider. 18.6 calibers long.



Fire control equipment includes a Zeiss range finder of familiar pattern. At the left is a "circulo de visada," an azimuth-measuring device onto which is clamped a pair of binoculars to furnish the optical portion of the instrument.

A Battalion Air Observation Section Test

By Capt. Steve E. Hatch, FA

This test involves an original occupation of position with fire missions, and a forward displacement with night bivouac and early morning fire mission. The test may be performed either as part of a battalion field problem or the battalion headquarters battery and one firing battery may be employed as a substitute.

NARRATIVE

1. The chief umpire prescribes a problem which requires the battalion to march from the motor park on a bivouac area and take up a position in support of a given line representing our attacking front line elements. Upon conclusion of the initial phase, the chief umpire will assign to the Bn CO a problem requiring a forward displacement by battery, which may require night occupation of position. This portion of the problem will require a command decision on displacement of the aircraft.

2. In the first phase (initial position occupation) BP adjustment will be by ground observation, and in the second phase (forward displacement) BP adjustment will be from the air. In each phase there will be 5 problems fired from the air. Target and assignment methods will be chosen by the chief umpire from the following categories: using maps, air photo, or base point shift, fire missions assigned will be targets of opportunity, bracket or precision adjustment on base point or check point, or adjustment on BP from approximate compass laying, and will be assigned the observer both in the air and on the ground.

3. All fire missions will be graded for effect by an umpire at the ground OP, and also by an umpire in the air when practicable.

NOTES TO UMPIRES

1. At least one umpire should be an FA air observation pilot (Liaison) possessing considerable field experience.

2. Two individuals may fire two air problems. All other problems must be conducted by different individuals. Observers may be assigned by the Bn CO if no delay is incurred.

3. Umpires shall be responsible for safety. Their jurisdiction over aircraft shall be mainly concerned with operation in dangerous weather conditions.

4. At the conclusion of test, the chief umpire will assemble all participating personnel and conduct a critique.

5. Parts 1 (excepting 1b (1)), 2, 4, 5 (except 5d), and 6 will be scored once in each phase. Part 3 will be scored for each fire mission.

6. The final score will be converted to percentage. A score less than 70% is unsatisfactory.

GRADING SHEET

	SCORE PER PROBLEM	CUT ASSESSED	MAXIMUM SCORE	GRADE
1. POSITION				
a. <i>Field Selection</i> —Suitable for successful operational flights. Tactical location within perimeter defense area, natural camouflage of field, and proximity to battalion position.	75		150	
b. <i>Organization of Position</i> —Development of landing strip. Organization of field area: aircraft dispersal points, location of motor vehicles, maintenance facilities, personnel defenses, local security, camouflage of all installations.	55		110	
(1) <i>Overnight Position</i> —Sufficient security sentinels, tiedown and camouflage of aircraft, and disposition of personnel.	40		40	
2. TEAM PROCEDURE				
a. <i>Preparations</i> —Pilot and observer readiness for mission.	20		40	
b. <i>Knowledge of Situation</i> —Enemy front lines, friendly front lines, artillery positions, etc.—possessed by observer team.	30		60	
3. FIRE MISSIONS				
a. <i>Speed of Adjustment</i> —Time consumed from takeoff to landing: 9 minutes—full credit; 12 minutes—satisfactory. (These times may be altered at discretion of chief umpire if distance the aircraft must fly to observe fire is unusual.)	8		80	
b. <i>Accuracy of Initial Data</i> —Must be close enough to permit rapid adjustment. No credit if first round lost.	5		50	
c. <i>Success of Mission</i> —Accuracy and speed of adjustment, considering terrain, type mission, and weather.	12		120	
4. COMMUNICATIONS				
a. <i>Use of Radio</i> —Knowledge of operation in local net by all air section members—includes US-BR radio telephony procedure.	30		60	
b. <i>Air-Ground Communication Methods</i> —Knowledge of SOI orders covering all methods of air-ground communication.	15		30	
c. <i>Communication with Bn CP</i> —Constant communication with Bn CP (radio, telephone, visual, motor, or courier) must be maintained.	20		40	
d. <i>Hostile Aircraft Warning Net</i> —Efficiency of net under enemy attack. Minimum—one enemy attack (use Ln. airplane) in each position.	10		20	
5. MECHANIC AND GROUND CREW				
a. <i>Landing Strip Work</i> —Function as a unit in preparation for takeoff and landing of aircraft on tactical missions.	30		60	
b. <i>Displacement</i> —Function of unit in displacement problems.	15		30	
c. <i>Mechanic</i> —Satisfactory completion of maintenance duties.	25		50	
d. <i>Qualifications of Individuals</i> —Each ground crew member must as a minimum be qualified in driving and in small-arms fire (carbine, .30-cal., and .50-cal. MG).	10		10	
6. TACTICAL USE OF AIR SECTION				
a. <i>Employment by Battalion Commanders</i> —Full credit if section employed for column control, position reconnaissance, camouflage discipline, etc., in known friendly areas. No credit if used in enemy areas of fire, or obvious uses not exploited to advantage.	50		100	
	Total		1000	

CUSHIONED LANDING

Nazi mountain troops are reported to have been dropped successfully from aircraft without 'chutes. The jumps were made over Norway into snowbanks from an altitude of approximately thirty feet.

—Army Air Forces

Not in the BOOK

GUN POSITION PHONE

In the Tunisian campaign we adopted a variant of the EE-8—and—HS-19 arrangement described by Cpl. LiVecchi on page 649 of the JOURNAL for August, 1942.

Our executive uses only the handset. One end of 15 yards of W-110 is attached to the proper terminals of a headset plug, the other to the "master" terminals of a master board which also carries a pair of terminals for each piece. Each section has (and is responsible for) a headset which has two wires permanently fastened to a small terminal board. Each also has a reel of W-110 wire: 200 yards for Nos. 1 and 4, 150 yards for 2 and 3.

