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Journal



JANUARY, 1944

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The Field Artillery Journal

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

JANUARY, 1944 — Vol. 34, No. 1

OUR COVER PHOTO was taken 8 miles south of El Guettar on March 21, 1943.

IN THE PAST YEAR our members overseas have been splendid about sending in accounts of their operations, and descriptions of their technical developments. Publication of material like this serves at least two purposes: it is of direct, immediate value to others who have not yet solved (or perhaps not yet met) the problems, and also preserves invaluable historical source material.

In the coming year we hope for an increase in articles of these types. All manner of artillery duties should be covered, especially those that have been rather neglected (in print) thus far: the ammunition officer, liaison officer, and CommO are a few examples. If possible, your manuscripts should be double-spaced, on one side of the sheet only, and illustrations should be drawn with India ink—but if facilities are lacking, don't hesitate or delay: send your material along, and we'll take care of any necessary smoothing. And in any case we take care of all clearance through the War Department, prior to publication. Along with it please be sure to include brief biographical data—especially a summary of your recent service and assignments.

IF YOUR JOURNAL has stopped reaching you overseas, the trouble may well lie with your family. Some well-meaning relatives write in that "So-and-So is now overseas, so please cancel his membership." You know even better than we do, what a help the JOURNAL is in active theaters. We answer letters like the above with quotations from V-mails received here, and in most cases your families cooperate. Sometimes they don't, though, so for your own benefit please be sure you're not inadvertently crossed-up by the folks back home.

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Published monthly by the United States Field Artillery Association. Publication office 3110 Elm Avenue, Baltimore 11, Md. Business and editorial office. United States Field Artillery Association, 1218 Connecticut Avenue, Washington 6, D. C. Address all communications to the Washington office. Entered as second class matter August 20, 1929, at the post office at Baltimore, Md. Accepted for mailing at the special rate of postage provided in Sec. 1103, Act of October 3, 1917. Copyright, 1943, by The United States Field Artillery Association. Subscription price \$3.00; Canada \$4.00; foreign \$3.50; single recent copies to members, 25 cents; non-members, 35 cents. THE FIELD ARTILLERY JOURNAL does not accept paid advertising. It does pay for original articles accepted, but unsolicited manuscripts must be accompanied by return postage if they are to be returned. Addresses and ranks will be changed as frequently as desired, upon notification; not otherwise. Changes should reach the editor three weeks before date of next issue. Immediate notice should be given of any delay in the receipt of the magazine.

Authors alone are responsible for statements made.

No articles are official unless specifically so described.

SOME TUNISIAN DETAILS

By Col. C. C. Benson, Cav.

IN THE SOUTH

Rommel was holding a position at the Mareth Line and at El Guettar, guarding his left flank. At Maknassy he had further groups, and so on up all the way to the Mediterranean. I came into the picture about March 29th, with orders to report to Gen. Terry Allen, who was commanding the 1st Inf Div, then engaged at El Guettar. His division, supported by one tank battalion of the Zth Armd Regt, had moved into Gafsa, captured about 1,000 Italian prisoners there, moved on to the east from Gafsa past El Guettar. At the time I joined him he had some of his troops on Hill 369, some on the Gafsa-Gabes Road, and some on the hill mass northeast of El Guettar. This point was partially held by German-Italian troops and partially by American infantry on Hill 369. That was a very hot spot indeed. The valley varies from 3 to 5 miles in width.

When I reported to Gen. Allen in the El Guettar oasis, my troops were north of Gafsa, and II Corps HQ were at Gafsa. My instructions were to cooperate with Gen. Allen, but not to get involved in anything without direct orders from Gen. Patton. I found out what the situation was, discussed it with Gen. Allen, and then went back to II Corps HQ and conferred with the II Corps staff and with Gen. Patton. He placed under my orders the equivalent of about half an armored division, consisting of the RAth Ren Bn, 2 battalions of armored artillery, 2 of tanks, 2 TD battalions, an infantry battalion, a company of engineers, ordnance, signal, supply, and medical units, and named it "The Benson Force." It was improvised and assembled right there on the battlefield. Some of the battalion commanders I had never seen before. I hadn't the slightest idea of the state of training or combat efficiency of some of the people who were to fight under me, and I had an improvised staff. They were a fine bunch and did excellent work, but they were not accustomed to working together and not very well acquainted with me and my methods. I point this out now because a good deal of our later difficulties arose from the fact that the team was not well-knit at the start.

On about the 29th of March, the 9th Inf Div had taken over on the south. The 1st Inf Div had shifted troops to the north and had placed outposts along the Gum Tree Road (1 on map). We had a funnel, plugged by a series of transverse ridges which were strongly held by enemy tanks, AT guns, artillery, and infantry; also, there were two or three mine fields. On the 30th, both the 1st and 9th Inf Divs attacked to secure the outlet of this funnel, the idea being that as soon as they secured the outlet my armor would go on through and raise hell over in this territory.

The mission given to all of us by the Corps Commander was to put pressure on the forces that were in our front with a view to drawing away from the Mareth Line as much of the German armor and infantry reserves as we could get, so that the British Eighth Army could punch through more quickly and with fewer losses.

The infantry attacks on the 30th gained ground but did not get the outlet of the funnel. That day my outfit came up east of El Guettar and had its first real assembly with all units present; they had been flowing in day and night for two days from



When Axis resistance collapsed in Tunisia, a ceaseless stream of Allied supporting troops and supplies flowed across the coastal plain toward Tunis.

various places. We got together that day, watched the fight, and got acquainted with the ground and with what we were expected to do. All of us went as far forward as we could, battalion commanders as well as all reconnaissance people. The latter in this show consisted of a whole reconnaissance battalion, the RAth, commanded by Charlie Hoy; the tank destroyers had their own reconnaissance, so I had more reconnaissance than I could use at that stage of the game. The best they could do was to establish OPs on the heights overlooking the valley in which we were assembled and keep ahead of us several miles, taking over (as the Germans and Italians dropped back) the OPs that they had previously used against us.

On March 31st the infantry renewed their attack. Up to about 10 o'clock the infantry wasn't making any special progress. I knew that the 1st Inf Div had been heavily engaged for about a week, the men were very tired, and what with attacking or holding defensive positions with shell fire dropping all around them day and night, they had had very little sleep. I fought with them in other places and can testify that they are damned good fighters. It was very tough ground that they were trying to advance over, with deep wadis and sharp, rocky djebles, so that a small number of men on the defensive, well equipped with mortars and machine guns, could play hell with advancing infantry and did so.

I was with the Chief of Staff of the II Corps, at that time Gen. Gaffey, and about 10 o'clock I allowed as how we could crack that defensive position with a tank attack if they wanted us to, thinking that my tanks, in conjunction with the two infantry divisions that were still attacking, could put on enough pressure so that we could get out of there. I don't remember for sure, but I think Gen. Gaffey called Gen. Patton and got approval of the idea of making a tank attack; at any rate, he came back shortly and told me to go ahead.

I had two battalions of medium tanks (one from the Zth Armd Regt and the other from my own regiment, the KCth) in column of battalions, and it happened that that day the

battalion of the Zth was in the lead. I asked the battalion commander which one of his companies would be most desirable to use in an attack on that position, pointing it out on the ground, and he designated the company commanded by Lt. Buresh. I pointed out the objective to Lt. Buresh and told him that we wanted to launch an attack on that position beginning at 12 o'clock; told him what artillery support we expected to give and what additional support he could expect from the attacks of the infantry on the north and south flanks; and told him to shove off. It was then 11 o'clock. He had one hour in which to assemble his people, point out the objective to them, and get going.

His tanks were right there under cover. It was not difficult to assemble his platoon leaders or for them to assemble the tank commanders, and they did. They could see on the ground exactly what they were expected to do. My orders to Buresh had informed him that he would escort three artillery observers, who would be in tanks, to a ridge approximately 2½ miles out in front, and maintain them there until dark.

To get going in this attack Buresh had to pass through a mine field, down through a wadi which dropped about 15 feet below the plain, up on the other side in single column, deploy on a plain (which was almost as flat as a polo field, about 1,000 yards wide and a mile or so long, without any cover), and then move through AT fire to his objective. Our engineers had made a breach in the mine field so that he was not delayed in getting through the wadi, although it involved a number of twisting turns to get to the crossing and up the other side. He came out of there in good shape and formed in column of platoons, each platoon in wedge formation, and advanced toward his objective right at 12 o'clock. He was on his objective by 1220.

In getting there he was shot up from his right flank and from the front with considerable AT fire and by the 75s of German PzKw IV tanks. One tank was hit and caught fire; another tank was hit and stopped, and then another; but the company kept right on. I watched the whole thing from a hill two or three hundred yards on a flank and ahead of where they crossed the mine field, and could see every move they made from start to finish. They never wavered; they went on right straight through all this AT fire to their objective, the only pause being in certain elements of each platoon when fired upon from the right or from the front, and they did exactly what they had been taught. Those that stopped would pick out the enemy AT guns from the flashes, return their fire, and then move on. These guns were exceedingly well camouflaged and you couldn't see them except when they were firing. In making this attack they lost, I think, 7 tanks, but they went through to their final objective and were there within 20 minutes of the time they started. We supported them by excellent artillery fire, and artillery observers in tanks accompanied them to the objective and remained there until dark that night.

The fact that we were going to make a tank attack was not known to the 9th or to the 1st Divs until they saw it start. They knew that we were there and they expected that we might do something 'most any time, but it was not part of the plan that had been put out that day. Consequently, they were as much surprised by the success of our attack as were the Germans.

During the afternoon, sometime about 3 or 4 o'clock, I went forward myself to join Buresh. I had previously sent the remainder of that tank battalion forward and I expected to find them in the folds of the ground somewhere near where

Buresh's company was, but on approaching that position in my own tank I found the remainder of that battalion, and one TD company that had been sent out to overwatch them, were not advancing, apparently having been held up by the fire of AT guns. I told them to get going and follow me to join Buresh.

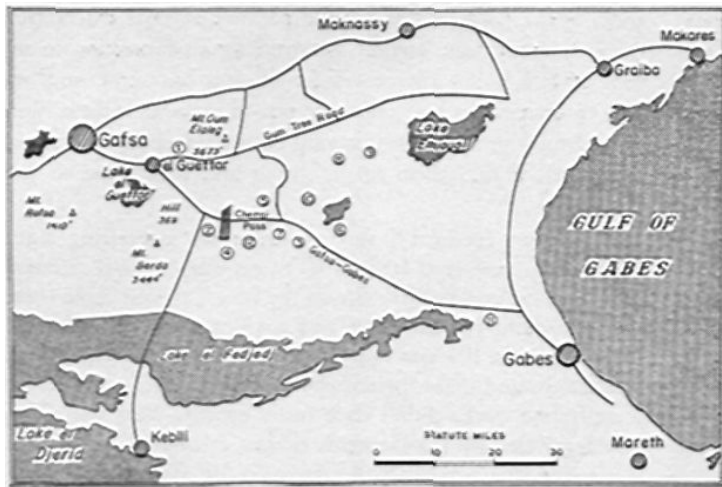
As I went forward I saw an extremely interesting sight. Here was a row of 6 Italian AT guns dug in, well manned, blanketed by our artillery fire at the time I passed them—and roving around behind them was a German PzKw IV tank. His purpose in life was not to shoot at us, but to stay behind the Italians and shoot them if they didn't do their stuff. Those poor Italian devils didn't dare move because they knew they would get shot by the Germans if they attempted to pull out. If we could have taken full advantage of what Buresh's gallant action had won for us, we would have broken open that funnel several days before the British Eighth Army cracked the Mareth Line. But it wasn't to be, and so we went on with other operations in subsequent days.

One of these that was particularly interesting was an attack made by the 2nd battalion of the Uth Infantry, then commanded by Lt. Col. Ringsak, a fine battalion and a fine leader. In this operation we proposed to move the "Benson Force" infantry close to the 1st Inf Div, and attack southward to join hands with the infantry of the 9th Div. I visited the 1st Div CP and talked to Gen. Allen; went to the 9th Div CP and talked to Gen. Eddy; and visited the front lines and regimental CPs and told them what we were trying to do. It took about 9 hours to make the arrangements. Ringsak was to advance from north to south across the funnel, to a road junction (2 on map) about 2½ miles from where he started. If he could get to that road junction it would be helpful, because German troops were moving up across Lake el Fedjedj and thus out, considerable pressure having been put on them by the British Eighth Army. If we could block that road it would force them back into the British bag and make it very difficult for them.

Ringsak was to use one company in assault, supported by the other two companies of his battalion and his battalion weapons. One company of medium tanks right close behind the battalion was to overwatch the infantry. A company of TDs with 3" guns was to overwatch the tanks, and I had Gen. Patton's permission to overwatch the whole thing with 10 or 11 battalions of artillery; I think there were two battalions of 155-mm howitzers and one of 155-mm guns included in that artillery.

The attack jumped off at 1 o'clock and moved exactly as planned. The whole front was covered with artillery observers, and just as soon as an enemy machine gun opened up the artillery cracked down on it. Machine guns and machine gunners went up just as fast as they appeared; actually you could see them—arms and legs and machine guns intermingled in the air. Ringsak's infantry went right down the line for 2½ miles, digging those fellows out like digging potatoes, and at the end of that advance they had lost only 3 men wounded. It was an excellent example of cooperation between infantry, tanks, tank destroyers, and artillery—all doing their part in a completely successful action. The officers and men who saw that operation or participated in it will never forget the effectiveness of the team play there demonstrated.

Each day that this fighting continued we gained something.



All the time we were putting more and more pressure on the defenders, so that they were required to draw more and more people from the Mareth Line. I think Buresh's tank attack scared them and drew the remnants of their last two armored divisions away from the British front on the Mareth Line; Ringsak's attack helped to pull their last infantry reserves away from that line and thus contributed to the smashing victory of the British 8th Army.

On the night of April 6/7 I tried to advance a force to where they could jump on the Germans if they attempted to withdraw, because our information was that they would probably try to break off the action and withdraw toward Sfax. In that force was a battalion of medium tanks, one TD company, one company of infantry, and part of the KCth Ren Bn. What I had anticipated actually did occur. The Germans pulled out that night, and by 9 o'clock the next morning were well on their way to the east. This Gafsa-Gabes Road (3 on map) is the old road; the new one runs north of a small lake and then joins up.

Early that morning I received a 'phone call from Gen. Patton saying the enemy was withdrawing and to get after them. I joined my most advanced units and got them started. They were somewhat delayed because the enemy had mined a wadi over which they had to pass.

Salt away for your own future use the information that each one of you must learn how to remove mines and to instruct others in how to remove them. It is very simple; you gouge around in the dirt with a hunting knife or a bayonet, and when you hit one you uncover it, put a piece of wire around it, get away about 30', and pull it out. Having removed it, make sure there is not another mine in the same hole. You remove the detonator and then it is harmless.

Upon my return to the other portion of my command, which was back in the valley, an order arrived from Gen. Patton. It was on a piece of paper torn out of a pocket notebook, about 2" wide and 4" long, written in longhand with a pencil, and this is the order that put half an armored division into action that day: "Attack and destroy the enemy; act aggressively. G.S.P., Jr." That was all there was to it. We moved half an armored division 35 miles on that order that day.

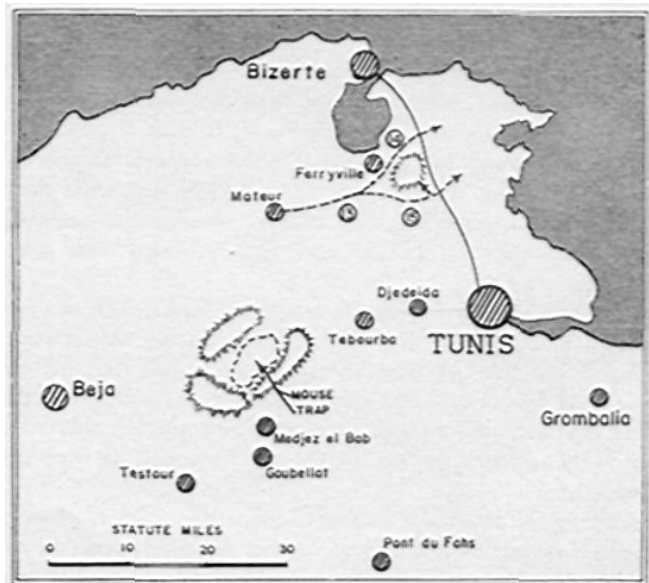
This brings out an interesting point of technique, which all of you can apply to great advantage. The point is that I had been informed, and as far as possible all the members of my

force had been informed, of the situation of our own troops and the enemy troops just as far as we knew it from hour to hour, so that when the time came for us to get going all Gen. Patton had to do was pull the trigger. There was no necessity for paragraph 1(a) or 1(b); the details of the plan had all been worked out beforehand. When we broke through we were to assume a certain formation and move in battle formation across country toward the east until we ran into the enemy. I recommend that bit of technique to you, because it will save much valuable time whenever it can be used.

The portion of my command that was back in the valley consisted of a tank destroyer battalion, part of the reconnaissance battalion, a medium tank battalion, an artillery battalion, and part of an infantry battalion. They were moving through two mine fields (4 on map) on the main Gafsa-Gabes road. The other portion of the command, which had been well forward all night, was moving across country. The idea was that as soon as they could get through the mine fields, the KCth Ren would fan out in front on a broad arc and proceed rapidly to maintain contact with the enemy. The TD battalion on the north would cover the head of the column from the road to the north (5 on map) and on the left flank. The TD battalion on the south would cover part of the head and all of the south flank. Between the two TD battalions were the artillery, the infantry, and the two medium tank battalions. We had discussed this formation before and all knew what to do. We went through the mine fields as rapidly as we could, and then spread out in a battle formation which was approximately 5 miles wide and 10 miles deep as it flowed across part of the open plain (6 on map), ready for anything that we might encounter.

The first opposition was right in Chemsî Pass (7 on map). There were one German 88-mm gun, a PzKw IV tank, one 47-mm gun, and perhaps some other odds and ends, but our nearest elements were a couple of miles south of their position. An infantry company went after them. They let the bulk of our troops go by without firing on them.

One of my tank companies went in behind Hill 369 to make sure that there were no German tanks in that vicinity. It had been their habit every day to retire to the shelter of those hills;



for the two days and night previous, our artillery had been firing on the reverse slopes and gullies behind those hills, and apparently their effect had been terrific. There were approximately 200 corpses back there and some of the prisoners that were picked up said they had been in slit trenches for from 18 to 19 hours without an opportunity to get out. They were very much shaken. One of the prisoners wanted to know if we used belt feed or clip feed for our 105s.

There will be many stories about who joined hands with the Eighth Army on the afternoon of this advance. There were three companies of the KCth Ren on a front of about 12 miles, and I think all three of them joined up with some portions of the British Eighth Army's reconnaissance. One of these companies pursued some Germans who had captured the commander of a British reconnaissance squadron. The Germans had to leave their prisoner, whereupon the KCth restored the British squadron commander to his unit.

My CP saw very little of me the day we joined hands with the British Eighth Army. My tank had previously been bombed out of action, and I was roaming around in a peep. The CP moved about 35 miles that day, and other elements of the troops must have moved between 40 and 45 miles. When I heard along about 2 PM that my reconnaissance had joined hands with the British, we changed the direction of march for the main body and moved northeast, up west of Lake Ennouail (8 on map). When we reached this point we were covered in part by one reconnaissance company. It was closely followed by an entire TD battalion, and that in turn by part of a medium tank battalion. When we moved east (to 9 on map) we were fired upon by German tanks apparently in here.

We were about 6 miles south of the Gum Tree Road, and there were clouds of dust kicked up by enemy vehicles hastening off to the east on that road. Artillery shells from the 1st Armd Div over the hill near Maknassy were dropping over the ridges and onto the road and there were some vehicles burning. I ordered this TD battalion commander to cut the Gum Tree road, and remained with him until he had issued his orders by radio. There were an hour of daylight to do it in and 6 miles to go. Having started the TDs, I joined the nearest tanks and told the battalion commander to go and cut the Gum Tree Road. He had eight tanks with him and about half an hour of daylight to get there by the time I got his instruction to him. Unfortunately, neither tanks nor TDs actually reached the road, although both shot it up. A few tanks or TD guns on the road might have bagged 2,000 prisoners that night, whereas merely shooting at them at long range got us only 137 burning vehicles.

During that night my command assembled between a lake and a hill (10 on map). The distance across the area was 5 or 6 miles; we had plenty of room and were well protected. We knew the area to the southeast was covered by the British as far as 11 on map, and we knew the enemy was to the northeast: there were 14 German tanks out there that had run away from the British Eighth Army. During the night we refueled, refilled ammunition racks, and got some rest and food. We would be ready to roll from a position about 10 miles north of the left flank of the British Army at the first crack of dawn, and I was very much pleased with what we had accomplished up to that time, despite disappointments in several small particulars.

At 2 o'clock in the morning I received a message to withdraw 18 miles. I figured that this was exactly what the Germans would want us to do if they had captured our code book; consequently

requested confirmation to verify this remarkable order. There we were with about half an armored division, ready to join hands with the rest of our division which was just around the shoulder of Maknassy, both of us rearing to go through to the Mediterranean, and orders for my force to withdraw 18 miles! I couldn't understand it. We shortly received another message from Corps HQ which said, "Stop bellyaching and comply with your orders," which was American enough for me to understand, and we also received other confirmation.

The reason we were ordered to withdraw was that, unknown to me, there was a line beyond which the American troops were not supposed to go. Had we gone on, either alone or in conjunction with the remainder of the 1st Armd Div, we would probably have messed up all the carefully worked out plans which had been communicated to advance elements of the British 8th Army. Regretfully we complied with the order and pulled back 18 miles (to 12 on map). We picked up about 1,000 prisoners, mostly Italians, scooped up by the KCth Ren and other troops. There were very few Germans in the bag, as they had left the Italians to be the rear guard while they pulled out. That ended the southern operations.

IN THE NORTH

Now to jump from that operation to the one up north, in which the campaign was brought to a close. We moved from El Guettar up to Souk El Khemis. On the way we paused for a few days to rest and refit the division. Gen. Harmon had taken over command from Gen. Ward.

The British troops were moving up along the coast, the French were moving up to Pont du Fahs, and we were intended to come up later to the Beja-Mateur area. As the lineup finally straightened out, there were native French troops in the north along the Mediterranean Coast; below them in a very rugged area was the 9th U. S. Div; next to them was the 34th U. S. Div; south of them the 1st U. S. Inf Div; and be-behind all that was the 1st Armd Div in II Corps reserve. The open country was dominated by high hills, on which the Germans had established their OPs. They called this place to the north and east of us the mousetrap, and that is exactly what it was. If we had shoved our armor in there the Germans would have cracked down with artillery and made us pay heavily by smashing our armor before we could do any good.

This operation was conducted under Gen. Bradley, who had taken over command of the II Corps from Gen. Patton who had gone back to organize the forces that invaded Sicily. Gen. Bradley and the infantry division commanders had many discussions with Gen. Harmon, each of the infantry division commanders requesting a company of light tanks, a battalion of medium tanks, or a detachment of this and that to help them in their operations. Gen. Harmon held that if these requests were granted, the 1st Armd Div would not be able to land with a wallop when the Corps Commander needed it; however, battalions and companies of tanks participated in two or three infantry attacks. Our own Uth Armd Inf was fighting to the south of the mousetrap, which was about 12 miles long and 5 miles wide at the widest point.

It took a week of hard infantry fighting to get through the mousetrap, and the armor did not enter that area in any considerable strength until after the infantry had secured the high and rugged ground on both sides of it. The real break

came after about a week of fighting up there by the infantry, and then one night the opposition withdrew hastily, leaving comparatively few mines and very few delaying AT guns. When we got the word to go we were able to advance rapidly about 20 miles without stopping, from the mousetrap area to just south of Mateur. At that point the Germans had blown up the bridges over streams that were too deep to be crossed without engineering help. The next two or three days were spent by our engineers improving the crossing and laying bridges to make sure that we would get across regardless of enemy air action. The engineers were strafed and bombed again and again while building the bridges, and they kept right on building them. The NNCth CA Bn (AA), which had been with us for some time, stayed at their guns with the enemy planes coming right down at the gun positions, until one gunner said to his commander, "Lieutenant, do you want to see his tonsils?" before the officer would let him fire, because he wanted to get a kill. I have seen them stay right with their guns, even when a member of one crew had a leg shot off and another, badly wounded, had fallen by the gun; the gun kept shooting.

A conference was held at 1st Armd Div HQ near Mateur on the afternoon of May 5th or 6th, and while returning from that conference in a jeep Gen. Robinette had the misfortune to run into the fire of a 155-mm gun. He and his driver were both badly wounded, and the command of Combat Command "B" devolved upon me for the rest of that operation. I was sincerely sorry that Gen. Robinette was hit. He had done a lot of hard, good work and certainly deserved the opportunity of going through to the finish, which was then in sight.

The engineers having completed their work, we were moving out to attack in the morning. Operations of the next three days culminated in the surrender on the 9th of May, and, for the American troops involved, ended the fighting. Combat Command "B" was near Mateur and had orders to attack NE. Nearby (about 13 on the map) was a hill mass, and there were plains—low by the lake, low by the road, and high in between.

One incident occurred on the second day of the operations which I will mention because, so far as I know, it was the only time during the North African campaign that anything like it occurred. It was a charge of the Light Brigade. South of the Lake of Bizerte there was a plain about a half mile wide, overlooked on the south by a ridge behind which, to the south, were German AT guns waiting for anybody who would attempt to cross that plain (14 on map). It was important to cut this road to prevent German troops from getting down to Tunis and so south to Cap Bon Peninsula, where we expected them to stage another Bataan. We didn't want to let them get any more troops in there, hence took chances to prevent them doing so. Col. Lambert ordered his light battalion to charge across the plain and cut that road. To do it they had to advance for 2 miles. They knew that it was all watched on the south flank by enemy AT guns. The account of what happened there came to me later from the artillery observers who were on the hills watching the action.