On occupying position, a wireman drives 4 stakes a foot or so in front of the master board. Each section runs its wire to this board, ties onto its proper stake, and hooks up its headset. Our stake-driver connects these lines into the master board.

Keeping guns, stakes, and connections in the same relative positions prevents mix-ups at night; dipping wire ends in solder speeds installation. These wire lengths permit any battery front or formation. Complete communication is provided. Best of all, the exec can work with his recorder and phone operator in a light-proof dugout during night firing.

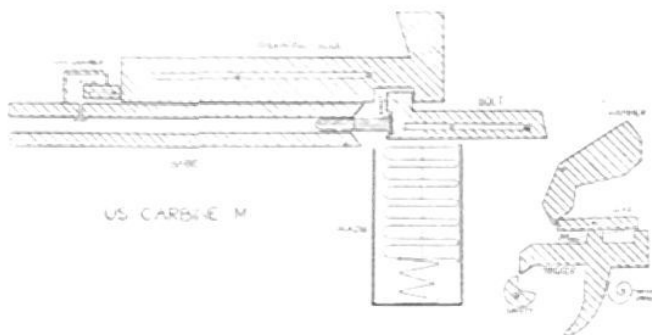
LT. WILLIAM E. MILLER, FA

TRAINING AID: CARBINE, CAL. .30, M1

For group instruction, a ply-wood cutaway model of the carbine proved ideal. Its several parts are painted in bright, contrasting colors, and all mounted on a large, smooth backboard. The whole thing can be made either life- or over-size, with few tools and little material, and in a very short time.

Gas piston, operating slide, and bolt are slotted, and move back and forth on screws mounted on the backboard. Placement of these screws governs the extent of the movement.

The hammer, pivoted on a single screw, is actuated by a spring. This



EDITOR'S NOTE: This feature is devoted to ideas sent in by our readers describing methods or devices which, though not specified by official literature, have proved useful in service.

spring (not shown) may be either a rubber band or a flexible strip of metal such as a piece of the bands used to fasten large packages. If a metal strip is used it can be mounted on the back of the backboard and act on a long nail driven through the top of the hammer and passing through a curved slot in the backboard.

Sear and trigger pivot on a single screw of their own. The sear's pivot hole is elongated to permit a short sliding motion; its spring is a rubber band, mounted as shown. Trigger spring is either a bent strip of flexible metal, or a rubber band.

The safety, also screw-mounted, can be turned to *Safe* and *Off* positions to prevent or permit the trigger to be pulled. It needs no spring.

One round of ammunition is a separate piece which can be separated into bullet and cartridge case. Additional rounds in the magazine may be merely painted on.

Extractor is just a bent nail or pin; no spring is required.

If all moving parts work easily and without much friction after mounting, another rubber-band spring may be used to pull the operating slide into the firing (closed) position.

In demonstrating the carbine's mechanism, pull back the operating slide; this action opens the bolt and cocks the piece. Place the round in the path of the bolt and move operating slide forward, closing the bolt and pushing the round into the chamber. Turn extractor so it holds the base of the cartridge.

Trip the hammer by pulling the trigger. Sear and hammer operate as in the actual weapon, and as in the carbine itself the hammer can not be tripped unless the trigger is released after each shot.

Move the bullet out of the barrel. When it is past the gas port push back the gas piston, starting the operating slide to the rear. This causes the bolt and extractor to draw the empty cartridge case out of the chamber.

Then repeat the entire cycle.

LT. J. R. BOURNE, FA

SIMPLIFIED TEMPLATE

Present practice in using the template for identifying any desired point to the battalion CP, calls for the determination and memorizing or notation of 2 or 3 to as many as 8 or 10 points of origin. These points must be identified each time the template is used. Also, if any written record of them is kept either by notation on the map itself or in notes, there is always the chance that the information may fall into enemy hands; this would require a rapid determination of new points of origin at the last moment.

To simplify this procedure and provide more secrecy it is suggested that the template be cut to $\frac{1}{4}$ its present size, using, for example, only the blocks from A to F. One small square in the C or D block (or any other block) is chosen as the "secret square"—for example, C-38. That is the only number that need be memorized, and it may be used indefinitely or changed as frequently as desired; no written records need be kept. Only liaison officers, forward observers, and necessary battalion personnel need know this secret square.

In using the pocket-size template, the secret square is placed over the point whose location is to be identified; the template is turned parallel to the horizontal grid lines. The coordinates of *any convenient point* (house, bridge, cross-roads, intersecting grid lines) falling under the dot in *any square* in *any block* are then sent to the battalion CP—for example, Code A-26, 68.23—92.46.

At the battalion CP the procedure is reversed by placing square A-26 over the coordinates given, the point to be identified then falling under the dot in the secret square C-38.

All messages may be transmitted openly by radio or telephone—no information of any value to the enemy is disclosed since the point whose coordinates are given may be as much as 2 or 3 thousand yards from the point to be designated.

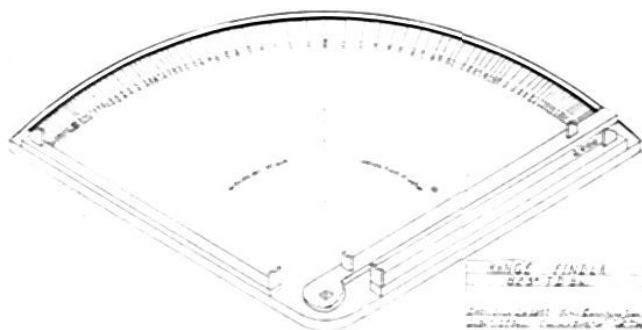
Incidentally, slightly greater accuracy can be obtained, because in each case the exact center of a square is used rather than an area.

If several different maps are used it is not necessary to have several sets of points of origin, only that each party use the same map. Also, the point can be identified by topographical feature or landmark if grid coordinates are not available. A point could then be identified by (for example) Code F-32 Mooreville Schoolhouse.

LT. EDWARD C. SMITH, CE

IMPROVED RANGE FINDER

Every TD gun needs range cards, but their usefulness is proportional to the accuracy of ranges shown to check points, crests, and likely avenues of approach. Using short-base methods we made the crude range finder shown here. It works so well that we use it to verify ranges in the deliberate occupation of a position.



When critical points have been identified and a range card made, the section chief or his assistant paces off 100 yds. to either right or left, lays his finder on the ground or a rock, and sights back on the sight of his piece to orient the range finder. Moving the pivoted sighting bar to the various critical points, ranges are read directly. Of course errors in pacing and variations from a true 1600' angle will affect the accuracy, but results are far superior to those secured by individual range estimation.

An 18" card or board gives fairly accurate results at ranges from 100 to 2,000 yards. By using a 200-yd. base all readings are doubled, making it possible to read to 4,000 yards. It is well to inscribe the range lines in both directions so the finder can be used on the more convenient or accessible flank.

LT. COL. PAUL B. BELL, FA

ANGLE MASTER

After some practice with the panoramic telescope a recruit begins to realize that it can be depended upon. He discovers that it will accurately change the direction of fire with only an arbitrary aiming point as a guide—that when used in conjunction with an aiming circle

or a BC 'scope, it will place all of the gun tubes of a battery parallel, on any desired line of fire.

But too few men can actually visualize the angles that are being formed and thereby understand just what is happening, so Eubert M. Algeo (a battery mechanic) and I worked out a device which would show just what happens. Thus the Angle Master was born.



This device was conceived and executed in "Spartan simplicity." It is merely a tripod on which is attached a sight mount, the mount being so made that the M12 A1 Panoramic Telescope seats itself securely in it, without adjusting screws. The pintle is a piece of old gasoline tubing with a bolt run through it; this permits the mount to rotate with a minimum of play.

Around the telescope, just below the azimuth scale, is a yoke through which a piece of doweling (colored red) was placed to represent the line of fire. A mark on the yoke lines up with the index on the azimuth scale so that when the instrument is zeroed the line of fire coincides with the line of sight. Then a yoke was fitted on the quick-sighting device of the rotating head, and another dowel (colored yellow) inserted in it to represent the line of sight.

So simple are all the parts that the Angle Master can be assembled in less than a minute, without a single adjustment clamp or screw. There are no handles, etc., to confuse the student. The line of fire is traversed by rotating the sight mount by hand, and the line of sight is shifted by operating the telescope. Placing the two pieces of doweling so close together allows the trainee to see each angle as it is formed.

When a shift in deflection to the left is commanded, the line of sight can be seen moving to the right as the azimuth scale is operated. Then, as the piece is laid back on the aiming point, the line of sight and line of fire can be seen traversing to the left with the new angle formed.

If the line of sight is rotated to the direct rear, a projection of the line of fire (or a longer piece of dowelling) will illustrate that as the index approaches 3200 mils, zero is again reached. If the rotation continues, the new angle minus 3200 mils can be readily seen.

By using more than one Angle Master they can be laid reciprocally. In so doing the parallelism and the transversal are graphically illustrated, and all lingering doubts as to just why the tubes become parallel are removed.

A battery of Angle Masters is an excellent means of giving gunners practice on rainy days or during off hours, as it enables them to become proficient in manipulating the panoramic telescope itself. With minor adjustments the Angle Master can be adapted to any of the standard panoramic telescopes in current use.

LT. CYRIL FERNANDEZ, FA

Diary of War Events

(As Reported in the American Press)