In the light battalion were two companies of light tanks and one of mediums. The mediums did not participate in this action, but the companies of light tanks did. They went along the plain at an average speed of 35 miles an hour and arrived at the far end without losing a single tank. The German tank gunners moved their tanks up on the hill just south of the plain

and poked their noses over in readiness to shoot, but never fired a shot. The German tank crews got out and stood on the backs of the tanks and just watched. We later captured those men; when asked why they didn't shoot, they said the tanks were going so fast that it was useless to try to hit them. Had there been just one string of mines across there or one ditch 6' deep to check that rush, they would have been slaughtered, because there were plenty of guns waiting for a chance to pile them up. Somebody asked the battalion commander later why he stopped his tank right out in the middle of the plain and jumped out to pick up his helmet; in the midst of this charge his helmet had come off, with his earphones in it, and he stopped his tank, jumped out to recover it and away he went again. He said when it was all over that he had no recollection of so doing. Many curious things of that nature happen.

Now to go back to the people fighting under me. At 5 o'clock in the morning of May 7th we launched an attack with two tank battalions, the one on the south led by Lt. Col. Henry Gardner with the second battalion of the KCth. He was to move to a certain objective, and the 3d Bn on his left in echelon was to follow through and then turn north so as to get in behind the hill mass (15 on map) that was holding up the advance of our infantry. The leading platoon of Gardner's battalion launched its attack on time and went through to the objective. This platoon was commanded by Lt. Curry, who had previously been awarded the DSC, and for his action that day and the following day recommended for another DSC. Unfortunately, this gallant officer was killed in action on May 8th. I believe that the Germans withheld their AT fire deliberately and permitted his platoon to go through expecting that the guns in the rear would clean up on it.

The second wave was led by Capt. Olsen and by Col. Gardner, battalion commander. They encountered a mine field, bounced off it, were taken under AT fire, and both their tanks were hit. Olsen was badly burned but managed to get away some time during that day. Gardner was hit in the left leg and lay out there in a wheat field all day. Thus one company commander and a battalion commander were knocked out at 5 o'clock in the morning leading the attack which was to be the principal one on that particular objective.

I went out between the lines a couple of hours later in my own tank, to see about renewing the attack and what the chances would be. I decided that the chances were good, hunted up Col. Hamilton Howze, who was then my executive officer, and put him in command of this battalion. When asked what he thought of resuming the attack in the afternoon he said, "I think we can do it and that it will cost us half the battalion." I said, "Get ready to attack at 4 o'clock. I will get you all the artillery support that I can dig up." He took over command of the battalion about noon and proceeded to work out the details of the artillery support with Capt. Combs, who had come up to represent the division artillery commander, while I went back to see what further support I could get for him. We later changed the hour of attack to 5 o'clock; the attack was launched at that hour, and was completely successful. At the objective we found Lt. Curry with 3 tanks of his platoon and about 30 prisoners waiting for us. He had been there all day.

The success of this attack was again materially assisted by artillery. I had hoped to get 3 battalions of artillery to support it. The artillery commander, Col. Maraist, secured some corps artillery, and when the attack was made at 5 o'clock one

battalion of tanks attacked with the support of seven battalions of 105s.

If it takes 7 battalions or 10 battalions of artillery to put one battalion of tanks or infantry where you want them to go, it is a cheap expenditure of ammunition. We knew that on the south flank of this attack were some German 88s. At ten minutes to five our artillery laid down a curtain of smoke; this was very effective and drifted down gently to where we wanted it. By firing over 1600 smoke shells, Maraist maintained that smoke for four hours. Every time the smoke became thin, AT guns along that side would open up on us again. All during that 4 hours after the tank attack had gone through, other elements were moving up—artillery, mortars, infantry, and the reconnaissance elements that had been held back behind the tanks because there was no use shoving thin-skinned reconnaissance up against a place where we knew there were AT guns.

We advanced about 6 miles that day. The Germans were moving so fast that they couldn't displace their AT guns, particularly the 88s. In that advance of 6 miles on the 7th I personally counted twelve 88s in pairs about a mile apart, through which Howze's attack had passed without losing a tank. The tanks were buttoned up and drove right into our own artillery fire, which changed from impact to air bursts, and they were bursting these 105s high enough up in the air so that they would keep the German AT gunners away from the guns until the tanks themselves could handle the German gun crews, whereupon they shot them with the 75s or mowed them down with machine guns. We knew pretty well where the guns would be; by that time we could say, "There should be a gun there," and there would be one within 100 yards. Artillery observers were doing a splendid job, and so was the artillery in following the directions of its forward observers.

We kept going all that day and all that night, made 8 miles the next day, and 25 miles the following one, ending up with a fight that started at 5 o'clock in the morning and finished about 9:15 AM. The 3d Bn, under Lt. Col. Cairns, on the morning of May 9th, went through about ten 88s bracketed in pairs. I was with the leading elements of the battalion that made the attack that morning. We first encountered two 88s in front, and I later found two more on our right flank about 1,000 yards away. Only the fact that other tanks were coming up behind the leading wave kept the 88s from shooting all of us in the right flank. While I was doing this my S-3, Capt. Gowell, was romping around in a peep, and when we ran into the first resistance he bounced off to my left and went to a French farmhouse which I visited about half an hour later. He had lined up the complete staff of a German division, loaded them into 3 staff cars, and marched them off—that was the last I saw of them. They apparently knew that the jig was up and weren't taking any chances of having some of our tanks that were fighting a few hundred yards away come up there to blast them with 75s. They were quite meek and did exactly what he told them to do. While I was turning toward this farmhouse someone pointed out a German truck that was coming up the road to the farmhouse from the opposite direction. We opened up at 1,000 yards, changed to 1,100 and then to 1,200, and put a round of 75 HE through the cab. Many 88s we saw later on that day had their muzzles straight up and the crews as far away from them as they could get; they didn't want to be identified as AT gunners.

About 9:15 the firing ceased. The terms were unconditional surrender, with such equipment as remained to be turned over in good condition and nobody to try to escape. After

designating 7 road junctions as prisoner collecting points I went out in my tank to see that the orders were carried out, and finally ended up near Porto Farina, where Col. Cairns was already collecting some 3,500 prisoners. En route, I received the surrender of Gen. Borowitz and what was left of the 15th Panzer Division. There were a number of rafts and small boats east of Porto Farina loaded with Germans trying to escape. At that time we had orders to fire on anybody who was escaping, so my tank crew got in their last practice of the campaign by knocking a boat out of the water at 3,400 yards. The gunner who did this shooting was Sgt. Mullins. In the first fight in which he was engaged as my gunner, he did a splendid piece of work. I complimented him, and asked him where he learned to shoot so well; he said that he had fired three rounds before becoming my gunner. He continued as my gunner until the end of the campaign. All the men in my tank were volunteers from the maintenance company, which worked out very happily because maintenance fellows ordinarily don't get a chance to participate in the fighting, and as they were very anxious to do so I always had a waiting list of men who wanted to go in my tank, although I got them into more trouble than most people would like.

Sgt. White, my tank driver, was exceptionally good. I have seen him go through a crooked Arab street where there wouldn't be two inches on either side, and never scrape a wall. He was skillful during a fight, and blew off steam when it was over by cussing a blue streak. After the fighting was over he came to me and said he and Mullins wanted to go to straight duty. I told him that I appreciated their fine work and expected that they would go back to their regular jobs and get promotions and probably not as many gray hairs as they had with me—to which he replied, "Colonel, in ten weeks you have aged me ten years." Well, he will never forget it and neither will I.

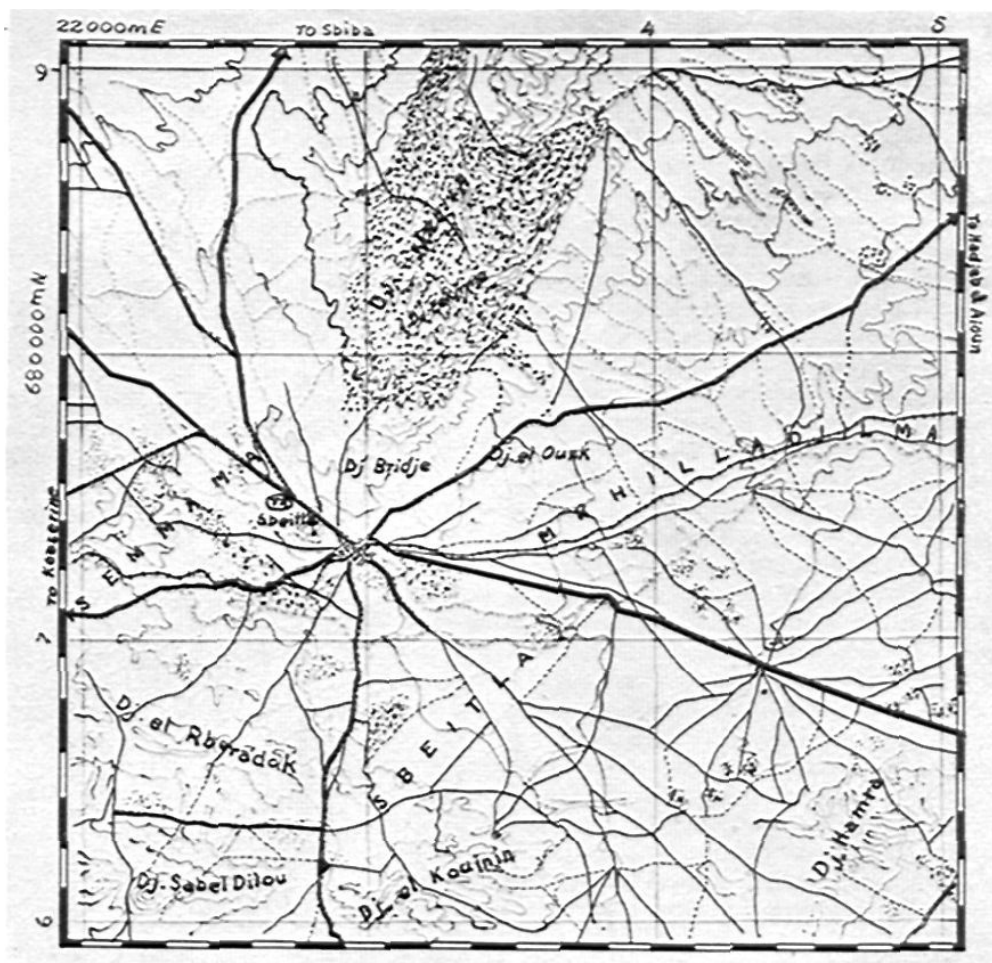
One word about replacements. Along toward the end of this operation, about the last week, the replacement system was splendid. If I lost 10 tanks up to noon of a given day and I put in for 10 tanks with crews, including 3 lieutenants and one captain, and radio accordingly, they would be there and in the fight the next day, so we got to hitting with full battalions every day. It makes a whale of a difference to the fellow who has to sock with his right and left to know he hasn't any broken knuckles and can still sock with all his strength. There was an armored replacement training center within 24 hours' driving distance of where we were fighting. It was commanded by Lt. Col. Bruss, formerly of the KCth Armd Regt, and he in conjunction with the ordnance people got well-trained tankers together with new tanks. When we put in a requisition he would fill it with complete crews and tanks, with the necessary officers, the necessary communications, gasoline and oil, food and ammunition, ready to go up there by dawn of the next day. It was almost too good to be true.

Since my return to the States it has pained me to hear that in Tunisia the infantry did the fighting and the 1st Armd Div got the glory. This is tripe. Those who did the fighting expressed no such views. We of the 1st Armd Div relied upon the infantry to do their part, and they relied upon us to do ours. On rugged terrain, hard fighting infantry tore holes in the enemy's line for armor to slash through. Each needs the other. Branch jealousy plans no part in winning battles, though it may contribute largely toward losing them. I want no part of squabbles over who gets the glory; the important thing for fighting men is to *win the war—and quickly*.

SIDI BOU ZID TO SBEITLA

Feb. 14-17, 1943

By Lt. Col. E. H. Burba.
FA



My unit, an armored field artillery battalion, was committed on the second day of the battle of Sidi bou Zid. Consequently the account of the first day's action is necessarily based on information received from other officers and a close examination of the battlefield after it was retaken by our forces. It should be remembered that—regardless of the amount of personal reconnaissance made—the viewpoint of any individual without the benefit of thorough interrogation of personnel from all units engaged, is somewhat limited. Therefore this article will deal in greater detail with the facts and circumstances concerning only one armored field artillery battalion.

Shortly after the disengagement and withdrawal of an armored combat command from a raid on Station de Sened, February 3, 1943, evidence was received of large scale enemy troop movements from both north and south. Immediate steps were taken to establish strong defensive positions at Feriana, 45 miles northwest of Gafsa. This latter town was considered untenable with available troops, due to the flat terrain and exposed flanks. An infantry division combat team, reinforced with one battalion of medium tanks and one battalion of armored artillery, composed the force at Feriana on which the light garrison of paratroops, rangers, and French infantry at Gafsa were ordered to retire in case of heavy attack. One combat command with two battalions of infantry and one battalion of 155-mm howitzers attached, was in position just west of Faïd Pass taking full advantage of the high ground available (Djebel Ksaira and Djebel Lessouda) for infantry

dispositions. Another armored combat command occupied the area from Hadjeb-el-Aioun to Fondouk, while a third combat command of the armored division was in position countering an axis threat in the Ousseltia Valley. The armored division CP and trains were some four miles west of Sbeitla. As the sun set on the 13th our forces, thinly spread over a front of 85 miles when they would under normal conditions occupy less than 15 miles, lay waiting for the inevitable attack by an enemy stronger in numbers and materiel.

German tanks debouched from Faïd Pass before daylight, 14 Feb, and another armored column moved north from Maknassy into assembly areas just north of the Grand Dorsal along the Maknassy—Sidi bou Zid road. In view of the precision and directness of each encirclement and thrust which occurred throughout the day, it is quite apparent that the Germans (through espionage reports and aerial and ground reconnaissance) had at this time a comprehensive plan for dividing and isolating important elements of our force. At daylight the enemy tanks, which had taken up positions in the vicinity of Faïd along the ravines and wadis on the north side of the road, launched a two-pronged attack. One, consisting of approximately two battalions, was met by one of our medium tank battalions between Sidi bou Zid and Faïd; the other, approximately one battalion of German tanks, which drove directly west, was met in the vicinity of Dj. Lessouda by an armored reconnaissance company and a company of medium tanks, supported by one battery of armored artillery. A front assault against the east slope of the mountain pushed

back our tanks, and the battery after firing several missions displaced to the south slope of the mountain. About 30 of the German tanks then moved north and circled the mountain, knocking out several and forcing the rest of our tanks into the ravines against the sides of the mountain which rises approximately a thousand feet above the surrounding plain. This force then attacked the artillery battery from the rear and overran the position, but only after losing several tanks. German armored infantry immediately encircled and dug in around the mountain. The two battalions which started toward Sidi bou Zid were well deployed, and upon the appearance of our medium tanks the enemy tanks on the flanks of the formation worked their way forward through wadis and cactus patches while the others engaged our tanks frontally. The results still show on the derelict tanks on the field, nearly all knocked out by penetrations of the side armor. Antitank guns may have been employed, but judging from the absence of characteristic gun pits and shell cases, there were very few.

While this fighting was in progress the German column from the south struck from the Grand Dorsal Mountain Range toward Sidi bou Zid and Djebel Ksaira. One company of our tank destroyers and one company of armored reconnaissance were surrounded initially, and the main German elements immediately drove to and around Dj. Ksaira. Armored infantry, as at Dj. Lessouda, immediately exploited the tank success and dug in. Having accomplished its principal mission, this tank force then converged on Sidi bou Zid and the area immediately east of it, while the German tank force from Faid drove in from

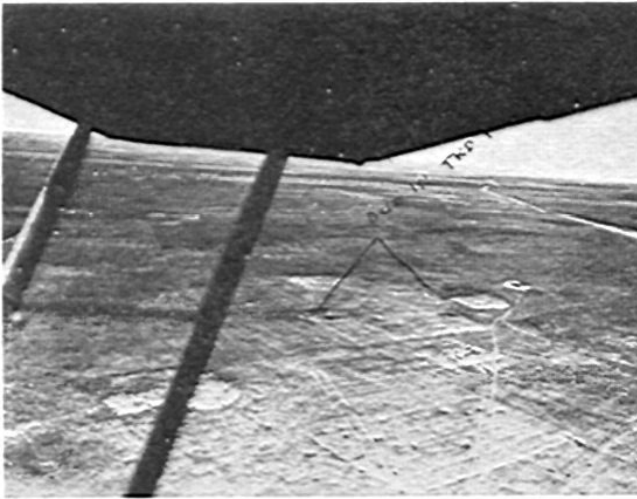
the north. In this manner the remainder of the armored field artillery battalion and numerous supporting elements were forced to displace. During this operation numerous casualties of personnel and materiel were inflicted by constant enemy dive-bombing and strafing attacks. The battalion of 155-mm howitzers was surrounded while covering the withdrawal of supported troops, and all guns were lost. Due to the rapidity of the attack and the capture or dispersal of CPs in rapid succession, sufficient information was not available to determine accurately the size of the German force. The following day after all reports were compiled it was determined that the entire 10th and 21st Panzer Divisions had been employed, and then only after another small combat command of ours had launched an attack with the assigned mission of attacking through Sidi bou Zid to Ksaira and hooking out by Dj. Lessouda, covering the withdrawal of the infantry trapped there. The results of this first day's fight are even more understandable when it is known that two German tank regiments opposed two medium battalions less two companies, and four German infantry regiments opposed three American infantry battalions.

At 0915 hours 14 Feb I received orders to move my battalion, less "C" Battery detached to the combat command at Hadjeb-el-Aioun, from Feriana to Sbeitla. This march of 40 miles was executed without air attack. By the time the column arrived at 1230 hours I had orders from the Division Artillery Commander to send "B" Battery 15 miles east of Sbeitla to support a battalion of armored infantry whose mission was to hold an important crossroad at 520-675, commonly known thereafter as "Kern's

CR" because of its defender. "A" Battery and Bn HQ occupied positions covering Sbeitla. The afternoon was spent surveying in, selecting alternate direct fire positions, and dodging bombs. At 0210 hours 15 Feb. my battalion, less "A" Battery which was to remain in present position, was ordered to Kern's crossroad, where "B" and "C" batteries were released to me upon the arrival there of the combat command from Hadjeb-el-Aioun.

The battalion was attached to this combat command whose mission was as stated in the second paragraph above. Its composition was as follows: one medium tank battalion, one armored infantry battalion, one armored artillery battalion (less one battery), one engineer company, one gun company, and one reconnaissance company of tank destroyers. The plan of the commander was in effect as follows: Recon Co make contact,





At Faid Pass, as in the Libyan desert, the Germans dug in tanks to support the defenses.

then move back on flanks. Tank Bn follow Recon after one hour, attack, break through, contact friendly forces on Dj. Ksaira, then cover their withdrawal to Dj. Lessouda, thence cover withdrawal of both forces to our lines. Armored Inf Bn pass through artillery and assist tanks in extracting our forces. Arty Bn close support of tanks initially; infantry as employed. Engineer company: pioneer work and breaching mine fields. Tank Destroyer company: protect flanks.

The reconnaissance elements of the combat command arrived at Kern's CR at 0730 hours and my HQ and "B" Btry joined "C" Btry in column at about 1000 hours. The tanks curled up in assembly position at 5.0-6.3 and my three battalion forward observers, one in a tank and two in H/T's with ¼-tons following, reported to the Tank Bn CO. As the tail of the column, armored infantry, approached the assembly position, Stukas and Me-109s bombed and strafed it repeatedly.

At 1130 hours the tanks moved out deployed in a column of platoons in line, following the reconnaissance from a point on the road at 5.0-6.1 directly toward Sidi bou Zid. From the slightly commanding ground at the line of departure, no activity could be seen on the perfectly flat plain to the limit of vision. As the tanks were proceeding at 10 to 15 MPH, it was evident that for at least the first 5 miles it would be impossible to keep within range of the leading elements by leapfrogging and keeping one battery in position all of the time. In order to be in the best possible position of readiness I marched the batteries out of assembly position, pieces first, and at the point of departure along the road cut off directly east in column of sixes, staggering the formation in squad column manner with 100 yards between vehicles. All personnel had previously received instructions in marching in this block formation and executed it without hesitation. While rolling out closely behind the tanks in the order "B," HQ (stripped to 5 radio vehicles, 2 ambulances, and 3 ¼-ton vehicles), "C," and with the dust of the semi-desert billowing up in huge clouds, the SCR-193 in my half-track caught the spirit of the occasion and blared forth suddenly with a commercial broadcast of *Stars and Stripes Forever* on the command net frequency. Soon after the fireworks started.

Having taken an odometer reading on leaving the road on the right bank of a wadi which showed even on our map (scale

1/200,000) and marching directly toward Sidi bou Zid, the S-3 was able to locate our position at 5.63-5.92 with sufficient accuracy to obtain initial data when the first fire mission was received. In fact, all he needed to worry with was range, because the muzzle flashes of a 4-gun battery were plainly visible through the noon haze just to the left of Sidi bou Zid; about 20 seconds later the air burst appeared about 50 yards left and 100 yards in front of "B" Battery. By radio orders to the BC of Baker "By the right flank" and four minutes later "Action left," that battery was displaced out of the concentration without halting. Cast was firing the first adjusting round (an air burst 100 yards up) before Baker stopped rolling, and was firing for effect some 4 minutes later when FO-2 picked up another battery on the right edge of the town. Since the first battery had quit firing and Cast was tied to the ground, S-3 gave the right platoon of Cast the second fire mission. The transfer was quickly handled: within 3 minutes Cast was neutralizing two 4-gun batteries and Baker was ready for registration. This occurred about 1300 hours, and from that time until 1630 missions were fired, all by FOs, as fast as the guns would take it.

When the two batteries opened fire the reconnaissance faded back on the flanks without having located any other dispositions. The reason was that the stuff just wasn't along the axis of advance at that time, but from 2 to 10 miles on the flanks. Reconnaissance planes which had been over us constantly since early morning, had definitely determined and reported the direction of our thrust, and Jerry disposed his armored elements in depth and along our flanks.

The tank battalion commander, having located the two batteries, immediately issued his order which provided for one company to flank and overrun the battery on the left or north of the town, another to flank and overrun the battery on the south of the town, and the third company (in reserve) to proceed through or near the town. Rally position was set beyond the town along the axis of advance. This attack was launched from a point roughly two miles west of the town. One forward observer went with each company. FOs 1 and 3 had half-tracks and ¼-ton vehicles, FO-2 was mounted in an M4 tank.

Before the left company arrived at its objective the leading elements reported approximately 20 deployed tanks approaching from the direction of Faid Pass. The Bn Comdr immediately ordered that company to meet this attack. By that time the reserve company, which the Bn Comdr accompanied, had moved in close to Sidi bou Zid and the other company had approached its objective. Then suddenly a large cloud of dust appeared in the vicinity of 6.0-5.0, and shortly afterward 25 tanks were reported coming in from the south. The right company was immediately diverted to meet that attack. Evidence of German tank tracks and angles of penetration of our derelict tanks found in subsequent study of the area indicated that the initial enemy forces seen were supplemented by additional tanks which worked south from the vicinity of Dj. Lessouda and north from 5.7-5.2 in such manner as to flank and cut off our companies and to provide cross-fire against them.

In the ensuing tank fight our forward observers as well as the tankers were rather roughly handled. FO-1, using a ¼-ton with an SCR-510, worked through wadis and occupied ground OPs. Late in the afternoon German infantry cut him off from his vehicle and he slipped out about an hour after dark and walked back to Kern's CR, where he caught a ride to the assembly area.

FO-2 in the M4 tank, which was the only tank available to

the battalion at the time, was with the center company. As the attack from the south flanked the right company and came in on the rear of the center company, his tank (in full defilade on a large mound where the best observation was available) received a hit in the engine compartment. Flames immediately enveloped that compartment and the FO-2 crew bailed out into a wadi nearby. Although machine gun fire and AP were raking the area, FO-2 decided to save the pride of the section, and crawled out of his hole and up to the tank. He opened the compartment door, fished out an extinguisher, and put out the fire. Then with the tank crew he went back into the tank and checked it over; the radio still worked, but the engine wouldn't start. Enemy tanks were seen coming on in. The rest of our tanks had pulled away to organize for this new threat, which left FO-2 and company between the two forces, completely immobilized. Rather than leave the tank and the opportunity of a lifetime, he started throwing out smoke grenades on the windward side, making the tank appear to be burning. He then adjusted the battalion on the threatening tanks. He was wounded once in the mouth by splash from a hit on his tank, and, in spite of profuse bleeding which made radio transmission exceedingly difficult, continued his mission as long as enemy tanks were in sight. As additional German tanks became available from the fight to the south, they added their weight to this action and finally their attack carried through the position. At this time several German tanks passed close to the artificially burning tank but they paid no attention to it. By that time three additional hits, none of which penetrated the hull, had twisted the gun tube and scarred the sides of the tank. Only after all targets passed out of sight did FO-2 take time to report his situation and ask for orders.

FO-3 and four members of his section riding in a half-track near the left flank of our right company were suddenly caught in an artillery concentration from an unlocated battery farther back. The driver of his ¼-ton, following at about 400 yards, reported that when the fire lifted and smoke cleared he could not see the half-track. Our tanks were engaged at that moment by the German tanks and no one who came out ever saw anything more of FO-3 or half-track. Six weeks later word was received that the officer and four men were prisoners of war, and it must be assumed that he got out of the concentration on the forward side and in the confusion ran into a German position.