SEPTEMBER, 1943

- 1st Large task force attacks Japs on Marcus Island, only 4 air hours from Tokyo.
R.A.F. bombs Berlin for 45 minutes.
- 2nd Russian troops push deep into Donets Basin.
- 3rd British 8th Army lands on southern Italy, captures Reggio Calabria and Scilla.
Flying Fortresses raid northern France.
Navy Secretary Knox reports that Japan has lost a third of her merchant shipping.
British & Canadians drop 1,000 tons of bombs on Berlin.
- 4th British & Canadians advance in Italy with little opposition.
- 5th Allies occupy Calabrian coast from Melito to Palmi.
Russian troops continue to push Germans from Donets Basin.
Gen. MacArthur's forces land on the Gulf of Huon east of Lac and 25 miles above Salamaua; surprise Japs, meet little opposition.
U.S. B-24s fly 2,000 miles to blast docks at Car Nicobar in Indian Ocean, Jap positions in Burma and Hongkong.
- 6th Parachute troops with artillery encircle 20,000 in the Salamaua-Lac sector.
U.S. planes bomb targets along the Rhine.
U.S. and British planes sink 7 U-boats in the Bay of Biscay.
- 7th Allies capture Palmi, push inland to take Delianova. Air activity centers around Naples.
Secretary of State Hull rejects Argentina's request for lend-lease arms.
- 8th Italy surrenders unconditionally.
- 9th Allies land in Naples area, meet German resistance. Flying Fortresses bomb German HQ at Frascati, 25 miles southeast of Rome.
MacArthur's troops 2 miles from Malahang airdrome, northeast of Lae.
- 10th Nazis occupy Rome. Premier Badoglio and King Victor Emmanuel flee, but keep contact with Allies.
Germans capture Milan; rush troops into Adriatic Balkans.
- 11th Most of the Italian fleet joins Allies at Malta.
British & U.S. troops capture Salerno.
- 12th MacArthur's troops capture Salamaua airdrome.
- 13th Allies repel German counterattacks below Naples.
Russians push across the Desna River.
U.S. navy planes bomb Paramushiru, in the Kuriles; wreck installations, sink or damage 5 ships, destroy 25 Jap planes.
- 14th Stiff German resistance continues at Salerno, but Allies advance in southern Italy.
Germans imprison the Pope in Vatican City.
- 15th Both Allies and Axis counterattack frequently in Salerno area.
Heavy naval fire helps us greatly.
Britain's 8th Army reaches Belvedere, 75 miles south of Salerno beachhead.
Maj. Gen. Ralph Royce assumes command of all U.S. forces in the Middle East, vice Maj. Gen. Lewis H. Brereton.
Russians capture Nezhin, rail junction 72 miles from Kiev.
Allied forces now within 5 miles of Lac on the west, 2 miles on the east.
- 16th U.S. 5th Army drives 8-mile salient near Salerno.
Yugoslav guerrillas capture ports of Spalato and Susak.
Soviets capture Novorossisk by land and sea, also retake Lozovaya and Romny.
- 17th U.S. 5th and British 8th Armies join in Italy.
Allies have occupied Aegean bases of Samos, Kos, Castellarizzo, and Leros.
Russia captures Bryansk, advances along entire front.
Lae (New Guinea) falls to U.S.-Aussie troops.
- 18th Salerno beachhead enlarged and strengthened by capture of more nearby islands. Our planes now using mainland fields.
- 19th Russians within 40 miles of Dniepropetrovsk.
2 Italian divisions drive Nazis from Sardinia onto Corsica.
Russians now within 30 miles of Smolensk, Kiev, and the Dnieper below Dniepropetrovsk.
- 20th French battle Germans for Corsica.
5th Army occupies entire Sorrentine peninsula, bringing Naples within artillery range.
Allies bomb Jap airfield at Cape Gloucester, New Britain.
- 21st R.A.F. is using airfield on Kos (in Aegean), with support of Italian ground troops.
Kaiaipit, 60 miles above Lae and only 70 below Jap base at Madang, is taken by Aussies flown in by U.S. planes.
Germans sack and burn Naples prior to evacuation.
- 22nd MacArthur lands troops above Finschhafen, 60 miles northeast of Lae.
Allies take Potenza, straighten lines in south Italy.
U.S. Rangers help drive Nazis from Corsica.
Reds retake Anapa, last German-held Kuban port.
- 23rd Nazis demolish Naples's port facilities, scuttle 30 ships in harbor.
Allies advance up to 14 miles along entire line, except at Salerno hinge.
Aussies now within 2 miles of Finschhafen; Nips surrounded on 3 sides, have water on 4th.
- 24th Russians reach the Dnieper at several points.
5th Army advances near Salerno; in south, 8th Army takes Altamura (42 miles above Taranto); Nazis on Corsica hold only thin eastern strip.
Allied torpedo boats invade Albania's Bay of Valona; sink 2 merchantmen, damage 2 more.
Round-the-clock air offensive in western Europe enters 3d day; Mannheim-Ludwigshafen, Aachen, and Darmstadt are chief targets.
Finschhafen airfield falls; Allies within mile of town.
- 25th Russians capture Smolensk (major Nazi base); cross Dnieper.
Aussies cross last water protecting Finschhafen.
- 26th Reds' drive on Kiev is undiminished.
5th Army grinds ahead in mountains around Naples; along flatter Adriatic coast, Allies advance 23 miles.
Allied bombers hit Bologna, Bolzano, & Verona, Brenner Pass control points.
- 27th Reds take last Nazi escape port in Kuban; storm suburb of Dniepropetrovsk; cross Dnieper at several points; within 13 miles of Gornel.
Our entire Italian line advanced.
In west Europe we down 58 German fighters, lose 8 bombers and 7 fighters.
New drive opens on Jap base at Madang.
- 28th British 8th Army makes whirlwind capture of Foggia and its 13 airfields.
At Wewak we kill 58 planes on the ground, sink or damage 7 large and 29 smaller ships.
- 29th U.S. Fifth Army breaks through the Germans' last mountain defenses, fall of Naples is imminent.
Yugoslav guerrillas evacuate Spalato but retain the initiative against the Germans.
Allied bombers in the southwest Pacific continue pounding the Jap base at Wewak on New Guinea.
- 30th American troops enter Naples. Germans retreat toward defense line south of Rome.
War Department reports American casualties killed, wounded, missing and prisoners now numbers 115,201; 85,039 Army and 30,162 Navy.
Russians capture important railway center of Krichev.
British and Canadian heavy bombers attack the Ruhr and leave the steel city of Bochum in flames.



For Heroism and Service



One Tank Destroyer Battalion of our II Corps saw constant and vigorous action in North Africa. Its personnel have been awarded special recognition, as follows:

DISTINGUISHED SERVICE CROSS

2nd Lt. Cyrus W. Cobb, 0-885759
Capt. Benjamin A. G. Fuller, II, 0-25075

OAK LEAF CLUSTER, SILVER STAR

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S/Sgt. Joseph P. Ward, 12009218
1st Lt. John D. Yowell, 0-389682

SILVER STAR

(Awarded, but not yet presented)

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Cpl. William C. Church, 31095991
T/5 Nick S. Ciokiewicz, 36009832
Capt. Benjamin A. G. Fuller, II, 0-25075
1st Sgt. Michael B. Kaminski, 6136148
Sgt. Milford D. Langlois, 12004773
1st Lt. Robert A. Luthi, 0-434224
Cpl. James E. Markle, 31040476
S/Sgt. Robert L. Moore, 6248645
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Sgt. Willis B. NeSmith, 7080182
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S/Sgt. Joseph A. Segit, 12003512
S/Sgt. Michael W. Stima, 6879051

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Cpl. Kenneth D. Kalwite, 6975328
Sgt. Clifford E. McLean, 39016640
Pvt. John W. Thompson, 32318866

CROIX DE GUERRE

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1st Lt. Lawrence E. Marcus, 0-370714
Capt. Robert N. Steele, 0-393469

CITATIONS FOR THE CROIX DE GUERRE

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2nd Lt. Cyrus W. Cobb, 0-885759
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1st Lt. Lawrence E. Marcus, 0-370714
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Sgt. Alvin L. Pierce, 7004784
Sgt. Harry J. Ritchie, 33144614

BOOK REVIEWS

THE TOUGHEST FIGHTING IN THE WORLD. By George H. Johnston. 240 pages. Duell, Sloan and Pearce. \$3.00.

Jungle fighting is what Johnston is talking about. Not the jungles of the movies or the stage, nor those of romantic literature. New Guinea is the theme—the New Guinea of Moresby and Buna, of the Owen Stanley spines, of Salamaua and Lae and Wewak.

In this territory is some of nature's toughest terrain, nastiest vegetation, and (for a temporary visit) most treacherous wild-life. Its battle began on January 23, 1942, and still goes on. There will be more of it, and much more in similar spots before Japan is crushed. Johnston knows this country and he experienced its fighting; what he says makes sense.

Mr. Johnston, a 30-year-old Australian war correspondent, covered every step of the New Guinea campaign. Most of the time he was on that island, the rest was spent either at GHQ or in advance operational bases. He was with the ground forces, the navy, and the fliers. His picture is one of incredible courage and endurance, unrelenting warfare, heroism, battle toughening, and battle itself. It is epic!

THE LAST DAYS OF SEVASTOPOL. By Boris Voyetkhov. 225 pages; map. Alfred A. Knopf, Inc. \$2.50.

There has been a great deal published concerning Russia since its participation in World War II. Seldom is it possible to obtain as unpolished an account of the individual Russian fighter as is here given by Ralph Parker's translation of Boris Voyetkhov's work.

Voyetkhov is a playwright, turned correspondent for the duratoin, his play being shelved until, as his director puts it: "When there is a second front we will produce the play." Oddly enough, the play Voyetkhov wrote was *Welcome Arms* and its theme concerns a second European front.

Journeying from Omsk to Sverdlovsk the author was talking to a Red Fleet sailor, unburdening himself of his woes. The sailor told him that if he wanted a "world-beater subject, come to Sevastopol." Shortly after this suggestion, Voyetkhov was commissioned as a playwright and a special correspondent to *Pravda* to travel to the Sevastopol garrison and attach himself to the Black Sea Squadron.

The story concerns the last days of Sevastopol, but is narrated more as the result of disconnected vignettes than as a planned, coherent story. The result is all the more forceful for its rawness and gory reality.

There is the story of Captain Alexeyev, whom everyone called Captain Nakhimov due to his striking resemblance to the dead hero of

Sinope and because of his great admiration for Admiral Nakhimov. Captain Nakhimov was mortally wounded at the same spot where the admiral met his death. "With his face to the ground, and bleeding from his ears and mouth, he lay in a welter of blood and mud, trampled by passing horses until in mortal pain he was borne into a shelter. In his last delirious moments the brave man screamed the famous Nakhimov order: "Friends, if anyone tells you that I order you to retreat, kill him as a traitor. If I come to you and repeat it, kill me. Sevastopol must be held."

There is the story of the daughter of one of the members of the town defense committee. Because her father would not permit her to join the women's force fighting the Nazis, she was now keeping the town register. She was about 12 or 13 years old.

Here is the story of the keeper of the ammonal explosive stores. A former gardener, he tended his grisly hoard as tenderly as he ever tended his roses. Orders had been issued to blow up the entire city. to render it absolutely unfit for Nazi use, if and when they were successful in their assault. The inhabitants were dissatisfied with the allowance doled out by the prudent gardener. They were asking for that amount which they knew must be had to destroy the factories they had so lovingly built; he was conserving, measuring the destruction that must be against the stocks he controlled. When the old gardener refused them with a curt: "What! do you expect me to have to blow up all of your factories? Why, I haven't enough for my own hothouse," the factory directors laughed and left "to do something they had never expected. Soon they would be laying explosives under what many of them held dearest in life."

This is not a light book, nor yet one to be purchased for casual reading. It will allow the reader to know the Russian soldier and the Russian civilian as they are, and will explain more than many books why it is that the Nazis will never conquer Russia. A. G.

THE FRAMEWORK OF BATTLE. By Lt. Col. John G. Burr. U.S.A., Ret. 249 pp.; index; illustrated by Marian Halstead. J. B. Lippincott Co. \$3.00.

Col. Burr graduated from West Point in 1914, and served in the field artillery until his retirement. He saw World War I; the interval of peace, when military matters were ignored by the public; then the present war, with its flood of news and the rise of the commentator. Recently there has been a keenly awakened interest in military news, terms, and methods. People are anxious to *know*, and even more to *understand*. Most of them, though, have shied away from "standard" works on war, tactics, and strategy, fearing they

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would find "dryasdust" language that would be distasteful and maps that might be unintelligible.

So Col. Burr wrote *The Framework of Battle*, one of the more aptly named books I've run across. One of the more aptly written, too. In it you find no "canned language" or canned thoughts. He goes beyond the glitter of the self-styled "experts" to give the elements of tactics and strategy in plain language. He describes the principles of strategy—and so illustrates them from history that all can understand, and enjoy the process. Most of his examples are drawn from World War I, our Civil War, and the Napoleonic operations. And not the least of their value comes from the splendid tableau maps prepared by his wife. All this is then tied into the present scene.