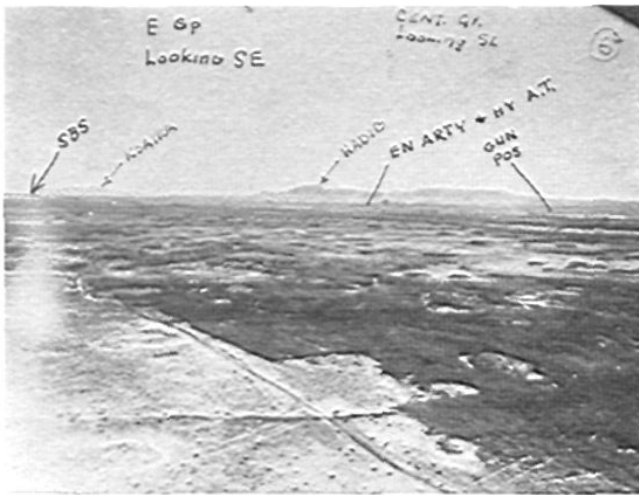
At about 1630 hours our patrols on the right flank reported some 15 unidentified vehicles going to the rear about 4 miles away. Shortly afterward an artillery battalion in position near Kern's CR opened fire on German tanks pushing toward our left flank. We also observed a cloud of dust coming toward us from the front. Realizing from reports of the fighting that the identity of the vehicles might easily be German, I gave Cast "Action rear" and pulled back the flank pieces of both batteries, forming roughly a circle of guns over 100 yards apart and with all other vehicles in the center. One company of the armored infantry battalion was just approaching our rear when the tank attack came in on their flank and my rear. Cast knocked out at least two tanks, one of which burned about 1,200 yards away, and the rest immediately withdrew behind a slight fold in the ground about 3,000 yards away. Several infantry vehicles were knocked out, but none of ours. Ten tanks came in from the front, and direct fire from Baker changed their minds while still 1,000 yards away, although no hits could be definitely ascertained. They withdrew to a position about 2,500 yards away and also waited. The infantry pulled back under the attack—and there we sat, feeling very much alone with each

half-track and self-propelled howitzer seemingly sticking up 12 feet from the barren desert floor! OPs with radio communication were immediately established well out, to give us early warning of other attacks. Fire was held, to conserve ammunition and prevent the disclosure of the number and exact position of guns pending the delivery of another attack. From time to time the enemy tanks maneuvered around, apparently with the idea of causing us to "march order" and try to get away, but they never ventured in for another all-out attack. Undoubtedly had we taken the guns out of firing position they would have cut us to pieces. The intensity of the 40-mm to 77-mm AP fire during those hours when we got the overs from the tank battle ahead seemed to consume the very air required for breathing, but the fire during the tank attack was twice as thick. The fact that there were no damaging hits proves the doctrine of dispersion and the inaccuracy of fire from moving tanks.

By this time the sun was setting. A report from the Bn Ln O indicated that all remaining elements were withdrawing to an alternate assembly area at 4.0-7.2. FO-2 reported his situation and asked for a wrecker to come after his bent-up, partially burned, but dearly beloved tank. In view of the fact that there wasn't a vehicle in the area capable of getting through to him, much less able to tow out a tank under the fire awaiting anything that moved, he was ordered to walk out on a compass bearing of 4800, carrying as much equipment (including radio crystals) as possible, and meet a ¼-ton which would patrol out as far as possible for one hour after darkness. Battery commanders were given the march order for execution on command; it provided for flank, advance, and rear guards composed of self-propelled 105-mms and 37-mm self-propelled AT guns, each contingent under command of an officer. Dj. Hamra, which was visible on the skyline, was given as the direction of march, the speed prescribed for all elements was 10 MPH, and the initial assembly point was the road running parallel to Dj. Hamra and perpendicular to the direction of march.

Shortly after dark the observers reported our "attached" German tanks were pulling out, and approximately an hour after dark our cross-country march began. As there was no moon at that hour, it was impossible to see the flank guard, 500 yards out, but due to complete officer control and radio communication the whole formation moved intact and without incident to the initial assembly area, thence in column to the final assembly area where gas and ammunition awaited us. FO-1 arrived about midnight and FO-2 about an hour later. We then received orders to go back to Kern's CR to support an infantry and tank battalion holding the north-south road through the CR. We arrived in that position at 0430 hours and got a long night's sleep of one hour.

All that morning, 16 Feb, was spent in reorganizing, and fortunately the Germans let us alone for the greater part of the time. When our attack failed the infantry and tankers on Dj. Lessouda and Dj. Ksaira had been ordered (late in the preceding afternoon) to infiltrate through the German lines and walk out. I picked up numerous "doughs" and gave them food, water, and transportation to the collecting point. One sergeant and five men brought out three German prisoners, one of whom had a shoulder wound. He told me of a Red Cross field worker who had refused to leave 5 wounded Americans and 3 German prisoners, preferring capture to leaving them unattended. He also said that Lt. Col. John Waters and



Flat maneuvering plains, ending abruptly at djebels, are characteristic of the Sidi bou Zid area of Tunisia.

5 of his men had been with them on the mountain; there was one light tank available, but Col. Waters elected to walk; the 5 men got through in the tank but apparently Col. Waters was captured by a patrol.

German reconnaissance appeared about 0800 hours, and we fired on them occasionally when enough vehicles congregated within range to make it worth while. All concentrations were duly plotted and recorded on the observed fire chart. About 1100 hours a forward observer reported "40 tanks are assembling on concentration No. 4"; a few minutes later, "Personnel dismounting and collecting together"—pause—"They're all together now. Fire when ready." All batteries were laid by that time and a 3-volley battalion concentration went out in nothing flat. Then a sensing from the FO to cover the rest of the target, and the command "Repeat fire for effect." One of the tanks was hit but recovered by them later in the day. Personnel losses must have been fairly heavy, but after the concentration they managed to move off all except the one tank. That is indicative of our experience all the way through the campaign. Concentrated indirect fire will stop or slow up a tank attack, but with 75-yard dispersion the number of direct hits is so negligible as to make the expenditure of ammunition justifiable only in direct ratio to the need for additional time to meet the attack. German tankers do not like artillery fire any better than we like their Stukas, but in both cases attacks go in regardless.

While digressing it might also be said that infantry attacks can be stopped cold with artillery fire, especially with observed time fire. In only one case did enemy infantry close with the infantry we supported, and then only because friendly dismounted patrols were out and the identity of the enemy troops working through rough terrain could not be established by the infantry commander before they were close to our lines.

At 1500 hours that afternoon another German tank battalion appeared in the area 5.5-6.5, this time well deployed and just out of artillery range. Four of their tanks left the formation and went up a slightly defiladed route as if to flank our left. Our orders then in effect were to make an orderly and slow withdrawal. Since the first tank force appeared our infantry had been withdrawn to the wadi at 3.75-7.20, covered by one company of tank destroyers and one company of medium tanks from the battalion which had been

withdrawn the preceding night from Fariana. This battalion constituted our entire tank force throughout the day of the 16th. The enemy attack fortunately did not materialize, but pressure was constantly applied by demonstrations of enemy tanks on our front and flanks. When the infantry was in position the rest of our troops moved back on the new line; darkness found us in that position, outposted by the tank destroyer and tank companies. Shortly after dark the enemy tank battalion moved in astride the main road and another came through the pass at 4.6-6.1. My battalion had been ordered into position at 3.35-7.20 and I found that the third and last combat command of the division had moved down from Ousseltia Valley and was in position to my right flank and front. At approximately 2100 hours the enemy tanks attacked astride the road and succeeded in penetrating our forward dispositions. Considerable confusion ensued, and at least 8 of the tanks worked down astride the road on the tail of some units which withdrew. The battery commander of "C" Battery, which was nearest the road, promptly investigated the rearward movement and secured permission to displace his battery to cover the road with direct fire. The outpost system was reinforced and sent farther out. At 0115 hours, 17 Feb, a patrol literally walked into the side of a tank. Feeling around it and finally seeing the white bordered cross, he backed off and found a slit trench, then opened fire with tracer ammunition from a tommy gun. When the tank gunner answered with his green tracer, he took cover and the 105s took over with HEAT ammunition. The other tanks also disclosed their position by firing, and the fight was on. After about 20 minutes the tanks pulled back, leaving 3. Outposts heard steel tracks crossing the gravel road as if to pass around our left flank, and a short time later when our engineers started blowing up an ammunition dump about 2 miles to our rear it appeared that we might at any time expect the tanks back through the olive grove at our rear. The position was organized as well as possible for all-round defense, and casualties from the fight were picked up and treated. This was made somewhat easier by the light of a new moon which came up about 0130 hours.

At daylight we were ordered to displace into positions on the west edge of Sbeitla. After getting the batteries into position I returned to make registrations and check the results of our fight. One PzKw III tank, approximately 100 yards from the gun which knocked it out, had received a hit on the front plate in front of the driver with HEAT and the hole was big enough for him to have stepped through had he been able. The platoon commander, who must have been crouched in the open turret, was no doubt aided in making his exit by the internal pressure which was sufficient to inflict fatal hemorrhage. Other experience indicates that 105-mm HEAT will make a penetration in the front armor of the German PzKw IV a foot in diameter, and on the PzKw VI ("Tiger") frontal armor approximately 4.2 inches with killing internal effect.

That morning an order was issued which provided for one combat command to withdraw slowly to the southwest, disengage on order, and withdraw along the road from Sbeitla to 2.0-7.1. Another combat command, which had taken the first attack in the vicinity of Sidi bou Zid, was to disengage immediately and withdraw on the road to Sbiba. The third combat command, which had attacked Sidi bou Zid on the 15th and was now reinforced with a battalion of light tanks, was to cover the withdrawal of the other two, fighting a slow rear guard action along the road to Kasserine.

This plan was executed with the combat command on the right exacting a toll of 20 German tanks in a hot tank battle

which lasted until approximately 1700 hours. The tank destroyer battalion attached to this force did an excellent job of covering this disengagement. Our combat command withdrew by bounds, with the tanks and tank destroyers covering the withdrawal of the armored infantry battalion to successive lines and the demolition and mine planting operations of the engineer company. During this retrograde movement all batteries of the battalion were stripped, leaving only the howitzers and necessary radio vehicles to displace to new positions; this was done leaving one battery in position all of the time.

At about 1600 hours while at the CC CP, the S-3 received a message from the light tank battalion commander relayed through his executive officer. He said he could see the wide wadi crossing at 3.0-7.4 and that it was jammed with German motorized infantry trying to breach the mine field laid by our engineers. I asked the S-3 to tell him (through the battalion executive) to observe and sense a volley. I immediately calculated a shift from a concentration about 1,000 yards to the right, and gave the fire commands to "C" Btry by radio. The tank commander reported "Ready to observe," and I gave "Cast Fire." The sensing came back and was transmitted to the guns through the three relays: "Increase your range about 300 yards and give them hell." Out went three rounds at each range of a 200-yard zone, and the report came back "That smeared 2 half-tracks, 3 trucks, and I don't know how many 'doughs.'" Before the end of the campaign almost every tank and reconnaissance officer had fired at least one mission by various means of improvised communication.

The RO from "B" Btry, acting as battalion FO, was on an OP at 3.3-7.9 when German infantry cut the road at 3.1-7.5. He had kept the guns hot all day and stayed too long. While we were firing the final concentration on the town of Sbeitla as a demonstration of strength and to slow them as much as possible, this FO, who had started back shortly before dark across country, reported that he was lost. Since we were due to disengage within a few minutes a flare was fired a short way from the position after the FO was told by radio to watch for it, and he picked it up over his left shoulder just as it faded out; he caught the tail of the column just as it pulled onto the road. The most difficult and distasteful of all operations, the complete disengagement of a



Directly in line with the cactus patch appears a white granary which was a famous landmark during the fighting here described.

division, had been carried out without incident as we marched through Kasserine Pass, 30 miles west of Sbeitla. We bivouacked six miles south of Thala at 0230 hours 18 Feb, and settled down for a long 4-hour sleep which was duly interrupted by the arrival of gasoline and kitchen trucks.

No account of the battle of Sidi bou Zid should pass without a tribute to the tankers who fought there. With fortitude and without hesitation our tank regiment less 2 companies engaged twice its numbers, reinforced with at least one battalion of heavy tanks, and fought virtually to the last man and last tank on terrain the very nature of which insured the success of a stronger force. It is easy for an army and a nation to take glory in victories, and easier for it to explain its defeats with excuses of unseasoned troops, but let us give full credit in this case to those officers and men who exacted a price of at least their own losses and upheld the finest traditions of our army by stoutly engaging a vastly superior enemy in order to, in one case, cover the withdrawal of other elements, and in the second case, attempt the relief of our surrounded garrisons.

TRAINING FILMS

Recent training film releases include the following of interest to field artillerymen:

- 3-2016—Individual Protection Against Chemical Attack
- 5-2021—Location and Construction of Road Blocks
- 6-1201—Employment of a Field Artillery Battery Against Tanks
- 6-1227—Laying the Field Artillery Battery
- 7-2023—Interior Guard Duty, The Sentinel
- 10-1237—Rations in the Combat Zone, Part I—Fighting Foods
- 10-1239—Loading of Motor and Rail Cargoes, Part I—Box Cars
- 10-1240—Same—Part II—Flat Cars
- 10-1241—Same—Part III—Trucks
- 17-1086—Field Expedients, Track Laying Vehicles
- 18-1166—The Antitank Rocket, M6, Methods of Use
- 18-2013—Direct Fire, the Tank Destroyer Section
- 21-2014—Baptism of Fire
- 21-2035—Security on the March, Mechanized Units
- 31-1253—Basic Training of Glider-borne Troops, Part I—Knots and Lashings
- 31-1254—Same—Part II—Loading Equipment in the CG-4A



This photo of the burning town of Sbeitla gives an excellent idea of its very gently rolling neighborhood, with distant hills faintly visible through the drifting smoke from town and ammunition dump.

SLUGGING IT OUT

By Maj. Edward A. Raymond, FA

Fundamental Tank Destroyer doctrine suffered a sea change between Camp Hood and Sbeitla. The theory of "Seek, Strike, and Destroy" became "Hide, Hit, and Maneuver." "The main TD lesson from the Tunisian campaign," says an Allied Force Headquarters announcement, "resulted from a misconception of 'offensive action.' Destroyers must not be used to 'hunt tanks.' Neither can they be used as tanks in a fire fight with tanks, without disastrous losses." Tank Destroyers were best used in Tunisia to establish a base of fire and give close direct support to other AT elements from hull-down positions, using their mobility to avoid artillery fire, to occupy alternate, supplementary, or cover positions, or to shift position to meet a changing tactical situation.

The experiences of an outstanding TD battalion in the battles of Sbeitla and El Guettar furnish excellent food for thought. Upon due reflection, they will make United States artillerymen still prouder of their Arm.

SBEITLA

Prior to the Sbeitla action the PJKth TD Bn less Companies A and C and the 3d Platoon of its Reconnaissance Company had been ordered to Ousseltia Valley at night, with the mission of preventing a large known enemy armored force from moving south in a valley at least eight miles in width. Conference with French commanders showed that the situation was extremely critical. Next morning the Germans failed to press forward and an Allied counterattack appeared desirable. The CP of the supported combat command was too far back in the mountains to coordinate the fighting, so a first attack order, issued back at the CP to unit commanders, resulted in an uncoordinated attack at 1605 hours, ending in a fight after darkness. All available heavy TD platoons were attached under infantry company commanders, leaving the TD battalion commander commanding a reserve of one light platoon. Practically all the ground gained was given up by pulling units back to the original defensive lines

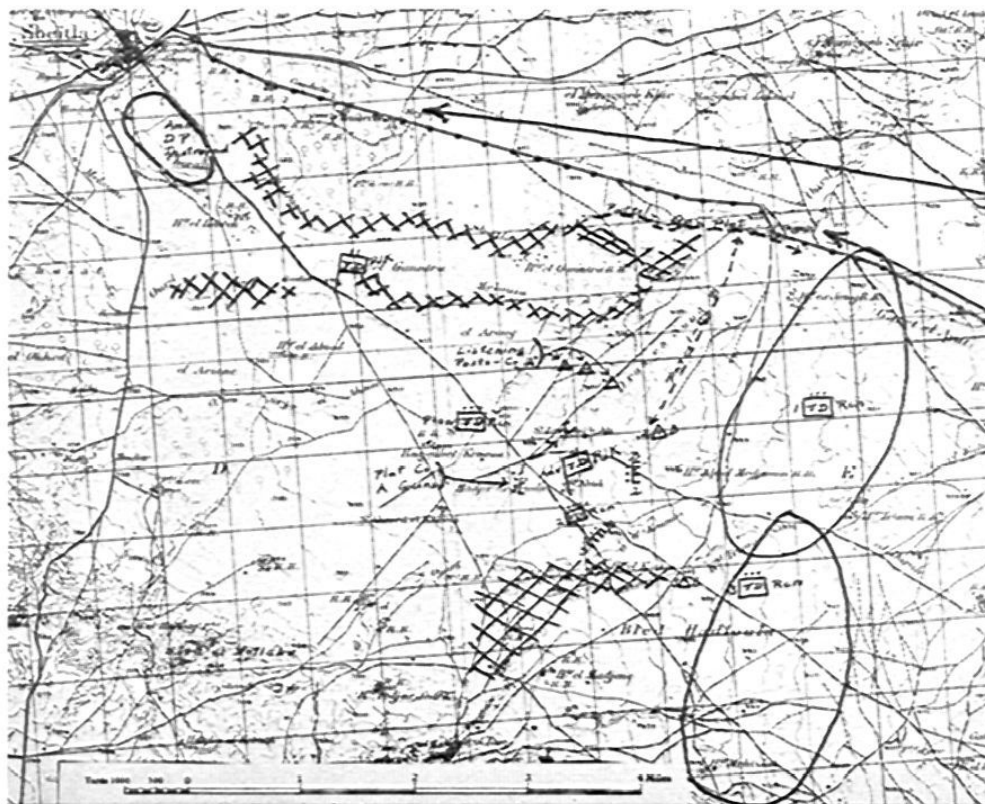


Figure 1

Time: 0001 hrs to daylight, 17 Feb 43.

Mission: To hold position, be prepared to counterattack on order, and cover mine fields east of position (which were not actually established).

Light platoon of Company B was attached to 2nd Bn Uth Armd Inf.

Enemy did not strike south of Sbeitla — Faid road. Heavy arrows from east indicate: north arrow, attack route of at least 4 tanks; south arrow, tanks heard approaching along road, by patrols.

Cross-hatched areas are wadis and sand dunes, very difficult for half-track vehicles.

organized by the TD battalion. Contact was lost, and the enemy continued during the night to improve his strong points covering and protecting the network of roads leading into Kairouan Pass.

Another uncoordinated attack was launched the second day. Then the 26th Infantry (under Col. Stark) arrived and, with the support of proper artillery fire, captured the Kairouan Pass in an attack up the east mountain range. At the same time armored and TD units launched an attack into thin air: as the enemy had not been kept under pressure, he had evacuated the valley for at least 15 miles to the north.

On 16 February the battalion covered the advance of the combat command as far to the east and southeast as Djebel Hamara. Through personal reconnaissance the battalion commander found that the engineers were about to lay an extensive minefield west of the line he was ordered to reconnoiter, greatly endangering his reconnaissance elements. The battalion's position area was unsuitable for maneuver due to wadis and deep sand dunes. The front assigned to the reduced TD force was far too great to cover. The mission was defensive. So the battalion commander made the following mental calculations:

1. It was doubtful that he could expect proper artillery support.
2. The support to be expected from the other combat command to the left flank was unknown.
3. No help from supported armored infantry could be expected, as its initial position was over 7,000 yards west of the TDs' main line of resistance. At least 20-30 minutes would be required for friendly tanks to advance and counterattack an enemy threat. Since direct-fire guns are badly handicapped at night, the destroyers would probably not last 30 minutes unaided. If a counterattack were ordered, help would be available.
4. Routes and plans for a possible withdrawal, including the order of withdrawal of units and rallying points, were not given or were very indefinite. (Later information indicated that all of the armored division was making a hurried daylight withdrawal through Kasserine Pass.)

Initial positions occupied prior to 0001 hours, 17 Feb., are shown in Fig. 1. From then until daylight reconnaissance units thoroughly covered the areas around gun units, and these in turn were ready for all-round defense of positions or for counterattack.

After daylight the guns of Company B were moved west behind a ridge, with instructions to be prepared to move rapidly to the crest and fire generally east and northeast. Four guns of A were placed west to cover B and protect the left flank, with direction of fire generally north and northeast. Good OPs were obtained, and the battalion commander could see both flanks. Two platoons of the Reconnaissance Company were employed on the flanks, with the remainder of the company in reserve near the CP.

A force of 16 enemy tanks was observed moving to encircle the left and rear of the battalion. Very little movement was required to meet this threat: CO "B" was directed to move to his crest and fire on enemy tanks east of his position, CO "A" was directed to smoke and shell enemy tanks north of his position.

Enemy tanks, including two PzKw VIs, appeared on the right of Company B. Others, in large numbers, were moving east of "B" in waves. The guns of "A" were firing on the original 16 tanks, which were moving along a

cactus hedge and slowly closing in on the left rear, and smoking them; the range was 1,500 yards. The battalion commander estimated that about 30 tanks were attacking his flanks and rear while others attacked his center in waves. He ordered "A" to cover and "B" to withdraw platoons by bounds. Bn S-3 was sent to meet a platoon of "B" and place it near the CP, which had been designated as the rallying point at a conference with company commanders the evening before. A message had been sent giving a second (supplementary) rallying point, but the COs of Reconnaissance Company and Company A did not receive it. "B's" movement was accomplished successfully; "A" continued to fire north until forced to withdraw.

Before this stage of the action the Battalion Commander remembers ordering his executive to take care of Hq Co and, if necessary, to move it north of the Kasserine Pass. This was done because it was the colonel's understanding that the entire armored division was withdrawing to Kasserine. He had personally observed the — FA Bn withdrawing — where he did not know, except that it was considerably west of Sbeitla. He also saw what he believed to be supported armor moving out of the mountains south of his OP. He observed enemy tanks forcing the remaining guns of one platoon of "B" and probably three guns of "A" west of the route he wanted them to withdraw along, so as to reinforce the flanks of the supported tanks.

He ordered, under S-3, remaining vehicles (except his own jeep) toward the second rallying point when enemy tanks got within 600 yards. These had all the CP radio equipment, and the battalion commander did not see them again until near Kasserine. The battalion executive was ordered to move the guns of "B" (then near the CP) to a more favorable position to the west, in the direction of the second rallying point. This was very necessary, as "B" could no longer see enemy tanks southeast of its position because of high sand dunes. As the company pulled out it came under heavy artillery and direct tank fire. Paced by the battalion executive, all personnel behaved coolly; that officer, in a jeep, showed complete disregard for his own safety all day. The second rallying point was found already untenable, and the company was reformed behind a ridge to the west.

The battalion commander could not tell whether or not the vehicles of "A" and "B" had passed the rallying point or had been destroyed. He thought that some might still come out of the fight, so remained

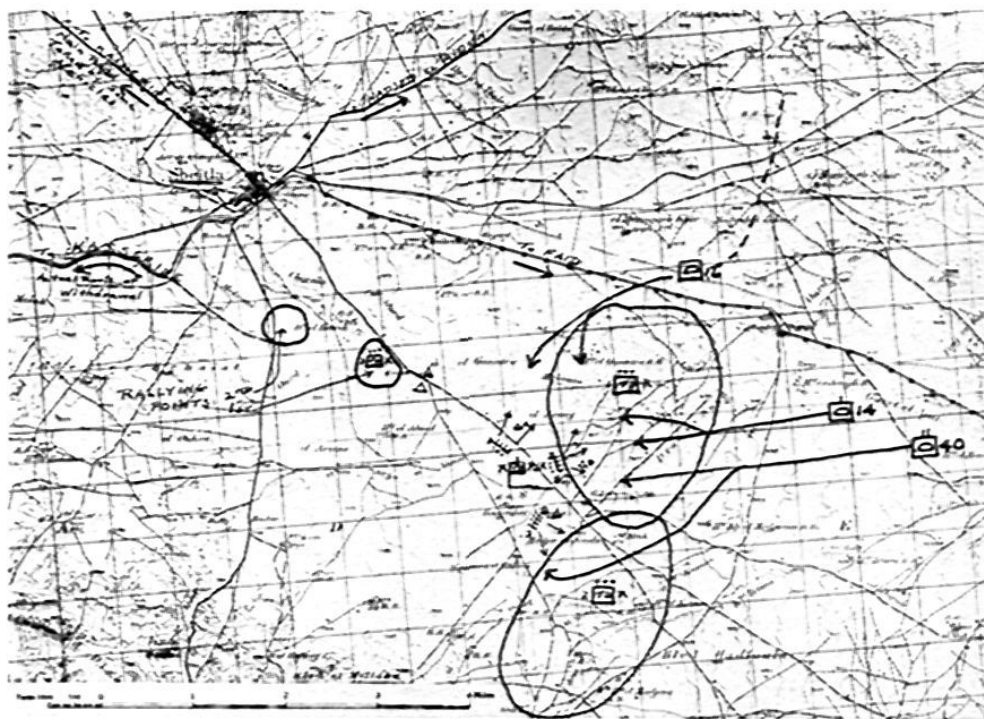


Figure 2

Time: From about 0700 hrs to about 1220 hrs, 17 Feb 43.

Shortly after noon the battalion was forced to withdraw by platoon. Some guns had been moved slightly forward before the attack.

behind to direct them. He could see no friendly tanks at this time, although he later learned that there had been some in the area, well concealed in wadis. He directed some vehicles of other units arriving from the southeast to the road south of the railway which led to Kasserine. After some time he moved along this road and found some of his guns in position, awaiting orders. Here a company commander, a platoon commander, and several enlisted men came out of the fight on foot and rejoined the battalion.

The commanding general of the combat command ordered units to assemble in the vicinity of the CP and the battalion commander, with a handful of vehicles, complied. It later developed that some guns and other vehicles had moved into Sbeitla, which was under heavy fire and burning. There they were evidently directed by MPs to move west, or moved on their own initiative into a double line of traffic which was pouring mixed units out of the town toward Kasserine. Some vehicles remained in Sbeitla and used their best judgment in a bad situation.