The Framework of Battle is coherent and accurate. It is good reading, as well. Although written primarily for the layman, it will give any officer or other soldier a fine grounding in the principles of war, as well as a "starter" in military history. It deserves all success, and both Burrs all praise.

SKYWAYS TO BERLIN. By Maj. John M. Redding and Capt. Harold Leyshon. 290 pages; illustrated. Bobbs-Merrill Co. \$2.75.

These are stories of daring and courage, stories of our battlefields 25,000 feet up in the stratosphere over enemy territory, stories as only two reporters who have known and lived with the crews of First Wing's heavy bombers can tell them.

Heroes in First Wing are numerous, and only the ones who performed feats "far above and beyond the call of duty" are included in *Skyways to Berlin*.

The book pictures how our fliers live, what they eat, and what they think about the night before a mission. It is the personal experiences of the fighting crews of the heavy bombers. M. K. W.

THE INVASION OF GERMANY. By Curt Reiss. 206 pp.; maps. G. P. Putnam's Sons. \$2.50.

Mr. Reiss is already known both well and favorably for his *Total Espionage* and *The Self-Betrayed*. He knows his Europe and his Europeans, especially Germany and the Germans. He has good sources, and a shrewd head with which to use them. These are just some of the reasons why *The Invasion of Germany* is such an excellent piece of work.

It is not, you'll note, the invasion of Europe that is his subject. Like Pershing and Foch at the close of the last war, he clearly sees that for the sake of future peace—for the sake of future world safety, even—Germany's 130 years of freedom from invasion must end. No longer may she feel that with impunity she can fight in her neighbors' yards whenever the mood strikes her. Mr. Reiss does not simply make this assumption, however: he realizes that even now many people disagree with this thesis, and so puts in a few good licks that should convert many a doubter.

Basic in this development of German invasion is a good, although somewhat disconnected, discussion of Germany's terrain: how the land lies, what the communications are, where fortifications are located and how they are built. Political, psychological, and air preludes to actual invasion receive due treatment. So too do Hitler's probable strength, and the role of occupied countries.

Mr. Reiss does not rely sheerly on his own mental powers, nor pretend to do so. He is free with his quotations, and equally so with his credits. This synthesis of current writers, historical precepts, and Mr. Reiss's conclusions is a frank, honest, and sound treatment of the subject.

MAPS. By Alexander d'Agapeyeff and E. C. R. Hadfield. 138 pages; index; illustrations. Oxford University Press. \$1.75.

These authors did not set out to write a technical treatise on map reading or interpretation. Their aim was to interest the public in the fascination of maps, and in the events behind them. True, the elements of map reading are covered, as is also something on map projections and the characteristics and peculiarities of different ones; in fact, these latter summaries are splendid for any of us.

The real meat of the book, however, is in its second part, *The History*

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(See Discount Offer on Page 870)

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of *Maps*. Early map makers, old maps (with some of them reproduced), ordnance maps and plans, and charts—all are described. Not of the least importance is the bibliography concerning map-making, map history, and charts.

With so many different aspects of maps gotten into so few pages, *Maps* is admittedly a sheerly introductory book. By that very token, though, it serves as a splendid guide and eye-opener. One of the authors made maps, the other sold maps and charts. Having had experience with different aspects of the same general subject, they complement one another excellently.

ADMINISTRATIVE AND SUPPLY NOTEBOOK. Military Service Publishing Co. 75c.

Shirt-pocket size, this check-list of summarized regulations furnishes a handy digest, particularly for new and/or junior officers.

BACK DOOR TO BERLIN. By Wes Gallagher. 242 pages; endpaper maps; illustrated. Doubleday, Doran & Co. \$2.75.

This is the record of the Allied campaign in North Africa. Scattered through the book are stories of what individual soldiers did; some equal the exploits of Sgt. York in the last war.

One amusing side-light is Gen. Jimmy Doolittle's openly shopping in Bond Street for heavy shoes and fur gloves, giving the impression that the invasion was going to be struck at Norway. Another interesting picture is of the headquarters of Gen. Eisenhower set up in the small, concrete walled office under the Rock of Gibraltar.

The story of the occupation is told minutely, complete to the numbers of men engaged. Darlan is described as a conscienceless schemer and opportunist who met the fate which might have been expected for him. M. K. W.

COPPER CAMP: Stories of Butte, Montana. Compiled under the Writers' Program of the WPA. 284 pages; chronology; index; illustrations. Hastings House. \$2.75.

Many an excellent state guide book has come out of the work of the WPA. Here is a lusty story of "the richest hill on earth," with many a legend of the old days happily preserved. It's a rounded tale, parts of which could have been written by Bret Harte had he lived to know Butte. Not staid or stuffy, *Copper Camp* gives the very feel of the roaring mining town that was Butte in its hey-day. Good Americana, good stuff.

MEDITERRANEAN ASSIGNMENT. By Richard McMillan 332 pages. Doubleday, Doran & Co. \$3.00.

Here is one of the few narratives to reach the permanency of print, which bears enough historic accuracy to be valuable yet at the same time makes interesting reading. There's no doubt about it—it is 'most in the class of the detective thriller, for keeping you up half the night. Granted, it held 'special interest for this reviewer, who spent most of 1942 either with the 8th Army or at GHQ at Cairo; to him, this book resembled a movie of recent daily travels and experiences. Although perhaps a mite biased on this account, still I am in a fair position to evaluate *Mediterranean Assignment*.

Mr. McMillan has been very frank about some of Britain's glaring errors in the desert, although he generously covers up some others. He makes more mention of the American equipment used, than have most other writers to date; it is especially refreshing to me to see it given proper credit, having worked on the supply and training phase of this American effort which Montgomery later translated into the big battle at El Alamein.