The ride the S-3 took with the two radio half-tracks after leaving the battalion commander is described in his own words:

"I rode in the first track and the S-1 rode in the second. When I reached the Oued El Melouia I started to turn left but noticed that the oued was getting very sandy and I did not think that the tracks could negotiate it without getting stuck. I didn't feel like taking chances—enemy fire was falling near us and I knew enemy tanks were approaching—so I then proceeded northwest, looking for a place to turn off. I had made no prior reconnaissance of the ground and decided that the best way to get to the area I wanted to reach was to go to Sbeitla and there take the road south.

"When I got into town I discovered that the road going south was blocked by big rock piles, and an MP in the town shouted to me that the road to the south was mined, and pointed out the way traffic was to take through the town.

"At this time four enemy fighter planes were overhead and two were bombing and strafing the vehicles in Sbeitla. About 10 or 12 vehicles were temporarily halted in town, partly blocking the road, and the men were running for cover in the ruins of buildings.

"I looked around and noticed that the other half-track was not behind me. I ordered my driver to continue by moving around the traffic jam, and instructed the men in my vehicle to fire the machine guns, rifles, and tommy guns at the attacking planes. As we passed each vehicle I shouted to the men taking cover to get back in their vehicles, fire at the German planes, and keep moving, because they were seriously blocking the road. My track was halted at the edge of town by wires across the road where a telephone pole had been knocked down. At this time two Mc-109s approached our vehicle, the first one at 3,000 feet and the second at 1,000. My technical sergeant tried to get the .50-cal. MG around to fire. I dismounted, went to the rear of the track, and assisted him in getting the gun from the rear of the track to the left side. The sergeant fired a few rounds at the first plane but saw that he could not turn the gun around on the cradle. The second plane appeared and the sergeant fired about 100 rounds right in front of the plane. He hit it. It started smoking, dropped to 500 feet, banked away, and was seen to drop over the hills to the east. Two other planes circled the area at a high altitude.

"I ran to the road, pulled the fallen wires loose, and then proceeded northeast so that the road would be clear and that I might reach the area cross-country. At the first crossroad a major, who an MP told me was provost marshal of the armored division, told me to keep the vehicles moving at 200 yards interval in the direction of Kasserine, and that it was important that the traffic keep moving in that direction. I parked my vehicle off the road and passed the information on to the other vehicles that were still with me.

"Then I proceeded cross-country to try to find a route to the rallying area. I found the S-1 and his track, and one "B" destroyer. Together we planned a way of getting back to the battalion. I was to take the 75 with me and proceed cross-country; S-1 was to take the main road to pick up any combat vehicles of the battalion that he could find, and bring them to the rallying point.

"On my route I came up to a 75-mm howitzer (SP) from a tank reconnaissance company, trying to duel an 88-mm gun. I tried to help, but the first round from the 88 landed 50 yards from us and we moved back over a hill to start indirect fire—but American tanks attacked the 88 and

made it unwise for us to fire. S-1 and another officer appeared an hour later, saying that the rallying point was in enemy hands. We decided to go to the main road and head toward Kasserine to attempt to find the battalion. We happened to join the colonel's column in the dark, about 5 miles east of Kasserine."

Of the Battle of Sbeitla, the battalion commander said afterward, "The officers and men under my command engaged a superior force, inflicting heavy damage to the enemy in a brave manner, and withdrew very skillfully until both gun company commanders had their armored cars destroyed. Platoon commanders did everything that could reasonably be expected in completing the withdrawal without losing all guns, only giving way when outnumbered and outflanked."

EL GUETTAR

The Battle of El Guettar was a counterattack by the German 10th Panzer Division on the 1st Inf Div positions 4 miles southeast of the town, after strong defensive positions 3 miles southeast of El Guettar had been captured from Italian units by the Americans two days earlier.

An attempt by the PJKth TD Bn to push rapidly east along the Gabes Road to maintain contact with the retreating Italians had necessitated breaking defilade, costing a destroyer and several casualties. After this, the battalion waited until after dark to patrol the valley for tank thrusts.

On 22 March the CG 1st Inf Div required part of the divisional artillery to make a night displacement east of the hill mass (the defensive position) in order to increase its range for infantry support; he gave the PJKth the mission of protecting these exposed artillery units, as well as preventing a tank penetration which would cut the supply axis of CT-26 and CT-18. The battalion was reduced in effective strength (by battle losses and the detachment of two platoons of "A") to 31 75-mm guns (SP) and 6 37-mm guns (SP). The battalion commander decided to use Companies B and C and the Reconnaissance Company less 1 platoon, east of a strong defensive position (see Fig. 3). Destroyers and machine guns were dug in, lateral patrols were established, and "A" was placed in battalion reserve so that it could defend a pass on the Gabes Road and protect the right flank. The Reconnaissance Company covered the movement of "B" and "C" into position and was prepared to move on battalion order; it also reinforced "A" with one platoon.

East of the defensive position and north of the Gabes Road are wadis and gentle rolling ridges with some knolls. With dry, sandy soil, it is favorable tank destroyer country. South of the Gabes Road the terrain is very flat, and around the right flank was soft and boggy at that time. Previous reconnaissance had proved that even jeeps could not maneuver out of range around that flank. This ground condition proved invaluable. It was clear weather and visibility was excellent.

G-2 information did not indicate a large German attack. It was bright moonlight when two German motorcyclists came down the Gabes Road shouting "Panzer! Panzer!" to scare the Americans; they were throwbacks to the medieval herald Talliaferro, who at the Battle of Hastings rode out from the Norman front all alone. Most of the seemingly insane things the Germans do to defeat their enemies' will to fight would never occur to Anglo-Saxon minds and suggest strange weaknesses in their own defensive psychology. The Americans shot one of the motorcyclists and captured the other. The prisoner stated later that his unit had arrived at 0400 hours and was ordered to attack at 0500 hours.

The 1st and 2nd Reconnaissance Platoons were outposting the "B" and "C" positions at a point about 5,000 yards east of the pass, with the 3d Platoon remaining in the pass to defend it. At dawn the 1st and 2d Platoons were to withdraw to help the 3d. By 0300 the initial positions were occupied and contact was established with infantry companies on the mountains to north and south.

After a 15-minute interval the motorcyclists were followed by at least two infantry companies on foot in squad column, preceding 16 tanks. Both TD platoons engaged the enemy with MGs, 37-mm fire, and 75-mm HE and AP. At least 50 enemy infantry became casualties. The enemy tanks did not appear to be hit at this time. The 2d Platoon withdrew at 0520 with the loss of the platoon leader's half-track and injury to him; it was still dark. The 1st Platoon withdrew to the first rallying point at 0600 and an hour later, just before dawn, withdrew from the outpost line. In this movement another track was lost.

At about 0800 hours 21 tanks attempted to outflank the Reconnaissance

Company on the right. These were engaged by direct fire from 4 destroyers. The artillery fired heavy concentrations on the group of tanks. At least 8 tanks were disabled or destroyed on this flank, of which four were retrieved by the enemy. The attack was stopped at about 0930 hours. During this action a B Company destroyer was hit and burned.

From about 0930 hours to around 1600, our position was under heavy long range artillery fire. At about 1700 hours another attack came due west down the valley. Just prior to this attack the TD positions were dive-bombed and strafed three times. The ground attack consisted mainly of infantry, but the tanks could be seen about 5 miles away. This attack was stopped about 1,500 yards short of our position.

The lieutenant commanding the 3d Platoon in the pass relates that "At dawn German tanks approached our position from the east. We opened fire with one 75-mm gun and one 37-mm gun. Destroyers on the left of the pass went into action along with the artillery. The tanks did not advance any farther west at that time. Enemy artillery at about 0730 hours laid a heavy concentration of smoke on our position. At about 0800 hours my OP on the south flank reported scout cars and tanks on our south flank. There were 22 tanks and scout cars attempting to out-flank our position at a range of about 2,000 yards. I put four 75-mm guns and two 37-mm guns into position and opened fire. Friendly artillery was notified of the menace and heavy artillery fire was also brought to bear. At about 0900 or 0930 hours the tanks withdrew, leaving two tanks in the most forward position and two more farther to the east. From my OP I could definitely observe four disabled tanks being towed from the position.

"One B company gun placed in position on this flank was destroyed by enemy tank fire. From about 0930 to 1630 hours, OPs observed enemy infantry advancing on both sides of the road about a mile east of our

position. At about the same time our position was dive-bombed and strafed three times. When enemy infantry had approached to within 1500 yards we opened up with one 75-mm gun, using HE shell. The Section Sergeant adjusted on the right of the line of infantry and made 5-mil shifts for 200 yards to the left of the road. I estimate that at least 100 enemy infantry were killed or wounded during this fire. Our artillery then engaged the enemy infantry with time fire and the attack was stopped.

"We organized our position for night defense against tanks and dug in machine guns for anti-personnel attacks. There was no other attack on our position."

The lieutenant commanding the remaining platoon of A Company received orders about 0300 hours to reinforce the Reconnaissance Company in the pass. "I placed three of my guns in defilade," he states, "on the north side of the road entering the pass. Shortly after daylight German tanks approached us from the east, traveling on the main road. I waited until the leading vehicle got within 800 yards and then ordered the platoon up to the crest to open fire. About the same time the unit on my right flank, units in the valley, and the field artillery opened up, making it difficult to observe the results of the firing of my platoon. The tanks then withdrew, reorganized, and began to circle the high ground. At this time I counted well over 30 tanks circling to the right. I ordered two of my guns to take them under fire, keeping the other guns ready for another thrust at the pass. The combined fire of the artillery and the TD elements on my right turned this thrust back before they had gotten 1,000 yards from the hill. My platoon did no more firing until noon, when an unidentified American half-track towing a field piece came down the road toward the pass. I held my fire because I was afraid that it was Americans escaping from the enemy, but when 7 Germans

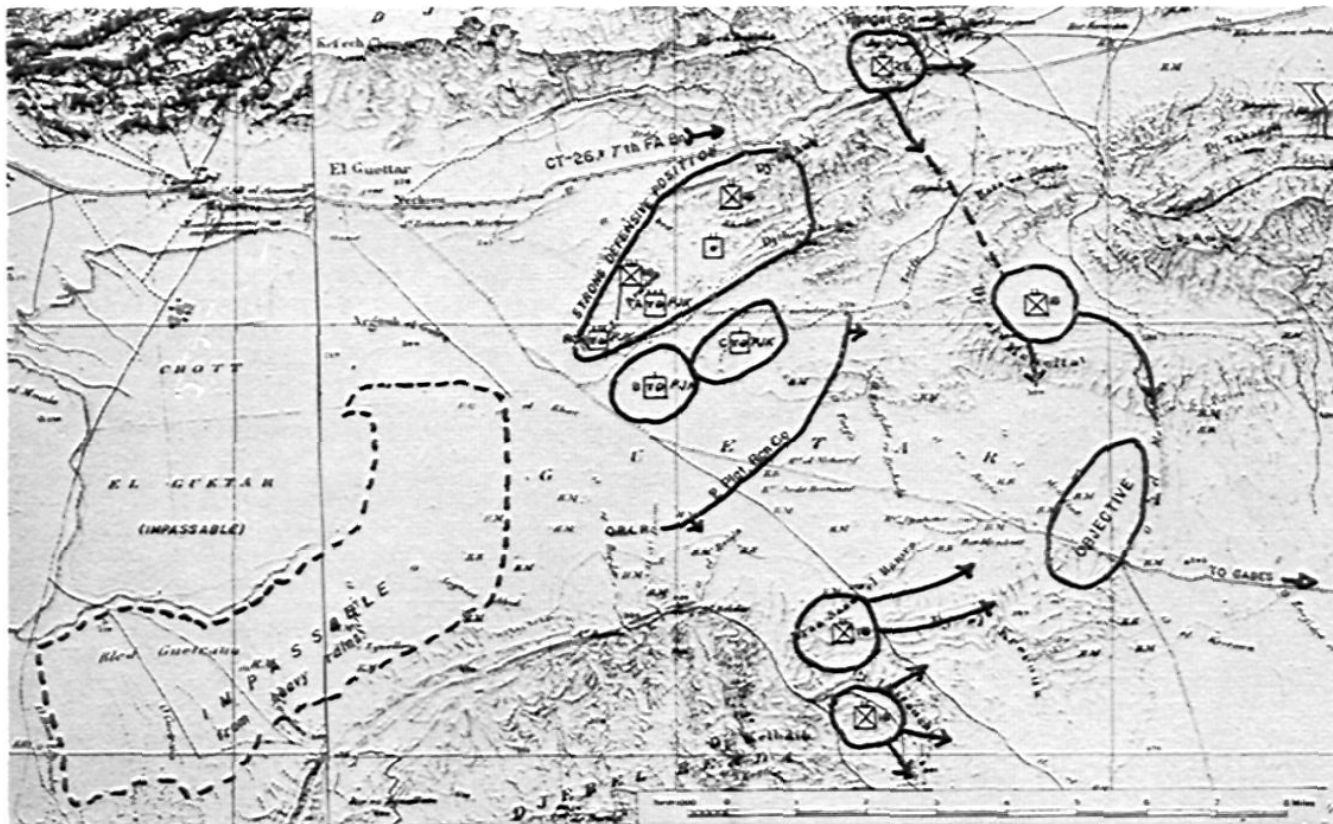


Figure 3

Initial positions: 0100 hrs to about daylight, 23 March 43.

1 Plat Co B withdrew to vicinity of Co A.

Co C and Co B less 1 Plat (20 guns) repulsed enemy tanks with fire and movement. from defiladed positions behind small ridges north of the Gabes Road until dark, when 3 guns (still serviceable) withdrew northeast and contacted friendly infantry.

The enemy gave up their attempt to envelop the right flank about 0830 hrs. One company (12 M-10s) was used to counterattack northeast but was forced to take defensive action.

dismounted and placed the gun in position I opened up with 2 guns, expended 20 rounds, and blew up the German gun and vehicle. Thinking that these men might be Americans, the S-2 left the battalion CP in a jeep, even though he was wounded at the time, and went out under fire to the disabled vehicle. He found five Germans dead and captured the two others in a wadi."

A glance at Fig. 3 will show B and C Companies in position behind the pass.

Two platoons of "B" withdrew without orders, under intense enemy infantry and tank fire. The company commander stated that he did not order this withdrawal and did everything he could to stop it. The platoon commanders stated that they were being surrounded by enemy infantry and were greatly outnumbered by enemy tanks. Their decision



Near El Guettar the Italians laid a mine-field in straight lines, right on top of the road. Hill masses rise precipitately from the plain.

to withdraw was no doubt sound under the circumstances and operated somewhat in our favor as it drew in many enemy tanks, which were taken in the right flank by fire from the concealed positions of Company C's platoons and the 1st Plat of "B," suffering heavy losses.

"B's" platoons that withdrew were immediately ordered to counterattack north and northeast. Due to unserviceable guns, only one platoon could be used to correct the situation and continue on the original mission of protecting the artillery.

The enemy attempted to envelop the right flank, using 22 tanks. Since the terrain was known to be impassable except within fairly close gun range and was mostly mined, this enemy effort was expected to fail. The tanks came within ranges of 2,200 to 2,000 yards from the right reserve guns, using smoke shell to screen their advance. Two enemy tanks were destroyed and six disabled. The range for TD guns was too great to expect more hits or good penetration; bracket adjustment was required. The fire of the destroyers, furthermore, was plunging, which gave less effect and required a large ammunition expenditure. At this stage of the action the indirect fire from artillery battalions slackened and then ceased, due to ammunition shortage. The TD battalion commander ordered all guns in his immediate vicinity to cease firing until the enemy tanks approached within 1,000 yards or until more ammunition (then on the way) arrived at the positions. The enemy took advantage of this lull to withdraw to the east out of range, and then move north to assist the attack against the American left. Before withdrawing they hooked onto four disabled tanks, towing them away. This wonderful target could easily have been destroyed, had the required ammunition been at hand.

One of the B Company platoon leaders describes his part in the above action as follows: "We reached our positions at about 1000 hours and started to dig our guns in. At 0400 hours we got a report that a tank attack was coming down the road. I ordered my four destroyers into firing position and waited. At about 0530 hours I saw many human silhouettes coming over a ridge in front of our position, and ordered all guns to fire. Our shells were landing all around the infantry. Our firing continued until about 0615 hours, and took a heavy toll. Meanwhile enemy infantry kept advancing under our fire, and some of them swept around our left flank. I made a quick decision and ordered my platoon to withdraw to a hill about 1,000 yards behind us, where A Company had their guns in position. From

our new position we commenced firing on 22 tanks that were coming down the right flank. A few of them were knocked out and the rest withdrew. The A Company platoon leader whom I had joined was ordered to the left flank. He had only one serviceable gun remaining, so I was ordered to give him three of mine, leaving me two. These I placed in a modified position and fired on tanks to the right flank until both guns were hit by enemy artillery. I had the crews withdraw to our rear bivouac area while I remained with A Company."

A staff sergeant of B Company relates that after occupying position in darkness, his destroyers were dug in without good knowledge of the terrain; "consequently a few tracks had to move later in order to fire on enemy tanks.

"Fire was noted along the southern ridge, east of us, at about 0430 hours; later enemy machine gun tracers kept pouring up the valley, evidently hunting for armor. Radio communications were excellent. Our men started looking for an infantry attack and began feeling a bit unsure of themselves.

"When the first sight of a tank was reported to the lieutenant he told us to wait until it got closer. Infantry was also reported approaching. The first shots were fired by the track on my left. It was still very dark and vision was only possible on skylines at 1,000 yards. One track commander discovered a tank a few yards ahead of him, but could not lower his piece enough to fire, so the lieutenant ordered him back a few hundred yards. There was now very heavy firing going on, both by the enemy and by ourselves, with machine guns, rifles, and field guns.

"My view of the tanks knocked out before dawn was limited, but I saw numerous fires and was shooting in draws that ran north and south, also along the road running east and west. The half-track next to me was hit and set afire, but the crew got out. Dawn came. It appears to me that the enemy believed we had withdrawn. Shells were exploding in the burning half-track and the remaining vehicles had defilade. On our part we were not sure which tanks were hit and which were merely at a halt.

"At this time enemy infantry was observed. We opened up with machine guns, with the support of C Company on our left. Next we saw smoke being laid down east and west along the southern ridge. Half an hour later that lane was full of tanks, and it looked as though we were cut off. All our three guns opened up with 'C' and the 105s to our rear. All the tanks from the right front—that is, those furthest advanced—pulled back fast. We felt pretty good then. We had numerous hits and there were plenty of fires. One track commander shot the top off a PzKw VI; there were many of these immobilized, with crews bailing out. Tanks in all directions were just sitting, but at this time we were positive of 7 tanks destroyed, a large ammunition truck destroyed by fire, and numerous infantry either cleaned out or hiding.

"Then at around 0730 the large field guns opened up on our artillery and got a few hits on their ammunition, which burned. Enemy tanks on our left opened up on us and we started pulling back once more. Another track received a direct hit and the crew was badly cut up, with one killed. The lieutenant and the track commander administered first aid under cover of our machine guns. Another track was hit from the left, but the crew was safe. The wounded were sent in in the AA truck and we withdrew to the northwest about 800 yards. By this time the enemy had a lot of small arms going, and rapid fire machine guns. His heavy field batteries were firing and tanks were all over the terrain in groups of six. Seeing a large flight of our bombers and fighters, I figured we had plenty of help. We were zeroed in on again, so shifted. We counted our ammunition; we were about out: I had 5 HEs in my mount. We just waited. We could see our artillery fires and the enemy tanks pulling up and drawing back to keep out of our barrages. The enemy tanks numbered in three digits, but no one had the heart to count them as it hurt us had as it was."

C Company's commander was ordered to set up a defensive line of guns to protect the MBth FA Bn, which he did with two platoons in line to the left of the Gabes Road. "At about 0500 hours," he recalls, "our Reconnaissance Company sent back: 'An armored attack is coming down the road. Do not fire on us!' At about this time a

cloud of smoke enveloped the road and machine gun and cannon fire from tanks began coming from within the smoke screen. I went to the 3d Platoon and conferred with its commander. We counted at least 18 tanks moving towards us. I radioed to my reserve platoon to send two guns to reinforce us and leave two to give depth to the roadside position, and informed battalion of the envelopment. The two reserve guns arrived and I tried to extend my left with them, but they could not move over the crest because of enemy fire. Battalion radioed that 'B' was coming to our assistance. It seemed to us that tanks had gotten between our 1st and 3d Platoons. Every time we moved to counter this we seemed to run into a cross fire. We finally ended up near the mountain with two guns and two personnel carriers. It was reported that the enemy was digging in a large caliber gun on a ridge above and to the left of us. We were moving a gun and the personnel carriers into a ravine out of this 90-mm fire when the gun threw a track. A machine gun and the 90-mm gun had us pinned down so that we couldn't move. We went to an OP and were immediately placed under heavy fire.

"At this time the 3d Platoon ran out of ammunition. I had sent a guide for the munitions officer in a jeep, but he had failed to get through. Nevertheless at just this moment I saw the munitions officer advancing toward the 3d Platoon under a hail of fire. One of our men reported that enemy infantry was coming along the foot of the mountain. As we could not get straight back to the company our best bet on getting back at all was to circle back through the hills. So I ordered the vehicles destroyed, sent the men back in groups of three, turned over net control to my executive officer, destroyed my radio, went back over the mountain, and reported to the battalion CP."

The munitions officer says of the action, "My job was to supply ammunition to my company, who were out in front. It wasn't long before our 3d Platoon began to call for ammunition. Failing to get a definite answer as to their location I decided to try to find them, and started out of the pass in which my half-track was waiting. Cutting off to the main road we skirted the mountain slope to the left flank, where we found three sergeants whose destroyers needed ammunition badly; we gave them our complete stock and started back to reload. At this time enemy artillery was getting close to us, and we increased our speed. On reaching the pass the tanks had swung to our right flank and were shelling the pass heavily. We reloaded the half-track with all the ammunition we could find, besides the supply in the ammunition trailer. One of the other lieutenants came along at this time to get ammunition also, after bringing in a seriously wounded man.

"As we set out the pass was again being shelled directly by a group of tanks from the right flank, who immediately spotted our track and gave us no easy moments. The other lieutenant, riding with me, directed us to his guns. Once when he was none too sure of his terrain he went ahead and located the guns under fire. We put our load into his destroyers (the 3d Platoon) and started to return for another load. Circling slightly more to the north to get out of artillery fire, we found B Battery of the MBth FA Bn, and they said it was impossible to get out that way. I went up on our OP and confirmed their statement, as the tanks had moved in closer and had cut us off from the pass. My driver said he was having motor trouble and the radio operator said we were now net control, as the company commander's half-track was out.

"I decided to remain at the present location to direct the company and warn them of the enemy's actions. I had the 3d Platoon fall back to the MBth FA Bn, and there we decided to fight it out if the tanks reached our position. With another lieutenant I set up several OPs to prevent being surprised by infantry and tanks. Our artillery was trying to adjust on the enemy who were holding the key point to the valley's entrance.

"We remained where we were until 1545, when the order came that as the tanks were going to attack at 1600 we were to get out of our position. We removed the breech blocks, radios, etc., and loaded them on the remaining runable destroyer, and sent it with a half-track and a jeep to make a run for it. The remaining personnel assembled, and we sent them in groups of six up and over the slope under enemy artillery fire. The enemy counterattack was well under way at this time so we hurried the men on, not wanting to be cut off if our troops were forced to withdraw."

In final comment on the engagement the battalion commander states, "The entire power of the TD battalion, greatly assisted by other

1st Division units, was employed in successfully turning a serious enemy armored attack. Although reduced in personnel, strength, and guns, the battalion was more powerful than in previous battle operations because platoons and companies were not detached, and because the battalion was integrated in the battle scheme."

LESSONS

Behavior of Enemy

The TD Battalion reported the following German habits during the Tunisian Campaign:

1. Tanks, (a) had a tendency to bunch up under fire, (b) fire time shell, (c) tow 88-mm guns, (d) were often serviced with ammunition by captured American jeeps.
2. MG fire was often used primarily for morale effect, especially at night.

Reconnaissance

The role of reconnaissance in TD units can not be overstressed. Reconnaissance for ready, firing, alternate, and supplementary positions and rally points must be made before an action, and these choices must be made in the light of all possible eventualities. The Old Man, all members of the staff with combat functions, and company commanders, should reconnoiter the ground they are to use. This is an exhausting, never-ending assignment. Reconnaissance in connection with TD operations gives plenty of employment to TD reconnaissance companies and TD battalions in general, without calling on them to double in brass for reconnaissance troops or battalions of divisions or corps.

At various times during the campaign the battalion borrowed M-5 tanks from the armored division and mules from the French, to increase mobility. (For the desirability of a liaison plane, see below.)

Digging In

Since the destroyer is not designed for slugging it out with enemy tanks in the open, it must have dug-in positions for all-around defense. Alternate positions should be prepared for each gun, if time and the ground permit. Tank destroyer defensive positions must be organized with a view to combatting the infantry which usually accompanies tank attacks. All the organic automatic weapons should be placed in dug-in positions. OPs—including the post of the platoon leader—should be dug in like field artillery OPs, even if it is not likely that they will be used for long.

Tactics

Successful TD tactics depend upon employment in mass. The German does not like to attack with less than 60 tanks. Even battalions should not be broken up, and detachment of one or two guns or a platoon is attended by many evils. An ideal tactical scheme is the use of a light force as bait, withdrawing according to plan, and bringing enemy armor under massed enfilading fire from prepared positions.

The principle of holding out a reserve should not be forgotten when on reconnaissance in force.

Night Action

There were three night attacks upon this TD battalion during the campaign. At first the men were sorely disturbed by the sight of enemy tank fire and tracers at night. Recognition of tank silhouettes proved difficult for them. They lacked prior training in detecting military sounds.

Direct fire at night, except at illuminated targets or on bright moonlight nights, is very difficult with a panoramic sight. The cross-hairs of the sight on the M-10 did not show up in darkness. Protective fires by indirect means are one solution; coaxial mounting of MGs firing tracers, such as the Germans use, may be another.

The siting and use of secondary weapons is especially important at night. In movement during the hours of darkness, no matter how tired or depressed the men are there must be patrols on foot all around a column in the presence of the enemy; at night men in vehicles are next-to-deaf and next-to-blind.

Air

War is fought in three dimensions these days, and TD personnel should never forget it for five minutes. On the defensive side the common error, largely avoided in this TD battalion, was to fire too early. Unless an enemy plane attacks, ground fire will disclose

positions. Fire delivered before enemy aircraft come within range endangers neighboring units and wastes ammunition.

On roads full-time 360° observation is mandatory. In a single vehicle one lookout is not enough; two men should be posted back-to-back. In a column, front and rear observers should be posted on alternative vehicles.

American soldiers need little encouragement to stay with their .30- or .50-cal. MGs, either on ground mounts or on vehicles, when enemy planes close in. The handling of the MGs of the battalion was admirable, and achieved surprisingly big results. (Incidentally, at 1730 on 23 January one of the lieutenants shot down a Focke Wulf 189 with a .30-cal. air-cooled MG.)

On the offensive side, the battalion needs a couple of light liaison planes for reconnaissance purposes, road control, and to cause hostile artillery to keep quiet: German training evidently calls for the suspension of all but extremely urgent fires when under air observation.

TD battalion commanders should not hesitate to initiate requests for needed aerial assistance. At 1050 on 21 January the colonel requested, through channels, air support to strafe and bomb a lot of enemy tanks and vehicles out of range of artillery and plainly visible to the northeast of his position. At 1330 the mission was carried out by 12 A-20s, escorted by P-40s. The Air Corps had no trouble in identifying the enemy. A French colonel watching the operation exclaimed, "Bon, Bon, Exactement!"

Mines

The vertical dimension in this war goes down as well as up. Hostile mines are feared worst of anything by most men on the front. The lurking danger is nerve-racking in the extreme. The Tunisian Campaign was fought without regularly assigned mine-detectors in the companies. At least two detectors per company were badly needed. The men had had no adequate prior instruction in detecting and handling mines, and were forced to learn the hard way. This battalion did know friendly markings, but not all TD units did: a motorcyclist from a neighboring battalion was killed running over a friendly mine on a plainly marked field. The unit here described took the hint: its only loss from a friendly mine occurred to a Reconnaissance Company jeep carrying three men in a field supposedly completely cleared. Once four destroyers were posted in Faïd Pass among several friendly mine fields, of which the battalion had received no warning. Although the position was occupied at dusk, no one made a misstep.

The Pioneer Section did a tremendous lot of essential service with mine-detectors, and cleared hundreds of mines before it got detectors.

The enemy appeared to be short of artillery ammunition in some sectors, but always used mines on a lavish scale. He evidently seemed to feel that, weight for weight, mines were more productive than artillery shell—certainly in building tank traps. TD units on

the defensive need trained personnel and facilities to lay their own minefields.

Indirect Fire

Fire by quadrant, using regular artillery methods, is indicated in many situations. Fire for destruction at mid-ranges requires a 25-yard bracket and quadrant setting.

On 22 January, "B" (less 2nd Platoon) was reinforcing elements of an armored battalion in an attack. The armored battalion was withdrawn, and was to have been replaced by the reconnaissance company of the armored regiment. Due to the latter's delayed arrival, the TDs protected the right flank of a large force and supported what developed into a holding attack by friendly infantry. From their positions the TDs brought indirect fire to bear on German strong points and enabled the infantry to advance. It is just as well that the battalion had "absorbed" a few quadrants back in Ireland and knew artillery methods.

Secondary Missions

In addition to their primary role, TD units can be profitably used on special missions when, and only when, there is known to be no immediate threat from hostile armored forces.

Secondary missions may include reconnaissance in force, advance or rear guards for special combat forces, artillery support, mine and booby trap removal and establishment of straggler lines (bands of stragglers are more than a match for one or two MPs). All these missions were accomplished successfully by this battalion, but it is not inferred that the battalion liked such jobs.

Artillery Support

TDs need artillery support when attacked by infantry, when they are subjected to night attack, or whenever they can indicate important targets to the artillery. Although the TD battalion is not an organic part of the combat team—is not "in the family"—the artillery should observe its conventional obligation to establish liaison with all supported units, and coordinate plans and fires with the TD battalion.

Ammunition

Ammunition resupply must be at the point of defense. Ammunition resupply must be initiated as soon as a position is occupied, if the mission requires a stand.

Conclusion

Tank destroyers are a new weapon. Everyone was waiting with great interest to see how they fared in Tunisia. It must be remembered that there were few units present, that they were supporting a thinly-held line, and that the mountainous nature of the country greatly restricted maneuver. Most of the TD units initially had obsolescent equipment. TDs were used a great deal for jobs they were never designed to do. Their losses were heavy. But TDs in Tunisia unquestionably taught a wealth of lessons and proved their own worth in the only way possible—by slugging it out with the panzers, round by round.

FORGET ABOUT THESE

The following visual aids have been declared obsolete;

FS 7-98—U. S. Carbine Caliber .30 M1, Part III—Marksmanship—Known Distance Targets
FB 18-3 —3-Inch Gun Motor Carriage M-10, Part I—Controls and Operating Instructions

ENEMY ARTILLERY INTELLIGENCE

By Maj. William J. Hanks, FA

During a 7-month period we of the 9th Inf Div Arty have participated in the campaigns of Thala, El Guettar, Sedjenane, Bizerte, and Sicily. These campaigns have impressed upon us the vital influence in warfare of the opposing artillery. The speed of our advance has normally been determined by the rate at which we have located the enemy artillery and forced it to withdraw—and just as *our* artillery disposition invariably indicated our scheme of operations, so did knowledge of the enemy's artillery disposition give us a sure key to his plans. Enemy artillery intelligence has thus gained an importance in combat intelligence second to none. The Div Arty CP with its central location and its direct contact with 4 or more firing artillery battalions early showed itself to be an excellent and logical place to make a thorough study of this intelligence, and within the CP this collection, piecing together, and development of the enemy artillery picture has quite naturally become the work of the S-2.

Without shame I can say that in the first combat we not only knew little on the subject of Artillery Intelligence, but did not fully appreciate its value. Experience has been our chief teacher, both of the importance of the subject and of the subject itself. This teacher, however, took many days of combat and constant trials and errors to bring home her lessons.

Building an accurate and complete enemy artillery picture rests upon two factors. Both are vitally important and absolutely necessary. One of these foundation stones is to have prompt and ready access to *all* information of enemy artillery observed in your sector; the other, to have as complete a knowledge of enemy artillery characteristics, ballistics, and methods of employment as is available. Great emphasis must be placed on each of these two factors, which could be called the paint and the brush necessary to paint the enemy artillery picture.

Obtaining the first factor—prompt and ready access to all information of enemy artillery observed in your sector—depends upon trained observation and prompt reporting. Every infantry officer and NCO as well as all artillery officers and NCOs must be given a working knowledge of enemy artillery, made thoroughly familiar with the elements to look for, and impressed with the necessity of reporting them promptly and accurately. The desired information falls naturally into two classes: the first is that concerning enemy artillery seen, and the second, that of enemy artillery not seen but whose activity is seen or heard.

Information on enemy artillery seen normally gives you a good location, because when seen it is usually adjusted on if possible; and even if not fired on, it will probably give an accuracy within several hundred yards, depending upon how accurately the observer has analyzed the terrain. From observed enemy artillery reports can also come much other important information: the number of pieces, their caliber and type, the amount and rate of firing, the target, the angle of fire, perhaps important data on the employment of that particular weapon—all this depending upon how much the observer can see and upon his familiarity with enemy artillery. The observer should be trained to report every detail that he has noticed; pieced together with other reports, these details often make sense.

The other reports (those of artillery whose activity alone is seen or heard) must not be neglected. They are of inestimable

value to your picture. Compare the amount of your artillery that is actually under enemy observation with the amount whose activity only can be observed or heard. The most frequent reports of enemy artillery activity will be, of course, the reports of enemy artillery concentrations in your sector, ordinarily called "shelling" reports. In those reports, observers should be trained to give just as many of the following elements as possible:

- (1) the time of the shelling;
- (2) the location of the concentration by coordinates, to the nearest 100 yards if possible;
- (3) an estimation of the caliber by the whine of the projectile (deep sound, large caliber; shrill sound, small caliber) and by the size of the burst;
- (4) the type—that is, howitzer or gun (can be determined by the sound as the projectile comes in: if the piece sound is heard, followed by a long whine and then the burst, it is a howitzer; if it's a zip and burst, with the piece sound either after or close before the burst, it is a gun);
- (5) the number of pieces firing (can be determined by the number of rounds hitting at approximately the same instant);
- (6) the rate of fire;
- (7) the number of rounds fired;
- (8) the duration of the fire;
- (9) the angle of fall;
- (10) dispersion;
- (11) observed or unobserved fire;
- (12) the target fired upon;
- (13) the approximate azimuth from which the projectiles are coming.

Emphasis must be placed on the fact that any one or all of these elements are important and should be reported at once. When enemy artillery on our front is firing toward a front other than ours, sometimes the only evidence we have of this activity is the sound of the firing out in front. In that case the best the observer can do is report the approximate direction and distance from his location and the amount and duration of the firing, try to estimate the number of guns firing and their caliber and type, and perhaps give the approximate direction in which the guns are firing.

We have found invariably that the majority of our reports of both seen artillery and seen artillery activity have come from the regular artillery observers through artillery communications channels. This, I think, is normal. These observers are constantly looking for enemy artillery targets or for any activity indicating such targets, and they are trained in taking note of the same details we seek. Not only that, but these observers have the most constant communication with the rear of anyone on the front. These reports are collected and checked for accuracy and completeness at the Bn CP by the battalion S-2, who consolidates them and in turn passes them on to the Div Arty CP. Normally these reports come from the battalions to division artillery immediately; in extremely busy sessions for the battalions, however, when immediate reports are sometimes impossible, they should be passed on just as soon as possible, with a *must* on a complete information report at least every 2 hours.

Although the artillery observer is your "number one" source

of information, the value of the infantry observer as a good source cannot be overlooked. In this unit, the infantry reports are constantly becoming more numerous and accurate. After they gain some knowledge of enemy artillery, it is simply a matter of showing the infantry what you wish to know and the reason for it, and they will cooperate 100%. Normally these reports come to us through G-2. In an emergency, the infantry regiment often gives us these reports direct.

Other possible sources and troops who should be trained to report are the reconnaissance and engineer outfits. In several campaigns these units brought in some very informative reports on enemy artillery. Actually, everyone in the division should be made aware of your need for such information—any effort you expend here will pay rich dividends.

It should not be discouraging if these reports at first are not up to par. Constant training and emphasis upon their importance, by both the division and artillery and battalion S-2s (with the help of the division G-2 in infantry channels), as well as constant vigilance and hammering for information by all these offices during combat, are necessary especially in the initial stages to obtain a smooth-flowing stream of enemy artillery information. Never forget, however, that intelligence is one stream that runs smoothest when it is flowing in both directions. Post any battalion immediately on artillery information which might affect that battalion; bring all battalions up to date on the artillery picture over your entire sector at least once a day; keep G-2 informed of new developments constantly. This will help the battalions and the division CP and it will help you. Remember that the more this enemy artillery information can be circulated about, the more accurate and up-to-date your incoming reports will be.

When we first went into combat at Thala and for a considerable time thereafter, little was known of the German artillery. The second of these vital factors—obtaining as complete a knowledge of enemy artillery characteristics, ballistics, and methods of employment as available—was mainly accomplished at that time by study of and deduction from observers' reports along with reports from other front line units, and by inspection of the few captured enemy artillery pieces we could find. Now, however, with the testing and inspection of many captured artillery pieces by ordnance and artillery experts, and with the influx of captured artillery data, a great amount of this knowledge may be obtained by a careful study of the intelligence manuals and information put out by higher headquarters. Because of the constant new developments and introduction of new weapons in the German artillery, however, the study of your reports from this viewpoint will always be one of your most important sources of knowledge of the German artillery. For example, at the beginning of the Sicilian campaign we had only the slightest information on the German "Nebelwerfer"; at the end, because of the constant efforts and thorough reports from our battalion S-2s and their observers, we were able to obtain enough information to give a reasonably complete picture of the weapon and its employment.

Once these two basic factors are established and in good working order, you can start building your picture. Get just as good a map of the area as possible, and tack it down on your table, arranged so that it extends about 10,000 yards behind your own lines, about 30,000 yards behind the enemy lines, and at least 10,000 yards beyond each flank of your sector. A 1/50,000 map is usually the most suitable for this purpose.

Now cover your map with a sheet of tracing paper, tacking it

along one side so it can be rolled up when not needed or when you wish to study the map. This sheet is your "Enemy Artillery" chart. All enemy artillery seen is plotted here, using small map symbols for guns and batteries, with the time observed and the caliber and type of the piece or battery alongside. All enemy artillery fire reported is plotted here also, with a small asterisk, placing beside it the time, caliber and type, number of pieces, and a dotted arrow from the asterisk in the direction of the gun if a direction is reported. A small circle is drawn around the asterisk to indicate registration. (Note: The written record of these reports, in the case of seen artillery, is found on the S-3 firing sheet; in the case of artillery known only by its activity, the record is kept in the journal.)

At first this plotting probably won't make much sense to you, but continue to plot and study and compare reports. Before long you will begin to suspect that this battery which an observer has just completed firing on at 1350A might be the same battery as the one 1,000 yards away that another observer adjusted on at 0830A and has not heard from since. Then you will notice that, in order to fire the observed fire just reported, the enemy would have to have an OP on this certain high hill out in front. Now by continuing to study these observed fire reports from an inverse visibility standpoint, it won't be long before you'll know not only several high points which afford the enemy observation, but also the general areas into which each of these OPs can see.

And as you plot the enemy concentrations, suddenly you will notice that here on the chart are four different concentrations, all of which were reported as being fired by a 3-gun battery; three were reported as 105 howitzer, one as a 75 gun. Further check convinces you they were all 105 howitzers. Since you know that enemy artillery, like our own, does most of its firing at near-maximum ranges, you see a chance that by swinging from each of the concentrations an arc equal to the maximum range of the German 105 howitzer you might arrive at a pretty good idea of the general area in which to look for this 3-piece battery. You do this, and dot in the general area containing the battery. Now every time this battery fires and is reported again, you can verify and narrow down your area. Perhaps someone will be fortunate enough to see him fire a ladder and give you a good azimuth. The artillery observers in the area soon will be able to give you a point which they are fairly certain is the maximum range line for this battery; at any rate, just as soon as you think you have this battery narrowed down to a two- or three-thousand-yard area, it's time to confer with another chart on your map, the "observation" chart.

On this chart you keep an up-to-date plot of the location of all artillery battalion observers in your sector, and the zones of observation or visibility of each. Now determine which ones of these observers can see into all or part of the suspected area, and notify their battalions to have them search that particular section for a battery of three 105 howitzers. Sometimes by drawing the observers' attention to a particular area like that, they will be able to pick up and shell the battery. If they can't locate this battery, it very probably means that it is in that part of the area not covered by observation, indicated by the dead space on your visibility chart.

This narrows your area down even more, so give this information to the air observer—there is an excellent chance that he can pick up the battery in that limited area closed to your ground observation.

At the same time, start a terrain study of the area. Spot in

that area the positions the German 105 howitzers could get into and fire from; there may be many, there may be only one or two. If the air observer has no luck, and you have to neutralize that battery, pick your most likely positions and have a battalion put down a heavy and wide searching fire through each of these positions in turn. When the enemy fire ceases, check the position being fired upon, because that very probably is your hostile battery location. If the hostile fire doesn't cease, go on to the less likely positions. If your reports have been numerous enough and accurate and your work has been careful, you'll find the battery.

This example is but one of the methods for locating enemy artillery which this combination of accurate reports and a thorough knowledge will reveal to you. Keep in mind, too, during this work, your location of the enemy's OPs. Blinding or disconcerting his observation with smoke, HE, or time fire is often a very effective method of silencing the enemy's artillery fire.

As the ranges go above 20,000 yards, you will find that back-plotting and deductions get increasingly difficult, and often in the case of the heavy caliber, long range stuff a large area location is the best you can ever do. In this case, or in any case where there is artillery you can't locate definitely, call

immediately to higher headquarters for an air photo interpretation of that area and tell them what you think is there. These photo locations will often tide you over a difficult spot. (Note: This photo interpretation service has been constantly improving in both speed and accuracy, and during the Sicilian campaign proved very helpful to us in several instances. Their locations are by coordinates, and have usually been accurate enough for counterbattery work.) And keep in touch with the next higher headquarters constantly on all this artillery information. Their sound and flash outfit can sometimes locate precisely, when all other resources fail completely. The closest cooperation here is essential to produce the best results.

In order to produce a continuous picture which develops with the campaign, we have found it desirable to spread our enemy artillery charts over a period of four to five days each, plotting the activity for each day with a different colored pencil. Built up in this manner the chart presents a clear day-by-day development of the enemy artillery disposition, and it has the effect of bringing any trends and changes in this disposition quickly to your attention. And it is this enemy artillery disposition with its trends and its changes that presents to you one of the most leading clues you can possibly get to the thoughts and the plans of your enemy.

ADJUSTING TANK DESTROYERS BY QUADRANT

By Maj. Henry L. Davisson, FA



The secondary mission of all TD battalions is indirect fire supporting the fires of other artillery. How to accomplish this with only a gunner's quadrant was the problem which confronted us.

Our method was as follows:

1. Line the guns up about 25 yards apart.
2. Bore sight all weapons on a distant aiming point.
3. By quadrant, drop all guns to mid-range, and fire a round from No. 1 down the center of the sector.
4. Using forward observation methods adjust No. 1 on a base point; all guns having followed all commands, all are theoretically on the base point.

Then proceed to fire, using forward observation methods. Our unit fired on, and had effect on, targets at 2,000 to 6,000 yards, covering a front of about 1,500 yards. Occasionally *Battery left* or *Battery right* would be ordered to find out which, if any, gun was firing out; correction of these individual guns would then be made.

The truly crude part of the firing was the deflection shift. After the base point had been adjusted on, a piece of chalk was used to mark one gear-tooth of the turret gear-ring, and the opposite point on the turret; when these two lines coincided the piece was aimed at the base point.

It had been found that a complete turn of the traversing hand-wheel was 18.5 *gr*. This traversing hand-wheel has four spokes, or roughly 5 *gr* for each spoke. Again using chalk, by marking one spoke and its outline immediately behind on the turret, a unit of measure of 5 *gr* was arrived at. In practice, if 10 *gr* right was desired, the gunner turned his hand-wheel right so that the second spoke was opposite the chalk mark. So simple it is nearly ludicrous, in practice this method worked beautifully. It was found, however, that this hand-wheel had to be held in position while the gun was fired or it would drift off five or six mils while the piece was being loaded.

Bear in mind that we have no false ideas of pin-point accuracy or of firing this method immediately in front of our own troops. For area targets (such as "infantry assembly area," "truck park," "town," "harbor," etc.) the effects of 36 3-inch guns firing indirect fire should not be overlooked.

MEDIUM ARTILLERY LIAISON

By Capt. W. V. Ledley, FA

When the duty of liaison officer in a medium artillery battalion was assigned me, I had very little conception of the function. The field manuals are not very explicit on the subject of liaison, particularly in the medium artillery. After many experiments during the Tunisian Campaign, and now Sicily, a workable procedure was developed.

Although the T/O of April 1942, under which we still operate, only calls for one officer and section,* we almost invariably have to maintain liaison with the two most active combat teams. This has been true since it is difficult to reinforce in, and dangerous to shoot in, any area without working through the unit responsible for artillery fire in that sector. In spite of all efforts, Division Artillery cannot always have the latest front line information of all units on the division front.

Each of our two sections has consisted of an NCO, radio operator, driver-messenger, jeep with infantry ammunition cart for trailer, and SCR-610 and SCR-284 mounted. There is no doubt that our poor jeeps are overloaded, but every man and piece of equipment is needed: driver for overlays and written messages, NCO to relieve officer (liaison conscientiously carried out is a 24-hour job during a rough battle), and radio operator to work continuously when there is no direct wire between battalions. During pursuits that is usually the case. And in those unfortunate situations when artillery discovers there is no infantry in front, an instantaneous alternate means of communication besides wire is essential. On the rough terrain over which we have been operating, when the light battalion has displaced forward and the medium has not, the SCR-610 is often out of range and the 284 must be used. The ideal solution both for transportation and communication would be a command car with SCR-608 mounted.

When joining a light battalion CP I usually try to set up under a convenient tree within 50 to 100 yards from FDC. If my battalion has laid a line to the supported battalion board we T-splice a local into it, thus giving me and the FDC a direct line which is essential for urgent fire missions. Unless within earshot of the FDC it is impossible to keep up on the situation, since information is generally received there in a fragmentary fashion. No matter how diligent the staff, the situation map is not always up to date during rush periods. Keeping my battalion informed of the situation, which is often confused, is a difficult task, complicated at times by communications. Only when the direct wire is laid can data on the situation be fully given and discussed. When one must rely solely on radio, working often without adequate light, encoding messages takes time, errors creep in, and the data tends to be obsolete when actually received. As yet there has been developed no satisfactory, quick, all-inclusive code which is suitable for this purpose and easy to transmit. Unit prearranged message codes are excellent for fire missions, but of necessity are too limited for other uses.

Situation information in the form of an overlay is the most satisfactory, but one hesitates to dispatch the only jeep when we are often liable to displace several times a day on very short notice, and when (due to heavy traffic) sending a vehicle out on the hazardous roads we have used is a definite risk particularly at night. The wire lines between the two battalions through the Division Artillery switchboard are of limited value to the liaison

*T/Os and T/Es dated 15 July, 1943, provide for the medium artillery only 1 liaison officer (captain), 1 jeep, 1 SCR-610, and a driver. Note that some of the details herein described may not necessarily reflect the situation existing under the new tables, although of course the principles undoubtedly will remain the same.—Ed.



From the steps of the undamaged cathedral Gela's cathedral square looked like this the morning of July 10th, when the Americans captured the town. A dead Italian sergeant lies at the feet of forward observers Lt. William Bartlett and Capt. W. V. Ledley (helmet in hand). They had just descended from the cathedral tower where Bartlett directed naval gunfire against the first tank attack.

officer except for urgent transmissions. One or the other line is usually busy and if one needs and gets the connection for any length of time, two units are prevented from communicating with the higher headquarters. In such a set-up it is more satisfactory to rely heavily on radio, particularly for fire missions.

Fire missions occasionally occupy a great deal of time. Even though it may be possible to plug a light artillery observer direct to our own fire direction center, I rarely do this and generally relay the transmissions. This is done because there is ample opportunity for misunderstandings between the two when the observer is harassed by enemy fire and has to yell his commands to a telephone operator at the bottom of the hill. I know better how my own unit wants to handle a mission, and if things are somewhat confused, explanations can be interpolated and any tendency toward friction minimized. This is particularly important when the observer is way out and speaking through a double radio relay or talking over a party line, either of which is more apt to be the case than not. One of the duties of the liaison officer is to tactfully decline to fire targets not suited to medium artillery. More often, however, I have had to come in of my own accord on our proper type of targets, particularly counterbattery, since there is the commendable tendency of direct support units to feel self-sufficient and thus temporarily forget about us.

At times we have been asked of what use are we in another artillery CP since they know our capabilities almost as well as we do? Also, why don't we go up with the infantry? The reasons are that the infantry is well covered by liaison, forward observation, and battery OPs from the direct support units, and secondly, communications. Should we be forward with our radios and the wire lines go out, the two battalions would be out of communication and we would fail in our reinforcing mission. In just such emergencies the supported unit's radios are occupied with their own missions.

AMERICAN ARTILLERY PROVES ITSELF AGAIN

By Lt. John E. Whelden

WITH U. S. FIFTH ARMY, ITALY—A supply officer in Italy recently remarked that so much ammunition had been brought over the Salerno beaches that the artillery would have to burn out the barrels of its guns before it would exhaust the shells put at its disposal. So great have been the massed fires of Fifth Army artillery that one battalion has already done just that in pouring devastation into German lines. Both branches are well satisfied since supplies are still flowing smoothly and new tubes are on hand to replace the worn-out ones.

"When American artillery goes after the Germans, they don't just plunk one shell here and one there to heckle. Every available gun goes on one area and smashes away for whatever length of time is thought necessary to wipe the place out. That," says a high ranking artillery officer in the Fifth Army, "is what is called massed fire and is the reason why American artillery is admitted to be the best in the world. In Tunisia our artillery massed 13 battalions on one point and every gun had fired its mission in 15 minutes."

Forward observers who often get out in front of the infantry so they can direct our artillery fire are one reason these results can be achieved. These men deserve all the credit in the world. They're often the last ones to pull back from a position made untenable because of enemy fire. The chances are that they lead any other group in the Army as far as percentage of wounded and killed is concerned, officers estimate.

Army officials are convinced that artillery doctrines as taught in training in the States are sound all the way through. They admit to only one change in that doctrine since the American Armies took the field: now they like to mix in a few white phosphorous smoke shells when firing a concentration of high explosive. At night, especially, the phosphorous creates confusion and causes casualties by burning.

"For proof of how good our ammunition is," the artillery officer said, "look at the fields into which we have fired. I've seen fields with six or eight or ten dead cattle lying around and not a shell hole within 100 yards. If you stand up, the tremendous fragmentation of the shells is going to get you."

Tank destroyer crews (who come under artillery) and the artillery itself agree that high explosive ammunition with "oomph" is the best all purpose ammunition and they use it in an overburdening ratio to armor-piercing.

"When a tank gets hit with HE, it blows the side of the thing right in," a tank busting Colonel said. "If the tank gets hit with AP and the hit isn't in a vital spot, the shell is just as liable as not to make a nice round hole in one side, pass through the tank, and make a nice round hole going out the other side."

Experiments exploring the possibilities of various guns for artillery use are being carried on even after getting into combat. And there can never be too much artillery.

But when it gets down to cases, the "Long Tom" is still the tried and true favorite of the men who ought to know. This is the 155-mm rifle. It has led a spotted career, including condemnations as too heavy for maneuver in the very early stages of the African campaign and even temporary shelving while officials began investigating the piece.