Many planes of American manufacture are mentioned, and it would 'most appear that they were all operated by the R.A.F. Actually, it should have been pointed out that our 9th Air Force bore some share of the 8th Army's tremendous air effort. Many a P-40 that haunted the Germans was flown by an American pilot and bore U. S. markings. Many of the *Liberators* and all of the *Mitchells* were also 9th A.F. planes. These American crews did their

share, and were pals with the gallant R.A.F. crews; many of them lie buried side by side, in Egypt and Libya.

These omissions, though, do not seriously detract from this book. As a whole, Mr. McMillan's account is magnificent. Without question it is entertaining, refreshing, and amazingly true. It should be on the "must" list of all readers, and is especially recommended for Service Schools as an introduction to wartime field duty and the urgent need for full resourcefulness.

G. B. J.

THE INFANTRY JOURNAL READER. 679 pp. Doubleday, Doran & Co., Inc. \$3.00.

Excerpts and articles from past issues of the *Infantry Journal* have been classified and reprinted in this rounded anthology.

BLOOD FOR THE EMPEROR. By Walter B. Clausen. 331 pages; index; endpaper maps; illustrations. D. Appleton-Century Co. \$3.00.

An eye-witness, blow-by-blow account of the war in the Pacific from December 7, 1941, to the present is told by officers and men of the Army, Navy, Marines, and Air Forces, and by Associated Press correspondents—all of whom were at the scene of the various actions described.

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M. K. W.

AMERICA IN ARMS. By Brig. Gen. John McAuley Palmer. 196 pages. *The Infantry Journal.* 25c.

Gen. Palmer is among our ablest military historians, in or out of the army. In 1941 his survey of our army from its inception was published by the Yale University Press. This inexpensive edition is now available, to members of the Armed Services only.

ESCAPE FROM THE BALKANS. By Michael Padev. 311 pages. Bobbs-Merrill Co. \$2.75.

The author felt it his duty to report to the American and British public the workings of the Balkan underground movement and to give a true picture of Balkan problems and of their possible solution.

Arrested by the Gestapo a few days before he had planned to leave the Balkans to do graduate work in America, Padev was sent to a concentration camp near Plovdiv. Here he met many prominent political leaders and gathered much valuable material for several stories. After a conditional release from camp he wandered as an outlaw with friends from the Bulgarian underground, succeeded in getting a Croatian passport, and headed toward the Turkish-Bulgarian frontier. Here he encountered the Gestapo, but was lucky enough to be permitted to leave for Turkey into freedom.

M. K. W.

THE SHARPS RIFLE: Its History, Development and Operation. By Winston O. Smith. 123 pp.; bibliography; index; profusely illustrated. William Morrow & Co. \$3.00.

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These officers know whereof they speak: Estabrooke is Instructional Coordinator at the Naval Air Technical Training Center in Chicago, and Karch is on duty at the same place, on leave from serving as Principal of Cincinnati's Graphic Arts Vocational High School. Their suggestions for instructors, including self-analysis, are excellent. Conduct of shop activities; lesson planning and presentation; conduct of demonstrations; use of oral questioning and discussion, visual aids, and tests; maintenance of discipline; and how to make a course of study and to write instruction sheets—these are the topics ably covered, and so far as this reviewer is aware this is their first presentation from the point of view of the Services. The experience of these officers yields many an excellent pointer.

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M. K. W.

THE ARMY OFFICER'S MANUAL. By Lt. Col. A. C. M. Azoy, CAC. 335 pages; appendices; index; illustrations. D. Appleton-Century Co. \$2.50.

Here is a new revision of this handy little manual. It does not cover so much ground as does *The Officers' Guide*, being considerably smaller, but it does go into a bit more detail concerning drill and ceremonies, combat signals, and some other matters with which every officer should be familiar. It may well answer many of your questions.

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G. I. JUNGLE. By WO E. J. Kahn, Jr. 149 pages. Simon and Schuster. \$2.00.

New Yorker staff member after graduation from Harvard, Kahn was inducted 5 months before Pearl Harbor, reached Australia in May, 1942, and was among the first American ground troops to land on New Guinea. He continued his writing habits, his essays being published by *Yank* and by his former colleagues. This collection of them deals little with actual combat, but does give a clear, excellent, and "human" picture of wartime and army life in lands down under. It is a volume not to be overlooked by anyone with friends or relatives in that part of the world, or interested in the many facets of this wide-flung war.

UNDER A LUCKY STAR. By Roy Chapman Andrews. 300 pages; endpaper maps. Viking Press. \$3.00.

Dr. Andrews has traveled all over the world, often collecting scientific information on the whale. His expeditions into unexplored Asia, which took more than ten years, are unequalled in the history of scientific exploration. The author's post-war ambition is to found an international organization for the exploration of the still largely untouched hinterland of Asia.

M. K. W.

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INDIA'S PROBLEM CAN BE SOLVED. By DeWitt Mackenzie. 232 pages; illustrated; appendices. Doubleday, Doran & Co. \$3.00.

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The author maintains that India is the arsenal of the Middle East, and that the Indian crisis has ceased to be an imperial family affair but is now a problem of first importance to all the United Nations.

M. K. W.

ELEMENTARY JAPANESE. By Lt. Col. E. J. Sullivan, CWS. 142 pages. P. D. and Ione Perkins. \$2.50.

Col. Sullivan's guiding principles were (1) elimination of infrequently used words, (2) use of the "familiar" form of speech wherever practicable, (3) use of the more regular form where alternatives appeared, and (4) inclusion of a military vocabulary. The result is a practical volume. It is broken down into 40 lessons. Admittedly, it is preferable to work under an instructor's guidance, but even the self-teacher can gain a good foundation from this little text.

MAKERS OF MODERN STRATEGY. Edited by Edward Mead Earle. 519 pages; bibliographical notes; index. Princeton University Press. \$3.75.