Before they had a chance to make any conclusions, however, the "Long Tom" had proved itself on the battlefield in Tunisia. The higher-ups on the scene had needed artillery and called on the long, lean rifle. It delivered. Army officers say it is the best gun we have.

"The Germans come in and say they cower with fear when the rifle is finding them," the high ranking artillery officer related.

This material came to the JOURNAL directly from Headquarters Fifth Army. The principal officer interviewed, and quoted herein, was the Artillery Officer of the Fifth Army.

"They say they can tell a 155 shell. They can see the flash 10 miles and hear the report and then nothing happens for what seems like several minutes. But they know it's coming. They don't like the drum beat effect of all our different kinds of guns going off. All they know is a lot of explosive is somewhere far away and descending on them."

The "magic fire" of Tunisia and Sicily is still haunting them.

The "magic fire" is not confined to the 155 rifle. Our guns now kick out rounds to ranges equal to comparable guns of the enemy. Where our 155 howitzer used to fall short of their comparable 150-mm, we now are right up with them and using the same gun improved. The men that shoot the 105 mounted on half tracks wouldn't trade their gun for any in action. For mobility and accuracy, and also for contributing to the drum beat effect of the "magic fire," they cannot be beaten.

The Germans do have a 17-centimeter gun that will shoot 34,000 yards, but they have found it practical to use only for heckling.

Still, the experts always seem to come back to the "Long Tom" with its 100-pound projectile, its terrific range, and its uncanny accuracy. They had them working on the fifth day of the Italian campaign and brought them over newly established beaches to do it, which says something for their mobility.

"The day of the landing the artillery got many guns ashore and had them all firing," the artillery officer continued. "One battery of 105 howitzers came ashore under German artillery and set up 800 yards inland. The command post was on the sands of the beach. Firing flat trajectory, the battery knocked out eight tanks within an hour, forced two to surrender, but couldn't stop three or four from escaping.

"Our artillery has occupied positions that before this would have been thought impossible. They're seemingly hanging them from the cliffs, actually dynamiting to get a place to put the guns and then using a winch to get them in place.

"There was one place where the only spot from which a gun in a battery could fire was right in the middle of the road. They put the gun in position and fired a mission. Then they'd move it off to let the traffic pass. Every time they had a mission, they'd move the gun into the road and bang away. Then they'd move it off and wait for the next one."

With Allied big guns flashing lights into the sky night after night and beating a drum-like effect from the hills, artillerymen point with pride to their weapons.

"Artillery has shown up the biggest mistake the Nazis made in planning this war," the artillery officer said. "Hitler and his gang thought the Luftwaffe would do the work of the ground's big guns. Now his air power is being killed off and he has no great amount of artillery.

"I have seen 88s in emplacements where they were knocked out—they were the poorest positions for half a mile around. He has desperately converted a revolving rocket gun, originally planned for chemical warfare use, into an artillery piece. That's the one the Americans first met in Sicily and called 'Screaming Meemie.' It throws chunks of lead in an irregular pattern. It's so unreliable that the Germans don't dare fire it over the heads of their own troops.

"The German is no artilleryman and he knows it. He knows it's going to lose him the war."



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 RUSSIA (October 23 to November 20, 1943)

At the beginning of this period it was uncertain whether or not the German retreat east of the Dnepr River would continue on further to the rear. Events since this line was reached indicate that the German High Command does not intend to retreat further if the same can be avoided. As will be seen, German resistance along the Dnepr River line has greatly stiffened.

The ability of the German army to present a materially stronger opposition appears to be due in part to the employment of materially greater forces. As to the total size of these, Russian information is about all that is available as the Germans naturally have not issued any list of their own troops. Assuming that the Russian reports are based upon identifications, the following information is at hand.

According to the Russian estimate of October 6th there were then 211 Axis divisions in Russia, of which 189 were German divisions, as compared with 179 German divisions one year ago. The Russian estimate of November 6th as announced by Premier Stalin in his speech of that date shows 257 Axis divisions in Russia of which about 240 are German. This is an increase of 51 German divisions within one month. If these 51 divisions had been in army reserve on the Dnepr line during the retreat to that line, this would explain the failure of the Russians to have previously discovered such a large increase in force. It would also account for the German resistance, which has been much stiffer.

These figures can only be accepted as tentative, however. In the same speech of November 6th Stalin claimed that within the past year the Germans (not Axis) in Russia had lost 4,000,000 men (including 1,800,000 killed), together with 14,000 planes, over 25,000 tanks, at least 40,000 guns, and other materiel in proportion.

If a German division in line is assumed (together with usual corps and army troops) to represent 20,000 men, the 179 divisions in Russia a year ago amounted to 3,580,000 men and these must have been more than completely "wiped out," as the Russians express it. Stalin specified that the "best German cadres have been destroyed." If now there are 240 German divisions in Russia, representing 4,800,000 men, Germany must have raised this number of new troops together with their complete equipment. This appears to be quite doubtful.

Germany stated last February that it expected to raise 3,000,000 men this year, which would suffice to replace all divisions lost at Stalingrad and furnish necessary replacements during the ensuing year. At the time, this seemed to be about the limit of German personnel possibilities. Even if every one of the 3,000,000 Germans had been sent to Russia, if the Russian figures of German losses are accepted there would have been a

net loss of 1,000,000 in the German strength in Russia. But the latest Russian figures show an *increase* of at least 1,000,000. Similar calculations might be made as to materiel. If the Russian figures are correct, the German production must be perfectly astounding.

The foregoing does not take into consideration that there has certainly been a substantial increase in German strength in personnel and materiel in Italy and in the Balkans during the past five months, amounting at least to some 25 divisions. So not all German replacements or newly-organized divisions have gone to Russia: at least a half million have gone elsewhere.

Keeping the foregoing in mind, a more detailed consideration will now be given to the events of the period by active sectors, as follows:

- North—north of Gomel
- North Central—Gomel (inc.) to Cherkasi (exc.)
- South Central—Cherkasi (inc.) to Zaporozhye (inc.)
- South—lower Dnepr to the Black Sea, less the Crimea

NORTH SECTOR

On October 23d the line was

Novosokolniki (German)—Nevel (Russian)—Surazh (G)—Liozno (R)—Krasnoe (R)—Proposik (G)—Sozh River.

As described in this JOURNAL a month ago, the Russians had staged a major offensive on October 7th against Nevel (which they had taken) and toward Vitebsk and Orsha (which they did not take). After a few days all three attacks had temporarily ceased. The attack toward Orsha, starting from the vicinity of Krasnoe, was renewed on October 21st and continued each day to include the 23d. Daily the Russians fired a strong artillery preparation to open the battle, and then followed this up by a tank and infantry attack. Only local gains were made. On the 24th they lost to a German counterattack nearly all that they had won.

The Russian High Command now discontinued this offensive and started another one. On October 25th this jumped off astride the road from Cherikov to Chaussy on the main road toward Mogilev, a very important enemy center of resistance. Chaussy, just west of the Pronya River, was held by the Germans. This attack was pushed with extreme vigor for two days and made slight gains. Two more days, the 27th and 28th, were spent in attempting to exploit the small advances made. This effort had no important success.

Russia's greatest difficulty was the unexpectedly intense German artillery fire, which surpassed their previous custom. It appears that the Germans have taken a leaf out of the Russian system of tactics. The Russians have been using very large

artillery forces and great amounts of ammunition, vastly exceeding that customary with the German army. The latter has now strengthened its artillery to a notable extent, and is furnishing it with more ammunition. It is not now known whether the German artillery is as yet equal in number and calibers to the Russian artillery, but the disproportion between the two artillery forces in favor of the Russians has decreased. The Germans are now reaping the advantage of their improved artillery cadres, and the Russians are finding their attacks more costly.

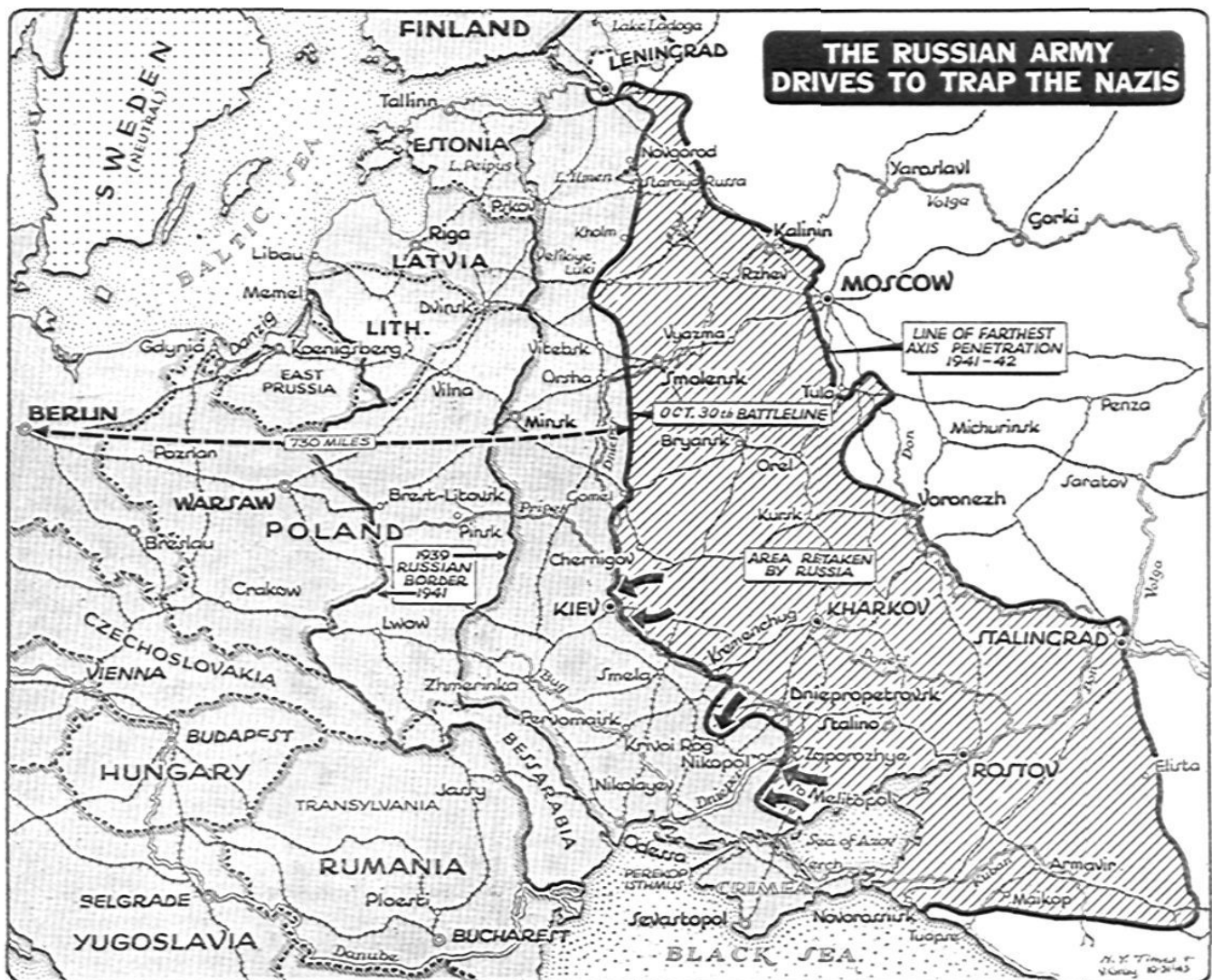
The second attempt of the Russians in this sector not being promising, the High Command once more shifted the offensive to a new area. On October 28th an attack was launched southwest of Velizh, directed toward Vitebsk, another enemy first class center of resistance. This made a gain on the first day, in that it forced a crossing of the Ussvyat River and captured Surazh, making an advance of 3 to 5 miles out of 35 to go. A renewal of the attack on the following day failed. For rearrangement of troops it was then discontinued until November 1st, when the attack was renewed and continued during the succeeding day. Only minor gains were made.

Attacks toward Orsha and Chaussy were renewed on 29 October. Each attack, which was continued through until November 2nd, made minor gains which were partly lost to German counterattacks. The Germans were most active in their

defense and never failed to strike back with great promptness, not giving the Russians time to consolidate positions which they had temporarily taken.

In the foregoing battles armored troops were employed only to a very limited extent. This was due to the terrain, which consisted largely of wooded swamps and marshes. Frequent rains kept the country so wet that armored vehicles were largely confined to roads. The fighting was almost entirely by the infantry and artillery. Due to the woods, air observation of ground movements and positions was difficult, so both sides had opportunities to move and assemble troops without detection by the opponent. The artillery had great difficulty in finding satisfactory OPs. Observation from tree tops was found unsuitable as nothing much could be seen except other tops of trees. Also, due to swaying of branches the instruments could not be laid accurately. It was found necessary to construct solid observation towers, projecting above tree tops but properly camouflaged, from which it was possible to observe to a limited but valuable degree.

For the fourth time, the Russians shifted their attack. A new one was initiated on November 3d, westward from Velikie Luki and to the west and southwest from Nevel. The country in this vicinity is the same kind of woods and swamps, but is interspersed with numerous lakes. As the Russians found it possible to use armor in some places, tanks were in line. This



attack made gains which were continued through the 4th and 5th. The Germans had difficulty in sizing up this attack as little could be seen from either the air or OPs. It was necessary to wait until a complete set of identifications had been obtained in order to determine what countermeasures were required. This came on the 6th, by a counterattack which recaptured part of the territory which had been lost. On the 7th heavy fighting occurred in dense forests, both sides being on the offensive at various places. On the 8th the Germans made more gains. Thereafter the fighting continued on until the 12th, gradually decreasing as the front stabilized, with about a 12-mile net gain to the Russians southwest of Nevel.

This battle was renewed on the 17th toward the southwest, south, and southeast from Nevel. That to the southwest pierced the German line and advanced on; on the 18th it was intercepted by superior German forces and destroyed. No gains were made in the other directions.

In the meantime the Russians made a new and very strong effort to capture Orsha, which appeared just beyond their reach. The ground had now partly frozen, and it was practicable to employ armor. On the 14th a determined attack was launched astride the route from Krasnoe to Orsha. Following what was intended to be a very effective artillery preparation, Russian infantry advanced and was supported by numerous tanks in addition to constant air support. Very bitter fighting occurred, but as before the German artillery fire was so effective that only slight gains were made.

This attack was renewed on the 16th. The Russian artillery concentrated its fire on selected sectors, after which the Russian armor dashed forward. This got through, the artillery having punched open a gap. Due to the forests German fire from the flanks was not serious. But the Russian troubles now commenced. The Germans had a second line, along which was their own armor. The location of the Russian artillery preparation had indicated the line of attack. When the Russian armor came through it was intercepted by German armor, while other German troops closed in all around them. It thereupon withdrew—not without severe losses.

Two days later, on November 18th, the Russians renewed the attack in the same manner and with about the same result. The battle lasted all day—short, however, in this latitude—and resulted in the Russian armor's being unable to maintain itself after piercing the German front, as against intercepting forces which attacked from all directions at once. In this case, due to the forests the air force was unable to locate in time converging German forces. The Germans, by observing the Russian artillery preparation, were able to determine where the Russian armor advance would be and had some time to assemble troops at appropriate locations to encircle them when they came on. The Russians tried once more on the 19th. This time they failed to get through, the attack breaking down under the intense defensive artillery fires.

From all accounts it appears that in this severe battle the Russian counterbattery fire was ineffective. All reports indicate that the German artillery was able to continue its fire continuously. The German success in this area was due to the German artillery, the intercepting forces (assembled in rear areas, out of range of the enemy's initial artillery preparation), and good G-2 work in promptly locating the Russian probable line of attack.

At the close of the period the line was

Velikie Luki (R)—Nevel (R)—Litvinova (R)—Surazh (R)—thence southward with no substantial change.

On October 23d the line was

Gomel (G)—Rechitsa (G)—Loev (R)—Dnepr River to Cherkasi, with Russian bridgeheads west of the Dnepr 10 to 20 miles north from Kiev and in the river bend south from Pereyaslav.

In this sector there have been two major Russian offensives: one south of Gomel and the other north of Kiev, the latter having been intended by the Russian High Command as their major operation of the whole front for this period.

The Gomel Offensive

On October 23d minor Russian attacks were made along the Sozh River, just south of Gomel. These seem to have had the mission of distracting attention, for they were not seriously pushed. On the 27th, while continuing with this attack, a supplementary one was opened along the Sozh north of Gomel. Some Russian armor was used, but only minor gains were made and these were lost to a German counterattack on the 29th. Thereafter for some time only minor fighting occurred in this area. The Russians obtained considerable information from these attacks as to the probability of being able to break through the German front.

Using this information the Russian commander, Gen. Konstantin K. Rokossovsky, determined to try again and make his main effort around the south side of Gomel, with a view to encircling it and either induce the enemy to abandon this strong point or else fight under disadvantageous circumstances. This plan was similar to that of our Gen. Grant against Vicksburg.

Everything was ready by November 11th, on which date a very strong Russian attack was launched from the vicinity of Loev with axis of advance toward the northwest. The ground was frozen sufficiently to enable armor to be used. A considerable number of tanks were employed and very strong air forces were made available. This offensive made gains from the beginning; it continued on through the 13th and the 14th. The Germans appear to have been taken by surprise by the strength of this attack; they failed even to materially delay the Russian advance. Within three days the Russians advanced 35 miles and were astride the main line of communications of the Germans between Rechitsa and Mozyr. The Germans did succeed in keeping their forces intact, and in withdrawing went westward to cover the line Kalinkovichi—Mozyr. The Russians thereupon occupied Vasilevichi.

Finding the enemy blocking an advance to the west, but no enemy to the east, a combat force of armor and cavalry under Gen. Markian M. Popov was detached to advance rapidly on Rechitsa and capture the same. Popov's force reached the west exits of Rechitsa after dark on the 14th. No time was spent in reconnaissance: an immediate attack was launched. This failed, as the town was fully garrisoned and on the alert. Stopped toward the west, where German reserves were gathering, and recollecting that the Russian mission was the reduction of Gomel, a more regular attack was started against Rechitsa. During the 15th and 16th the Russians closed in on this town from the north, west, and south. The Germans thereupon withdrew eastward across the Dnepr.

By the 20th the Russians had advanced only slightly from Rechitsa toward Gomel. A renewal of the attack north of Gomel (commenced on November 12th) met strenuous resistance, and at date of writing has made but slight gains. Gomel is now a German salient based on Zhlobin, to which place the line of communications is still open.

The Kiev Offensive

The Russian High Command considered this sector to be the focal one of the entire front. They estimated that 14 German divisions were defending the sector from the mouth of the Pripyat River to Kiev, inclusive. At the beginning of the period the 1st Ukraine Army Group (Gen. Nikolai F. Vatutin, commanding) was charged with the recapture of Kiev and driving the enemy away toward Germany.

This Army Group already had a bridgehead across the Dnepr River just north of Kiev, which city was right on the front line. The first steps to accomplish the assigned mission were to transfer across the Dnepr all the troops, ammunition, supplies, and replacements considered necessary to carry out the offensive, so as to be at least temporarily independent of the line of communications across the river.

Whether the Germans ascertained these preparations is not yet known. They made strong reconnaissances in force commencing on October 28th, but what they learned from these has not been ascertained. From their subsequent movements they seem to have obtained considerable information.

On November 4th the Russians attacked in great strength, both toward the west and toward the south. From what they had already learned, and from identifications made this day plus air observations, the Germans were assured that this offensive was in great strength. They thereupon decided to regroup their forces that night. By the end of the day the Russians toward the west had passed Dnymer, and to the south they were near the north exit of Kiev.

The German estimate of the situation was that the mission of this Russian attack was to strike southward in connection with another Russian attack which was to move northward from the lower Dnepr, thereby (if successful) threatening to enclose a large German force within the Big Bend of the Dnepr. To prevent this the German decision was to assemble their main forces on the south side of the Russian offensive, leaving to the west only a containing force with the minor mission of delaying the enemy. The Germans assembled their forces with center near Fastov, drawing their troops in from both east and west. This involved the abandonment of Kiev — which in any case was held by a weak force.

It is not known at this time whether the German estimate correctly divined the Russian mission. There is some

evidence to show that the Russian mission may have been to recover territory and chase the Germans out of Russia in any direction or by any route available. The Russian congratulatory general orders stress the release from the enemy's hold of territory, and particularly of large cities. Lesser attention seems to be given to capture of German troops, of which few have been taken compared with the severity of this year's campaign.

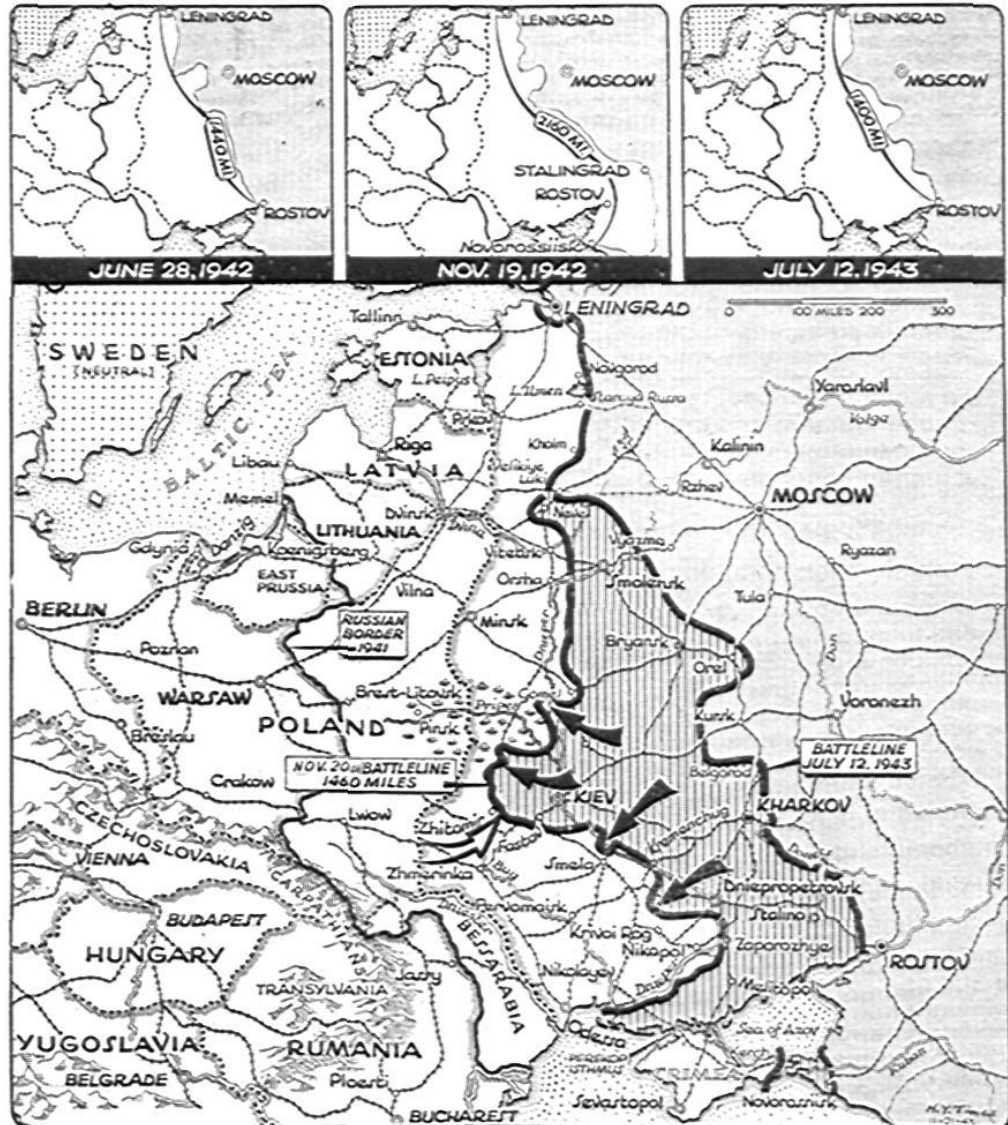
Regardless of the correctness of the German estimate, the Russian offensive made fast progress to the west; it naturally made less progress to the south. On the 5th the Russians advanced west without meeting strong resistance. They also advanced southward and approached Kiev from the west. On the 6th they prepared to attack Kiev, making the main effort from the west; they were under the impression that a large German force was trapped there.

The battle started with a 40-minute artillery preparation which the Russians described as the most terrific one yet fired in this war. The artillery plan was

First 3 minutes—all batteries fire at maximum rate zone fire directed on presumed enemy's front line. This fire uniformly distributed along entire front.

Next 34 minutes—precision fire, counterbattery, and against located targets.

Last 3 minutes—same as first 3 minutes.



At the end of that preparation the artillery fired a rolling barrage, behind which infantry and tanks followed. The rate of advance was about 3 kilometers an hour, which rate was maintained. Toward the end of the day the Russians found that the Germans were not in Kiev, but in rear of them near Ivanovka. On being attacked next day in this direction, the Germans fell back toward Fastov (pending assembly of their reserves) and avoided serious engagements.

On the 8th the Russians reached the Sdvish River and Fastov. Meeting very strong resistance at the latter place, they did not persist in advancing further in this direction, but bypassed it and directed their advance in two combat groups, one astride the main road from Kiev to Zhitomir and the other astride the Kiev—Korosten road. On the 9th the Russians lost ground slightly near Fastov but gained toward the west, forcing crossings all along the Sdvish River. Rain set in; roads were very bad.

By the 11th the Russians had reached the line Teterev River—Kuchary—Radomysl—Kotcherovo—Brusilov. Now the Germans opened a counteroffensive, striking northward from near Fastov. Notwithstanding the bad ground, the Russians decided to attack also. This resulted in two advancing forces of armor having a meeting engagement. A wild tank battle resulted, in which the Germans made minor gains. Both sides in this battle made much use of SP batteries which accompanied the armor, posted mostly on the flanks with heavy tanks while medium tanks composed the center. Infantry in armored trucks followed the medium tanks. The attacking force's whole formation was a rectangle capable of facing in any one or all of four directions in accord with the situation.

On the 12th the battle near Fastov was not renewed. The Germans made a new grouping (more to the west) while maintaining their line near Fastov. Very late on this day the south Russian column reached the outskirts of Zhitomir; without delay it entered the city. During the night street battle the Russians captured the city, the Germans withdrawing toward the northwest, covering the road leading to Novograd Volynski. This Russian column did not advance beyond Zhitomir: troops had to be detached to meet the German threat on the south flank, which was apparent by this time.

The Russian north column, not being so threatened, pushed onward against weak enemy forces and reached its objective at Korosten on November 17th and Ovruch on the 19th.

The Germans completed their new regrouping in time to attack (on November 15th) northward from the line Ivnitsa—Khodorkov, with main axis of advance normal to the Kiev—Zhitomir road. The German line extended eastward to beyond Fastov, and this part of it wheeled on its right as a pivot to maintain connection with the left. Very heavy rains set in but did not interfere with the battle, which was waged with great intensity.

The Russians started the battle in the morning by an artillery preparation followed by an attack of infantry and tanks. This failed under German artillery fire. Thereupon the Germans counterattacked. German artillery concentrated its fire on selected sectors and punched a hole for the advance of the German armor. The Germans did not attempt to penetrate deeply, where intercepting forces could reach them: they remained within the fire protection of their own artillery, and exploited their gains by removing mine fields (found in great profusion) and in reducing Russian infantry and antitank units in the vicinity.

In this way the German counteroffensive proceeded day by

day on practically the same plan, the Russians generally attacking in the morning and being repulsed. The Russians thereupon withdrew their armor and opposed the following German attack with infantry, antitank, and artillery forces. German gains were small, but as they came right along day after day they secured results. On the 19th the left of the German attack crossed the Kiev high road east of Zhitomir. At the time the Germans who had withdrawn along the road to Novograd Volynski returned and attacked Zhitomir from the north and west, while the counteroffensive attacked from the south and east. Most of the Russian troops in Zhitomir were withdrawn in time. The rear guard was captured and the city retaken. At the end of the period the German counteroffensive is proceeding methodically though very slowly. According to German reports, special attention is being given to accomplishing gains with a minimum of loss.

At this time the new line is

Gomel (G)—Rechitsa (R)—Khoyniki (G)—Dernovitchi (G)—Ovruch (R)—Korosten (R)—Turchinka (R)—Chernyakhov (R)—Korostyshev (?)—Fastov (?)—Stugna River—Dnepr River to vicinity of Cherkasi, with Russian bridgehead south of Pereyaslav.

SOUTH CENTRAL SECTOR

On October 23d the line was

Dnepr River from Cherkasi to Kremenchug—Syokoie (R)—Petrovo (R)—Piatikhatki (R)—Verkhne Dneprovsk (R)—Dnepr River to Dnepropetrovsk.

At the beginning of this period the 2nd Ukraine Army Group (General Ivan S. Koneff, commanding) had been engaged in a campaign directed against Krivoi Rog. This had been brought to a stop by enemy resistance, and the Russian attack had been changed to an advance southeastward along the west bank of the Dnepr River.

This Russian attack was opposed by a strong concentration of German bombers and battle planes which attempted with some success to paralyze Russian movements. German Panzer troops then attacked from the west and, breaking in in rear of the advance, caused considerable confusion in Russian rear areas. The Russians made progress notwithstanding, and on October 23d they arrived at Verkhovzevo Junction, 23 miles inland from the Dnepr.

On October 24th, in a dense fog, the 3rd Ukraine Army Group (Gen. Malinovsky, commanding) attacked across the Dnepr on both sides of Dnepropetrovsk. Simultaneously the Russian spearhead renewed its attack on Krivoi Rog, an important industrial and mining center. This latter attack advanced about 5 miles beyond Losovatka, where it was only 5 miles from Krivoi Rog. Both attacks across the Dnepr secured bridgeheads; the Germans evacuated Dnepropetrovsk the following night. On the 25th the Russians occupied that city, and the 2nd and 3rd Ukraine Army Groups established direct liaison at Romankovo.

The German reaction on the same day was a counterattack southeast through Spassovo, in rear of the extreme Russian advance at Losovatka. This secured only a small gain, but it stopped the Russian advance on Krivoi Rog. Heavy fighting followed during the next two days, with the Russian main advance stopped but other Russians advancing southwest from Dnepropetrovsk. In this direction, the Russians reached Krimichki (25 miles from the Dnepr) on the 27th.

Now the Germans concentrated against the Russians near Krivoi Rog. On October 28th they renewed their offensive through Spassovo with a strong attack by armored troops. To rid themselves of this threat the Russians met it with an attack of their own, using 2 armored and 4 infantry divisions. This

resulted in a great tank battle which continued all day, through the night, and into the next day. The Germans won; the Russians withdrew from the immediate vicinity of Krivoi Rog. At the other end of the line the Russians advanced from Dnepropetrovsk area as far as Alexandrovka, which became the temporary limit of the advance in this direction. Following the same tactics as was used later in the Kiev area the Germans continued their advance beyond Spassovo, but by slow, sure and short advances. By November 1st the Russians had been pushed back to the line they had held on October 23d. The Germans reported Russian losses as including 5,000 prisoners, 357 tanks, 378 guns, over 500 motor vehicles; for a modern battle these losses were moderate. There is no available report of killed and wounded for either side. Minor fighting in this area occurred later without substantially changing the line.

On November 14th the Russians made three new attempts to cross the Dnepr River—one each north and south of Cherkasi, and one northwest from Kremenchug. Only the one north of Cherkasi appears to have succeeded; this secured a bridgehead on the 15th, which was gradually expanded until on the 19th it was close to Cherkasi.

On the 20th the Russian spearhead made another attempt to advance toward Krivoi Rog. After the usual artillery preparation, strong Russian armor advanced. It unexpectedly met a powerful force of German armor supported by a strong air force. A terrific air and tank battle followed. According to German reports the Russians were beaten back for a loss of 247 tanks, while the Russians make no claim to any German tank losses.

As this article closes this battle may be renewed. For the entire period the Russians have gained a 20-mile strip along the Dnepr, including Dnepropetrovsk.

The line at this time is

Kremenchug (R)—Syokoie (R)—Sheltoie (R)—Piatikhatki (R)—Miloradovka (?)—Alexandrovka (R)—Nikolaifeld (G).

SOUTH SECTOR

On October 23d the line was

Zaporozhe (R)—Vasilevka (G)—Fedorovka (G)—Melitopol (R)—Molochna River to the Sea of Azov.

The Russians had just captured Melitopol. The German High Command now ordered their troops to abandon the area east of the Dnepr River (less the Crimea, which was to be held) and withdraw to across the Dnepr.

This resulted in a withdrawal and a pursuit over the Nogais steppes, a flat country with no natural terrain obstacles. Motor vehicles had abundant opportunities to work across country. The Russians sought to push armored troops forward, to get in rear of the retreating enemy and enable him to be surrounded and captured. German rear guards had the mission of warding off

such efforts. The rear guards did not occupy a position: there was none which motorized troops could not easily turn. Instead they themselves attacked by advancing toward the pursuers, attempting to disrupt their advance by firing into their flanks, capturing their CPs, destroying their supply trains.

This resulted in a series of small but fierce battles throughout a zone about 30 miles in depth, within which both sides had troops fighting, moving and facing in all directions in a most confusing series of engagements. Both air forces played a prominent part in this fighting, for it was their mission to prevent their own ground forces from being surprised and to guide them to positions whence they could surprise their opponent. Air troops also intervened by direct attack on the enemy, special attention being given to guns and vehicles.

With some exceptions, both sides escaped severe losses. By November 6th the Russians reached the Dnepr along its entire length, less two bridgeheads which the Germans are retaining on the east side. One of these is opposite Nikopol, the other opposite Kherson. Against these bridgeheads Russian attacks (some with strong tank forces) have failed.

THE CRIMEA

As the German forces withdrew on the mainland the Crimea lost its land connection with Germany and the German army. Its garrison's strength is unknown. There are a certain number of Romanian troops, variously reported as between 3 and 7 divisions. The Russian garrison for Sevastopol alone was 7 divisions, and it is improbable that a lesser German force will be left to defend that important center. Strong Axis forces are present at other places.

The Russians promptly made two attempts to recapture the Crimea. Between November 1st and 7th a series of attacks was made against the Perekop Isthmus defenses. This failed, as have attempts to land east of this isthmus by an amphibious expedition across the Siwash.

The other Russian attempt was more serious. On November 1st two landings were made, one northeast and the other south of Kerch. The northeast attack gained a beachhead, but the south one initially failed. Being renewed it also gained a beachhead on the 2nd.

Constant and severe fighting has occurred since. The northeast attack has made slight progress, the south attack almost none. The Germans are opposing a strong ground defense to continuous Russian attacks. German air and light naval forces are attacking the Russian line of communications leading across Kerch Strait from the Kuban. The south beachhead has lost heavily in boats containing reinforcements and supplies, the northeast one much less so. The south beachhead seems to be just holding on; the northeast force is struggling ahead at a slow rate. At date of writing this fighting is still continuing.

THE WAR IN ITALY (October 21 to November 20, 1943)

At the beginning of the period the Allied Army Group under Gen. Sir Harold R. L. G. Alexander was holding a line across the Italian peninsula as follows, all places inclusive:

Regia Canal—Cancello—Brezza—Pignataro—Roccaromana—Dragoni—Vinchiaturu—Busso—Oratino—San Stefano—Montecilfone—Petacciato.

The American Fifth Army held the left of the line, as far as the Volturno valley (inc.); the British Eighth Army held the right

of the line. The German Tenth Army held a line through

Monte Massico—Teano—southeast to Monte Maggiore—Caiazzo (exc.)—Cajanello—Trigno River.

THE ALLIED MISSION

From declarations made by the Commanding General, it is
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now known that the mission of the Allies in landing in the Gulf of Salerno on September 10th was not the capture of Naples, as had been thought by many. The real mission had been to surround and capture the German Tenth Army, which it was believed would be found south of Salerno.

A British and Canadian force had landed near the heel and toe of Italy on September 3d and was advancing up the peninsula. A sufficient time had been allowed to permit the enemy to move his troops southward to oppose this invasion, which was a decoy. Then on the 10th the American Fifth Army landed near Salerno, under the expectation that the landing would be unopposed and the enemy found to the south. Six divisions were used in the initial landing, and it was planned to shoot these completely across the Italian peninsula to the Adriatic Sea within 24 hours and thereby establish a barrier line to cut off the large hostile force supposed to be to the south.

But the German Army was not to the south. Less one division, it had been near Naples. The German intelligence section had noted that the landings at the south end of Italy involved only two or three British and Canadian divisions, and no Americans. It was known that there were at least five American divisions in Sicily and that there had been not less than five British divisions there. It seemed that the Allies had some seven divisions in Sicily still available for an amphibious expedition. The Germans estimated that there were ten more Allied divisions in north Africa, exclusive of French divisions.

The United States had advertised the fact that 3,000 vessels had been used for the invasion of Sicily. The Germans themselves had noted a large number. Only a small fraction of these vessels had been used to further the British invasion at the south tip of Italy. The German conclusion was that this landing was a feint, and that the main landing would be elsewhere; that it would have to be near Naples or further to the north, there being no satisfactory beaches south of Salerno.

The Tenth German Army detailed the 1st Parachute Division to watch the south part of the Italian peninsula. The remainder of the Tenth Army was held in readiness near Naples. Mission of the 1st Parachute Division was to delay the northward advance of the British force by appropriate demolitions and planting of mine fields. They were to secure identifications, but were to avoid serious engagements. A secondary mission was to strip the country, as they fell back, of everything that the German army could possibly use—with special attention to motor transportation. They seized practically everything that could move, including a good number of motor buses. This German Parachute Division was weak—it probably did not have a combat strength exceeding 7,000 men—but from its point of view it accomplished its mission reasonably well.

As explained in the preceding number of this JOURNAL, the Germans discovered the Allied invasion force approaching on September 9th. From its course, and the fact that minesweepers were busy in the Gulf of Salerno, it was judged that this was where the landing would be. One Panzer division was detailed to proceed close to the sea to delay landings. The remainder of the Tenth Army proceeded to the hills surrounding the Salerno plain, where it prepared a defensive position.

This action of the Germans prevented the establishment of a barrier line across Italy until after the 1st Parachute Division had withdrawn, leaving no Germans to the south. In view of this situation the mission of the Allies was changed initially to the

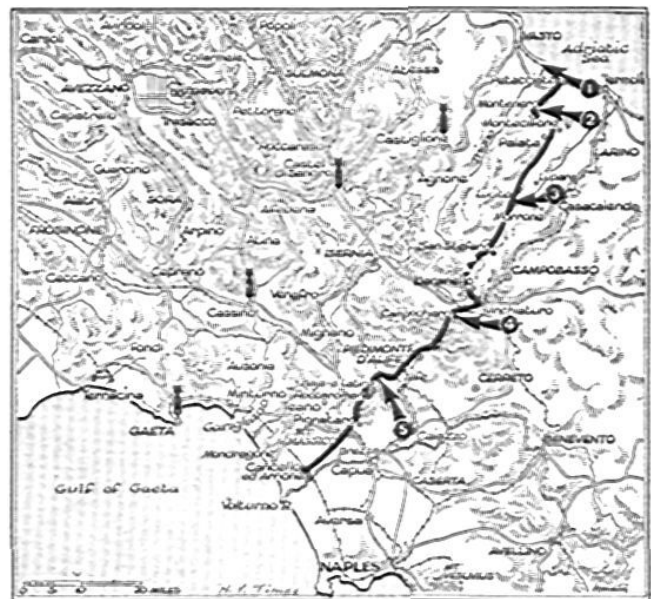
capture of Naples.

On October 23d Gen. Alexander gave out a revised estimate of the situation. The Italian campaign had forced the Germans to divert many divisions—perhaps 35 or 40—to south Europe. Every division sent in this direction weakened the German defense elsewhere. Things were not going so quickly as the Allied command had hoped: slogging through the mountains is a slow and costly business, and that is what he had to do. There was every indication that it was going to be extremely tough going until Rome was reached, but obviously the Allies were committed to taking Rome and had the best of reasons for doing so. He considered that he who held Rome held the hearts of the Italian people.

THE GERMAN MISSION

At the beginning of the period the Germans estimated that about 15 Allied divisions were in south Italy, committed to a step-by-step advance up the Italian peninsula. It was thought that the Allies did not have enough additional divisions available in the west Mediterranean area to engage in another major amphibious expedition. Temporarily there was no particular danger of the Allies landing far in rear of the present German front, although they might land not too far away from their present lines and then act in unison with them. The farthest north where such a landing could be made appeared to be opposite Rome. It might well be to the south of there. (See THE FIELD ARTILLERY JOURNAL for October, 1943, as to beaches on this coast.)

North of Cape Circeo is the territory of the Pontine Marshes. Some years ago these were drained and turned into cultivated fields. The Germans have reestablished these



On the anniversary of the opening of its victorious battle at El Alamein, the British Eighth Army surged ahead in several sectors. It crossed the Trigno River; although no locality was specified, the crossing most likely was near the coast (1). The town of Montenero (2) was captured, Lucito (3) was cleared of the enemy, and Campochiaro (4) was occupied. The Fifth Army speared closer to the Germans' mountainous defense line by smashing into Bajala Latina (5). Some of the points attacked from the air are indicated by the bomb devices.

marshes as an obstacle by removing the drainage pumps and thereby permitting the water to cover the land once more. For 15 miles back from the coast the inhabitants have been removed. The usual mine fields are being laid and demolitions prepared. German strength in this area is not known. In September there were reported to be three divisions, including one armored division, in the vicinity of Rome. About ten divisions are in line opposite the Allied Army.

MILITARY OPERATIONS

There has been no great battle during the period covered by this article. The Allied mission required an offensive. Constant attacks have been made, but undertaken by separate divisions for limited advances as opportunity offered. To determine where these could best be directed, there has been much patrol activity. The enemy has interfered by artillery fire, which at times has been heavy.

On October 21st the Fifth Army by a limited attack secured Piedmonte d'Alife and Alife. On the 26th a more ambitious project was started near Caiazzo, the mission being the capture of a ridge which extends westward to the edge of the plain along the coast. During the preceding night the artillery shelled the ridge heavily. On account of mist the attack was delayed in the morning. When this cleared up the artillery preparation commenced at 0800 and lasted one hour. The fire was directed against the ridge, which averages about 1,200 feet in height and was supposed to be held by the enemy's Hermann Goering Division. Immediately following the artillery fire came the air preparation. Waves of 6 to 8 dive bombers attacked the objective eight times at 10-minute intervals, dropping 500-lb. bombs. The infantry jumped off at 0915. There was some fire from enemy machine guns and infantry mortars, but no response from his

artillery. Enemy mortar shells hit two ammunition trucks which exploded; otherwise the resistance was not serious and the troops advanced per schedule. The leading infantry arrived at the summit at 1115, on time. No enemy had been seen, no prisoners had been taken, and no enemy dead had been found. This method of attack appears to be standard practice for this Army Group. It had previously been tried out in Sicily.

The Fifth Army also pushed forward on its left. This was low, flat, cultivated ground, much cut up by irrigation and drainage ditches. The enemy held Mount Massico as an advance post, with a series of guns and machine guns dispersed in an irregular manner. During a period of about ten days these were attacked one by one. By November 2d this ridge was in Allied hands.

On October 28th the British Eighth Army commenced a series of small, frequent advances. Indian troops were on the right, Canadians near the left, and British in the center. This led to a slow but steady advance until the south side of the Sangro River was reached about November 20th.

Severest fighting of the period appears to have occurred around Venafro, which was at the right of the Fifth Army. This place was entered by American troops on November 5th, but in the two following weeks it has been impossible to advance beyond. Just north of the town is Mount Croce, about 3,400 feet high. It is of lime formation with a bare top, but (as is common in lime formations) it contains numerous caves. The Germans have posted their machine guns and other small weapons in these. When our artillery fires they withdraw into the interior, where it is impossible to reach them. As soon as the artillery fire lifts to enable the infantry to close in, out come the Germans, and every attack has broken down.

On account of the steep slopes, rocks, trees, etc., tanks can not be used in the mountainous terrain except for limited areas, and then only in small numbers. The country is almost ideal for defensive warfare and—as the commanding general stated in his estimate—it is slow business slogging forward.

Snow set in in the mountains early in November, and rains in the low grounds. Troops in the mountains need frequent reliefs to thaw and dry out. In many places food and supplies can be forwarded only by pack transportation. Routes are few and are subject to enemy artillery fire and bombing, which have caused some losses.

German patrols are active. They raid into the Allied lines to secure prisoners and information. Even if the advance is slow, there is activity everywhere and a determined struggle to advance northward. In spite of the conditions, the Allies by November 21st had reached the line (all inclusive, except as noted):

Garigliano River (with enemy bridgehead on the south side at Rocca d'Evadro)—Calabritto—Mignano (exc.)—Venafro (boundary here between Fifth and Eighth Armies)—Pozzilli—Filignano—Montaquila—5 miles north to Rochetta—2 miles north to Castel San Vincenzo—5½ miles to Rionero—21 miles northeast to Castiglione—Atesa—Perano—Sangro River (enemy on south side).

The Allies now appear to be opposed to the enemy's main line of resistance, extending from the Garigliano River on the west to the Sangro River on the east. Based upon statements of Italians who have been taken, the enemy has been fortifying this line since early in October. Large numbers of Italians were impressed into labor organizations and forced to help construct trenches, emplacements, and obstacles.

At its mouth the Garigliano River is 55 yards wide and only 30 yards wide 10 miles up. Its south side is flat, with many



German shore positions on the Gulf of Gaeta (1) behind the front were bombarded by Allied destroyers in mid-November. After the enemy had retaken Mount Camino (2), the British wing of the Fifth Army again drove him from it and also beat back counterattacks near Calabritto. The Americans, seizing a salient two miles deep between Venafro and Montaquila, captured Pozzilli and Filignano (3). The Eighth Army made small advances around Rionero (4) and won the crests of several hills between Casalanguida and Atessa (5), breaking up a counter-assault. Targets of the Allied fliers included the railroad between Civitavecchia and Orbetello (A on inset), the naval base at the latter port, and freight yards at Cecina and Pontassieve (B).

trees and bushes. The north side is also flat, mostly covered with rushes. The ground then rises to a series of hills with Minturno on the first rise.

On the north side of the Sangro the German defenses are 3 miles in depth, covering a ridge approximately 600 feet high. Trenches are zigzag lines. Dense mine fields and 3 rows of barbed wire have been furnished. The Sangro is only 3 feet deep, but has a swift current.

Along the entire front concrete emplacements have been provided for machine guns, antitank weapons where necessary, and mortars. Artillery is well back, with excellent OPs. To facilitate observation groves have been leveled and towns destroyed. Much attention has been given to depth and to crossfire. In general, terrain in the mountains is covered by fire from adjacent sectors rather than from its own sectors. This provides partial enfilade fire, with defensive weapons outside the zone of limited attacks. This requires the attackers to identify the

location of the enemy's weapons—very difficult to do in practice—and then arrange to have the targets taken under fire by divisions other than their own. Unless lateral liaison is unusually good, long delays may occur.

At date of writing the enemy's strength on the Italian front as determined by identifications was:

<i>Divisions</i>		<i>Total</i>
Panzer	3rd, 15th, 16th, Hermann Goering	4
Parachute	1st	1
Grenadier (armored trucks)	29th	1
Motorized	3rd, 26th	2
Infantry	65th, 94th, 305th	3
	Total	11

During the period covered by this article, the Allied advance has been about 15 miles along both coasts, to as much as 25 miles in the center.

THE WAR WITH JAPAN (October 21 to November 21, 1943)

NEW GUINEA

At the beginning of this period Japanese forces had just launched an attack from Sattelberg against the Australian 9th Division covering Finschhafen. The distance between these two places is 15 miles, Sattelberg being to the north. This is an old Lutheran mission located on a plateau.

The Japanese engaged in this operation were those who had escaped from the Lae and Salamaua area, and from Finschhafen, when these were captured by Allied troops last August and September. Additional Jap replacements and reinforcements had arrived. The Japs at first made progress. They lacked air support, whereas the Australians had plenty of it. But as the action extended through dense jungle the battle became a series of separate engagements between small forces infiltrating back and forth. They presented no targets to air observation. The Allied air force was therefore constrained to bomb very large areas for lesser results. On October 22nd 221 tons of bombs were thus dropped. The next day the enemy abandoned the offensive and withdrew to Sattelberg.

As the period closes the 9th Division has initiated an attack against the Sattelberg, where it was found that the enemy had his defenses at the foot of the plateau but his artillery on top.

Throughout the entire period another Australian division has been endeavoring to reach Madang, having less than 30 miles to go from the upper Ramu River. Present reports indicate little, if any, advance.

SOLOMON ISLANDS

An Allied offensive against the enemy-held island of Bougainville started on October 25th by strong air attacks against airfields. On the 27th an Allied amphibious expedition was landed on Mono Island, just south of Bougainville. This is a round island about 6 miles in diameter, and was held by 250 Japanese. They were overcome within 24 hours.

On the 28th 2,000 Marine paratroops were landed on the west coast of Choiseul, at a place where there was no opposition. This was intended to be a diversion. Within two days contact was made with hostile forces, found to be 5 miles to the south

and 15 miles to the north. The Marines were withdrawn during the night of November 3/4.

Early on November 1st the main Allied expedition landed at Empress Augusta Bay, on the west side of Bougainville. There was practically no opposition. During the ensuing night, which was very dark, a hostile naval force approached from the northwest. This was discovered by the Air Force and was known in advance to consist of 12 cruisers and destroyers. American naval forces intercepted the enemy 30 miles away from Torokina Point. Enemy planes dropped flares in rear of the Americans, while the American ships had no such assistance. The battle started with the Americans' opening fire at 0227 and lasted until 0400. This was the longest night naval battle ever fought by American ships. The range varied from 15,000 to 18,000 yards. At this distance it was hard to see the enemy. Only one report of an eye-witness has been so far received. He states the enemy shot very well, but says nothing as to any damage received by our ships. The witness saw one Japanese ship (believed to be a destroyer) in flames, and considered it as good as sunk. The official account claims that the enemy lost 5 ships sunk and 4 others damaged.

On November 7th the enemy landed considerable forces both north and south of Empress Augusta Bay. They closed in on the Americans, who themselves received important reinforcements on the 8th. Fighting on a small scale has since continued, neither side having yet shown much aggressiveness.

NEW BRITAIN

The enemy's base around Rabaul has been subject to constant air and occasional naval attack. Air attacks of October 24th, 25th, 27th, and 31st claim to have destroyed 111 enemy planes on the ground and to have shot down in air fights 105 planes out of 180. The average weight of bombs dropped each day was nearly 125 tons.

On November 3d a very heavy air attack was made. The claim is that this resulted in sinking in the harbor 3 destroyers and 8 transports, while 2 cruisers and 9 other transports were damaged; 18 enemy planes were destroyed on the ground or on the water, and 67 downed in air fights. Our own losses were 9 bombers and 10 fighters lost.

Subsequent attacks at the rate of about two a week have since been made, with the enemy reported as losing 2 cruisers and 2 destroyers sunk and 8 cruisers and 13 destroyers damaged; 12 enemy planes were destroyed on the ground and 111 others downed, as against a loss of 17 of our own planes.

GILBERT ISLANDS

As this account goes to press announcement has been made of the practical seizure of the Gilbert Islands by an American force which included the 27th Division and the 2d Marine Division.