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These men do not just flit casually through the pages, however. Those related in time, or more particularly in thought, are grouped together. Their relationships, doctrines, similarities, and differences are clearly portrayed, so that a thoroughly rounded picture of military thought emerges. Such integration is not only informative and clarifying, but extremely useful for tracing the genesis, growth, and development of modern strategy. All this makes the book a fine one for study, or for library reference.

HOW THE ARMY FIGHTS. By Capt. Lowell Limpus. 388 pages; illustrated; index. D. Appleton-Century Co. \$3.00.

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JUDO: Forty-one Lessons in the Modern Science of Jiu-Jitsu (Enlarged Edition). By T. Shozo Kuwashima and Ashbel R. Welch. 146 pages; photographs. Prentice-Hall, Inc. \$1.89.

Profusely illustrated, this enlarged edition lives right up to its subtitle. All stress is on modern, practical applications of the principles of jiu-jitsu. Fundamental movements and action movements are carefully explained and clearly shown. The section on throwing movements has received special attention in this revision. The authors, experts and enthusiasts in this line, have done a fine job in preparing a highly useful volume.

THE USE OF AIR POWER. By Flight-Lieut. V. E. R. Blunt, R.A.F. 162 pages. Military Service Publishing Company. \$1.00.

Resigning his commission in the R.A.F. to do so, the author published this book which takes into account the fact that the changing character of modern war has led to much fresh thinking and reorganization of plans, and indicates the direction in which both logic and events are leading the military arms. This gives the principles behind the use of air power, viewed as a whole.

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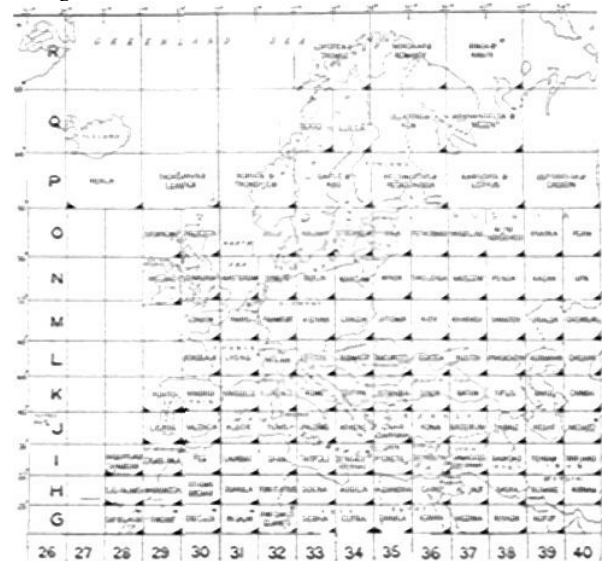
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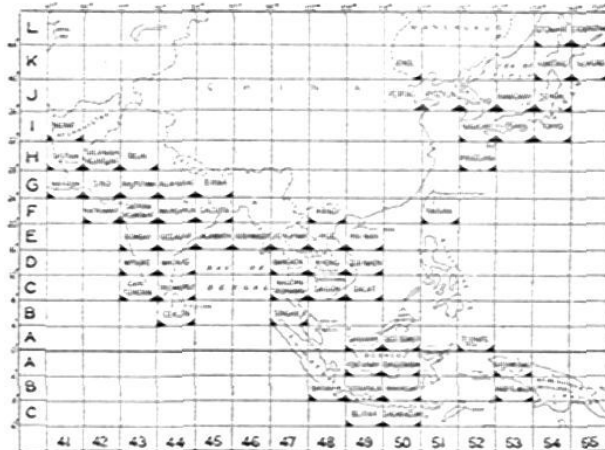
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THEY MADE ME A LEATHERNECK. By *Rowland Vance*. 175 pp. W. W. Norton & Co., Inc. \$2.00.

Rowland Vance is now a Marine lieutenant somewhere out in the Pacific. He didn't get there easily—he had to earn his right to go. And that's what this book is about: the process of earning a Marine commission, a 20-week course at Quantico.

That course is tough, the guys are good, the sergeant instructors the true salt of the earth. There is work and there's humor, and there are all those little incidents that slip back into dim memory without a reminder now and then. Which is where this book fits in. In many ways Vance is the Marines' Hargrove, and they should be proud to own him. For you see, he's done a bang-up job of painting a picture of Quantico, its people, and its candidates' course. It's a chucklesome book for those who know, and gives a fine idea of things for the benefit of those whom you'd like to know about these things.

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INCOME TAX AND ARMY PAY (5th ed., 1943). By Col. J. H. Doherty. 55 pp. Military Service Publishing Co. 50c.

Col. Doherty's handbook with self-describing title has been a lifesaver to many officers, in its earlier editions. Additional complexities of the new tax laws make this revised edition trebly welcome. New requirements include paying in advance, filing declarations of estimated annual tax (with, incidentally, amazingly stiff penalties if you can't read the crystal ball accurately a year ahead of time!), extra pencil-chewing and paper work. Col. Doherty calmly threads this maze, shows you step by step what must be done and how to go about it, and gently quiets your fears. His work is accurate and helpful. I know—I largely rely on it myself, and he hasn't let me down.

BALKAN FIREBRAND. By Kosta Todorov. 340 pages. Ziff-Davis Publishing Co. \$3.50.

Being in turn a chetnik in Macedonia, a revolutionary terrorist in Russia, a soldier in France, a statesman in Bulgaria, a political exile in Western Europe and America, sentenced to death six times (and even now under a death-sentence by Nazi-controlled Bulgaria) records an amazing career.

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Living now in Canada, Torodov continues to work for a free Balkan people. M. K. W.

WHAT YOU SHOULD KNOW ABOUT THE ARMY GROUND FORCES. By Col. Joseph I. Greene. 209 pages; index. W. W. Norton & Co., Inc. \$2.50.

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