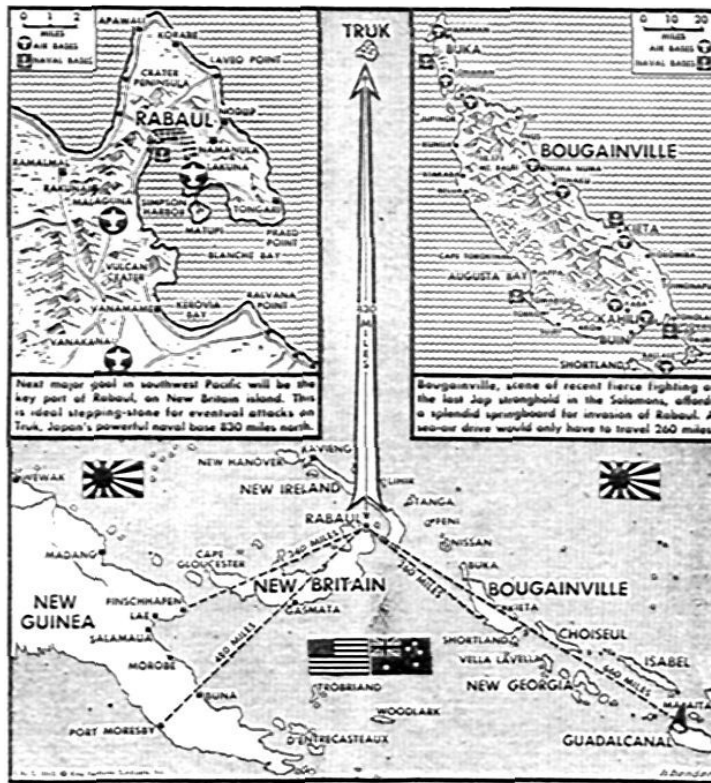
CHINA

The U. S. 14th Air Force has been active in raiding over south and southeast China and the north part of Indo-China. It now raids shipping off the south China coast.

The Japanese have started another seasonal raid to the Lake Tungting area. In the past the mission of these raids has been to destroy supplies. This raid is on a large scale, employing several divisions, on a broad front. At date of closing this account, the former objectives had not yet been quite reached. The 14th Air Force is doing what it can to aid Chinese ground troops resist the enemy.

SOUTHEAST ASIA

The Japanese have been engaged in clearing that part of the Salween valley which lies within Yunnan Province. Few details

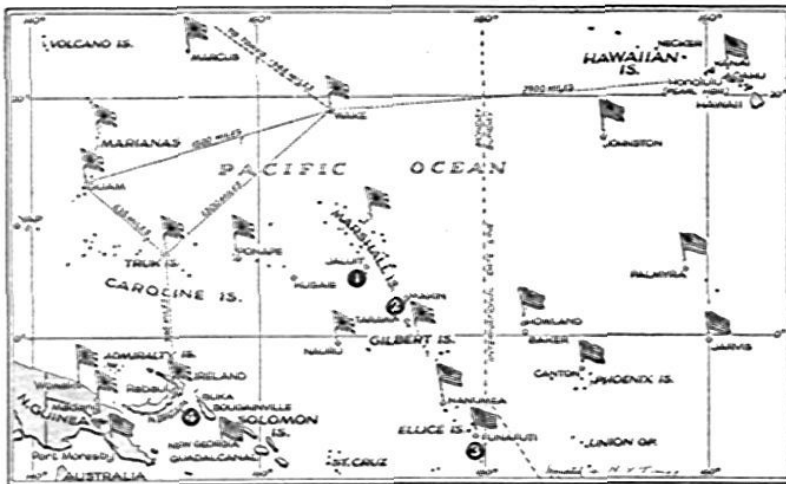


have been obtainable. In general the Japanese hold the west bank and the Chinese the east one, both sides having some bridgeheads on the other side of the river. The U. S. 14th Air Force, stationed in China, has been aiding the Chinese troops by bombing the enemy. Due to the deep valleys and their narrowness, this is only effective at a restricted number of places. The Japanese are building roads for motor traffic leading into this area.

On October 26th U.S.-trained and equipped Chinese forces amounting to 2 divisions moved eastward from Assam in India with the mission of crossing the north tip of Burma. They were covering road construction forces, consisting partly of natives but also of American white and negro engineer troops. These Chinese troops

are organized into triangular divisions, complete with artillery, and with American instructors. The British furnish clothing, rations, and pay. The ration is 1/2 lb. meat, 1/2 lb. vegetables, 2 lbs. rice. A native scout battalion of Kachins is attached. It has a British commander, but American officers and noncommissioned officers.

These troops are protecting the construction of the Ledo road which, starting in India, is intended eventually to furnish a connection with the Burma road. Work was started last December and has been pushed since, regardless of the rainy



Continuing the air offensive, Army Liberators set great fires at the airdrome in the Jaluit atoll (1) and battered an airfield at Tarawa (2). The Japanese in turn raided Funafuti (3), whence the American planes may have taken off. In the Solomons area, light United States naval forces shelled Buka Island (4), close to the enemy's stronghold at Rabaul, for forty-five minutes without damage to themselves, while our ground forces on Bougainville extended their beachhead.

season, though this did interfere with work. In one month 50 inches of rain fell; on one day, 7 inches. The road is about through the Nagai Hills, which are really rough mountains covered with jungle. The best types of road building machinery are being used but progress is difficult. Malaria and dysentery are indigenous in the country. Many men have been hospitalized from Naga sores; these are formed from leech bites, these lizards entering the clothing at night or by dropping from vegetation, and inflicting bites which become infected.

By November 17th the Chinese covering forces had advanced 20 to 30 miles and were holding the north banks of the Tarung

and Chindwin Rivers, facing south. Only enemy patrols had been met. Burmese composed the better part of these small enemy forces.

Allied Air Forces based on India have been conducting an intense series of day and night air attacks over Burma. These have been directed against enemy posts, and enemy-occupied villages, airfields, railroad, and water lines of communication. The Japanese air force has made but few attacks. Japanese planes are now regularly reconnoitering the east coast of India and Ceylon, presumably to locate invasion forces.

S. O. P.

By Col. N. P. Morrow, FA

The Army is sop-happy—that is, it has gone crazy over SOP. Of course, an SOP is fine in its place, which means when it is properly employed; it has saved countless reams of paper and prevented loss of valuable time. But we abuse it when we use it as a substitute for thinking.

Since mid-January of 1942, as a Corps Artillery Officer I have conducted 76 AGF Battalion Firing Tests. On some of these certain battalions were repeating the tests, but altogether 54 different battalions have been given the Tests by my Corps Artillery Section. During these Tests I have been struck by the multiplicity of divergent SOPs, not only between one Division Artillery and the next but also among battalions within the same Division Artillery and even among batteries within the same battalion. It has almost gotten so that individual officers have their own individual SOP with their particular battery!

Time and again I have asked a *battalion* forward observer, after he had sent his commands, what the battery was going to give him. The usual reply has been that he didn't know what the SOP was in that battery. He might get anything from a single round to a battery salvo. I believe that commands sent should be fired; anything else leads to confusion. Some battalions, when one battery fires an adjustment to be followed by a battalion concentration, have commands sent to and figured at the adjusting battery, which reports final deflection shift and adjusted range to the FDC; in others, commands go through the FDC—as, in my opinion, they should. But you never know until you find out.

I believe that an SOP can to a certain extent be used to advantage in fire direction procedure, but its use should be very limited in conduct of fire. Varying tactical situations and considerations of time, terrain, and ammunition supply mean that there is no "standard situation" applicable to conduct of fire—meaning, of course, how a target should be attacked.

Some battalions send all commands as to compass and range in code when radio is used, others in the same division do not. I can see the advisability, *once the system is understood through much practice*, but there should be greater uniformity of procedure. I have emphasized the expression above because I once saw a forward OP almost shot out because the code was mistranslated. Yes, the safety officer missed his cue.

Several divisions now in combat boast that officers and noncommissioned officers of branches other than field artillery can adjust and have adjusted artillery fire by air-ground methods. This desirable flexibility could not have been attained without a simple, common procedure which does not need an interpreter or prior membership in a secret society.

In this discussion I have limited myself to artillery firing, but it might be well to add that the same variations have been noted in other matters, such as march formations, occupation of position, establishment of local security, set-up in bivouacs, etc. Now, every piece of terrain is a separate little world of its own. No two bits are exactly alike, though they may seem so superficially. Any time you try to establish a bivouac and local security "according to SOP"—how often I have heard that phrase!—you are inviting trouble if there is an enemy around mean enough to shoot at you. That is what I mean by saying that SOP should not be misused to substitute for thinking.

My object in writing is to suggest to all Division Artillery and Group Commanders, along about the time they are ready to go into their D-maneuvers or similar training period, to consider the whole matter of SOP and combine the best features of those of their battalions into one which will be standard for all. For that matter standard artillery procedure within a Corps, covering appropriate subjects and *only* such subjects as are suitable to an SOP, would not be a bad idea.

"AS THE TWIG IS BENT . . ."

At least one youngster is getting early indoctrination into Field Artillery technique, as well as events of this war in general. One renewal reads as follows:

"Inclosed is a money order for \$3.00 for which please renew my subscription to the FIELD ARTILLERY JOURNAL for 1944. Sorry to be so late but I'm only 14 and had to earn the money."

Have you arranged for your son or "kid brother" to have the benefits the JOURNAL can give him?

Principles of Observed High-Angle Fire

By Lt. Col. Abbott H. Burns, FA

From a tactical standpoint it is frequently desirable to fire at very high elevations, to fire out of or into steep defilade. Occasions for using high-angle fire arise especially in jungles, cities, or mountainous terrain. Many modern field artillery weapons are capable of firing elevations up to 1160 mils; a list of these weapons appears below.

THEORY

The principles of observed fire (either lateral or forward-observation) procedure which are applicable to a normal trajectory apply in general to high-angle fire but some special points should be remembered.

An increase in elevation decreases the range.

An increase in measured site requires a decrease in quadrant elevation (site is discussed more fully below).

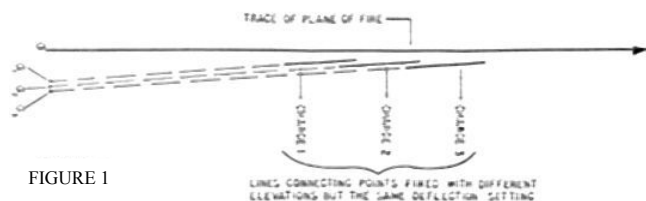
The value of c changes so rapidly with changes in range that use of c during adjustment is impractical. Elevation for each range should be determined from a graphical or tabular firing table.

The practical limits in elevation (900 or 950 mils to 1160 mils) permit a very limited selection of ranges to be fired with any one charge, and also allow very little range overlap between charges. For this reason more than one charge is frequently required during adjustment. With the 4.5-inch gun M1, the 155-mm gun M1, and the lower charges of the 240-mm howitzer M1918, there is no overlap between charges. This condition results in dead-space between charges for high-angle fire.

Because of the high maximum ordinates and long time of flight inherent with high-angle fire, range effects due to weather are sometimes very large. Because of the difference in the maximum ordinates and the times of flight, the range effect for one charge is likely to be very different from that for another charge when firing the same nominal range. This effect tends to change the amount of overlap between charges and also will change the range limits of the occasional dead space between charges mentioned above.

Time of flight is so great that special account should be taken of it in identifying rounds. An observer should be given the time of flight at the time he is notified BATTERY FIRED.

In high-angle fire drift is very great and should be considered in the preparation of initial data. Figure 1, which is drawn



approximately to scale for the 105-mm howitzer, illustrates the effect of drift for high-angle fire. For practical purposes the effective GT lines are parallel straight lines shifted to the right and rotated counter-clockwise. For any one charge, the effect of differences in drift at various ranges is a change in the apparent angle T and the associated factors s and d . During adjustment

with any one charge, therefore, no attempt should be made to compensate for difference in drift.

The following table gives the angle between the apparent gun-target line and the trace of the plane of fire for various weapons. If initial data are accurately determined, the factors s and d can be refined by modifying the angle T by adding the tabulated value if the piece is on the right and subtracting it if the piece is on the left. This refinement, however, is not usually justified, because it is very small and shows up in the *shot in* corrections to the factors.

105-mm Howitzer M2 firing Shell M1	60 mils
155-mm Howitzer M1 firing Shell M107	40 mils
155-mm Gun M1 firing Shell M101	100 mils
8-inch Howitzer M1 firing Shell M106	40 mils
8-inch Howitzer M1 firing Shell MK IA1	60 mils
4.5 Gun M1 firing Shell M65	30 mils
240-mm Howitzer M1 firing Shell M114	80 mils
240-mm Howitzer M1918 firing Shell MK IIIA1	80 mils

When it is necessary to change charges during adjustment, account should be taken of the difference in drift for the two charges. The required shift is *left* for an *increase* in charge and *right* for a *decrease*. A change in charge does not affect the factors s and d because the apparent GT lines are parallel.

Angle of fall with high-angle fire is so great that ricochet fire is exceptional. Also, time fire is not feasible with high-angle fire because the fragmentation of a time burst is approximately a plane at right angles to the line of fall and therefore practically parallel with the ground. Consequently a very slight error in height of burst raises the fragmentation so high as to cause practically total loss of effect. The effect of HE shell fuzed with the super-quick fuze is a plane of fire approximately parallel to the ground, leaving not over 4% of the shell fragments in a very shallow crater. The effect of HE shell fuzed with a delay fuze is usually a camouflet with all fragments trapped in the hole and practically no effect above the ground. The normal fuze for high-angle fire in neutralization is therefore fuze quick. For precision registration, better sensings will usually be obtained by using fuze delay because of the narrower column of smoke and dirt.

CHOICE OF FIRING TABLES

High-angle fire can be fired with either the graphical firing table or tabular firing tables. The graphical firing table is far superior to tabular firing tables for firing high-angle fire for the following reasons:

- Limited selection of charges for any particular range caused by the short range limits for any one charge.
- The necessity for frequent changes in range for a particular adjustment (also caused by the short range limits for any one charge).
- The fact that the firing table must be referred to repeatedly for determining elevations corresponding to various ranges.
- The fact that an increase in range calls for a decrease in elevation.

SITE

For observed fire, unless the angle of site is very great (at least 50 mils) it should be ignored. In case the range is

the target to Battery A, which has a front of 160 yards. No registration corrections have been determined for high-angle fire.

Procedure:

- Obsr: CX3842, antitank guns, request high-angle, will adjust.
- S3: CONCENTRATION 76, BATTERY ABLE, HIGH-ANGLE, WHEN READY.
- Rad (to obsr): CONCENTRATION 76, BATTERY ABLE.
- HCO: ABLE, 7880, L 176.
- Computer A: (Closes GFT and reads for charge 6: Drift, 52; Elev, 1134; Time of Flight, 59 seconds; and from 100 YARD SHIFT scale the deflection difference for 20 yards, Close 3.) B ADJ. SHE, CH 6, FQ, BDL 228 (176 + 52), ON NO 1 CL 3, SI 300, CENTER 1 RD, ELEV 1134.

SUMMARY





In general, there is no particular difference between the procedure in the conduct of high-angle fire and any other field artillery fire. The same factors are used in the same way. The only differences are:

Elevation should be determined for each range rather than by application of *c* range bounds.

Drift is so great that it should be used in the computation of the initial deflection.

More than one charge will frequently be required during adjustment.

When the charge is changed during adjustment, the deflection should be changed by the difference in the amount of drift of the

Messages, Messages and Commands	Results	Actions
In to Obsr CENTER FIXED, 59 SECONDS. Obsr to In 400 over.		Observer makes bold charge of one element. The arrow indicates the assumed direction of fire.
In to try # 1 CH 6, elev, 1000 In to Obsr CENTER FIXED, 49 SECONDS. Obsr to In 100, 100 short.		Computer A moves GFT indicator to 7500 and reads new charge, elevation, and time of flight. determines the difference in drift between charges 6 and 5 to be 15 mils. Observer believes rounds were lost in a ravine and senses short to pull rounds out of ravine.
In to try # 970 In to Obsr CENTER FIXED, 47 SECONDS. Obsr to In 50 right, 50 short, fire for effect.		
In to try # 17, 2 3 400, 960 In to Obsr SHOT FICKING FOR EFFECT Obsr to In range correct, ahead fire for effect.		

two charges in order to keep the shot on line, the shift being left for an increase and right for a decrease in charge. No attempt should be made to compensate for differences in drift during the adjustment with any one charge.

In forward observation procedure, the observer should request high-angle fire when he believes it will be required to clear some obstacle, and the fire direction center should notify the observer when high-angle fire is required to clear a mask.

BRITAIN'S ARTILLERY: A RESUME

By Major C. B. Thorne, M. C.

Maj. Thorne served with the Dragoon Guards in India. Born in Melbourne, Australia, he was with the Australian Expeditionary Force in Gallipoli and France in World War I.

In Britain's field artillery the smallest unit is the troop with its four guns. Two troops form a battery of eight guns. Next comes the field regiment of artillery with its three batteries. An infantry division is usually supported by three or more field regiments together with the other forms of artillery attached to it. A corps may consist of two or more infantry or armored divisions with their supporting artillery.

On going into action, the location of the guns of a troop is first determined by its Gun Position Officer. The Battery Command Post Officer (corresponds to U. S. Bn S-3) then accurately coordinates the guns of the two troops of his unit by plotting them on the same grid in order that they can engage a common target. The three batteries of a field regiment are linked up in a similar manner under the direction of the Regimental Survey Officer.

This process continues from front to rear throughout any formation. Within the division it is effected under the guidance of an artillery Survey Troop. It should be pointed out, however, that this work is often done by the Regimental Survey parties.

In country where the exact location of existing landmarks is in doubt, or in areas which are devoid of landmarks, Survey Units undertake the supply and erection of pylons or beacons. These form the essential reference points from which guns or other artillery units can plot their lines of fire or carry out other calculations. With higher formations (such as a Corps) there is an artillery Survey Regiment which is split up into Survey, Sound Ranging, and Flash Spotting batteries.

Consider the Survey Battery, one of the troops of which is already referred to above. As its name infers, its main duty is to assist artillery in the formation to fire with the highest degree of accuracy. To this end it renders service in the location of positions and ensures that all guns of the

divisions and the corps are plotted on the same grid and are thus able to concentrate on any target when necessary. These tasks may also involve work on air photographs and their interpretation.

Britain's Survey Regiment is also responsible for flash spotting. It is appropriate that these duties should be undertaken by this regiment, as flash spotting instruments must be set out with extreme accuracy—otherwise the angles taken by them to hostile gun flashes would be of little value. The exact location of enemy guns is ascertained by the interception of lines plotted on a map in accordance with these angles.

The flash spotters can also range guns on a landmark or on the position of an air burst; in the latter instance the shells employed are fitted with a specially designed fuze. Furthermore, flash spotters provide the Counter Battery Officer (who is normally at Corps Headquarters) with information regarding hostile batteries, and keep the artillery of the divisions informed regarding enemy movements.

Next is the Sound Ranging Battery. Like flash spotting, its job is to locate active enemy batteries and to range the guns onto them. The exact positions of the microphones of the sound ranging battery must therefore first be carefully located. With their instruments, the sound rangers are able to compare the position of the shell bursts with the sound made by hostile gun fire and, in consequence, determine the necessary corrections for the guns. Sound rangers thus augment the flash spotters, or furnish data with which to correct artillery fire in the absence of visible flashes from enemy guns.

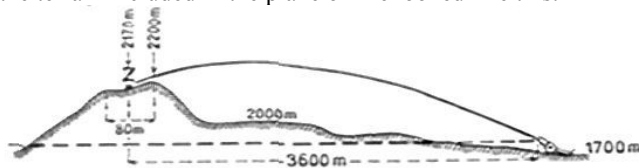
Artillery has a heavy responsibility in the field. It is not generally realized that Britain's artillery comprises one-third of her whole army. Thus neglect, carelessness, or inefficiency can be the direct cause of unnecessarily heavy casualties to the other fighting troops of any formation, and thus contribute to failure in battle—as well as to success if properly handled.

MOUNTAIN FIRING WITH AIR OBSERVATION

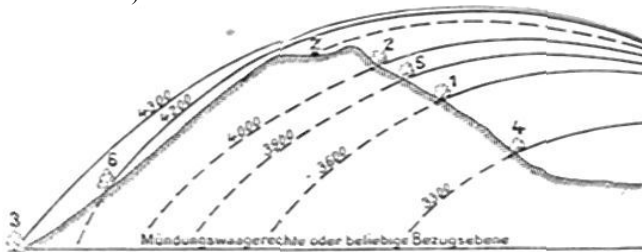
By Maj. Alfred Bauer, German Army

Principal difficulties of firing in the mountains with air observation are due to the fact that the air observer refers his observations to a plane surface, whereas the trajectory usually intersects the terrain elsewhere than on the horizontal plane in which the muzzle of the piece lies. This causes the theoretical position of the impact to differ in a wholly irrational manner from its practical position. The corrections announced by the air observer are therefore incorrect as regards distance, and can lead to complete failure of the fire.

An example of fire may illustrate this. The cross-section of the terrain included in the plane of fire looked like this:



Firing proceeded as follows (10-cm, mountain howitzer, smoke shells):



The plane in which gun is located, or any reference plane

Round	Range (meters)	Air observer reported
1	3600	400 short
2	4000	300 short
3	4300	1000 over
4	3300	600 short
5	3900	300 short
6	4200	800 over
7	3400	

Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article in *Artilleristische Rundschau*, April, 1943.

At this point the gunner started to bring his fire up from the rear again. Finally he managed to land a shell on top of the hill, just 50 meters short, so the battery increased its range by 50 meters and started its fire for effect. But the shells slid over the top and down the rear slope, and again the air observer reported from 300 to 400 meters "over." Thus the firing was broken off.

From this example it can be seen where the difficulty lies. Practically speaking, the front slope absorbs the distance and the rear slope magnifies it—but the air observer always refers to the projection of the shots on a plane, and he cannot do otherwise since he does not know the elevation of the point of fall. And so the observer is a victim of the point of impact, which in mountains is rather difficult to calculate even with 1:25,000 maps.

There might be some help in high-angle fire, since its steeply falling trajectories are considerably less subject to "sliding down the slopes." But on the other hand, the dispersion is so great that it seems almost impossible to hit the target with a probable error of 80 meters. In the case of the Model 36 mountain gun, 50% of the axial dispersion for the above example, for instance, is fully 100 meters!

Perhaps a mountain artilleryman, who is somewhat acquainted with the terrain as the result of ground observation and study of the map, and flying at a low height to get a good idea of the form of the terrain from all sides, may attain some results. But in this case he should not estimate the shots merely in accordance with their point of impact, but should include the form of the terrain in his estimates. That is, he should use his head.

In the above example the battery commander might have done this after the third round instead of shortening his range by 1,000 meters which made the fourth round "shorter" than the first. Where air observation is employed in firing it is of course not customary to change on one's own responsibility the figures given by the air observation, but mountains sometimes require departures from the rule.

From this discussion we learn that firing in the mountains with air observation is successful only in those cases where there is a half-way-level area of sufficient size around the target. Such is the case with targets on plateaus, on the floors of broad valleys, or on gentle, uniform slopes. It is not practical to fire on targets on the rear slopes of ridges, in the hollows between peaks, or on the concave top of rounded peaks.

CAMOUFLAGE—how not to do it! This installation is apparently close enough to shelling, bombing, or strafing to require a dugout. Why, then, leave mess gear out in the sun to attract attention by its glint?



BARDIA BILL AND PERIMETER PETE

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

During the Eighth Army's campaigns for the relief of Tobruk the British were subjected to a constant hammering from pieces which they came almost affectionately to call Bardia Bill and Perimeter Pete. These were the nicknames given to two guns operated by the Italians from excellent prepared positions in the rocky ground west of Bardia, to fire on Tobruk. Day in and day out, from this vantage point the Italians bombarded the British lines along the perimeter surrounding Tobruk. While these guns tossed plenty of 155s into the British lines, they constituted more an annoyance than a danger to the British forces. Only about one shell in 4 ever exploded. As a result the British with their characteristically dry humor accepted the shelling almost as a humorous interlude.

After the fall of Bardia these guns were captured in their original positions, well dug in and complete with dugouts and cover. On being unmasked they turned out to be none other than our old acquaintance Grande Peteux, Filloux—the famous French 1918 GPF. Only the firing pin mechanisms had been removed from the guns, and except that the barrels were very worn they were still in fair order. Both were

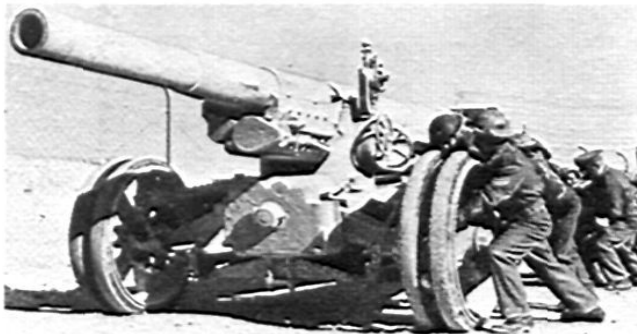


Photo 1

in original state and had not been modernized in any way. Photo 1 shows Bardia Bill immediately after the capture, when he was packed up for transport to the artillery shop at Cairo in January of 1942.

Three others captured later had been modified by the French for high speed travel and undoubtedly had been brought to Libya by the Italians. The Italians brought all these weapons from the French Tunisian garrisons, installing them first at Bardia. They also brought along a large supply of ammunition for this battery, but made the slight error of getting fuzes intended for the French 75-mm HE shells. These fuzes were the older French RYG percussion type; as these are equipped with a fulminate of mercury lower detonator they do not give adequate booster shock to the shell filler of the 155, and this factor explained the failure of the shells to explode when they had landed in the British lines.

Given decent ammunition and a crew who know the weapon, this old GPF is still the accurate gun it was during World War I. It is still a dangerous weapon to oppose, and the ineffectiveness of Bardia Bill and Perimeter Pete which was such a great advantage (both in low casualties and in providing humor) to the Eighth Army is attributable entirely to the lack of technical knowledge and skill on the part of the Italians and not to anything defective in the gun itself.



Photo 2

The French had modernized some of their GPFs prior to the fall of France in 1940, and Photo 2 gives an effective idea of this version. As a substitute standard for 155-mm guns our own army has a much more efficient and modernized version of the GPF. In Photo 3 is a modern though wrecked GPF; this gun was not worth salvaging at the time, and undoubtedly still rests as it is shown in the desert.

The GPF (either version) fires a 95-lb. projectile to a range of about 10 miles, and when properly fuzed the shell is still exceedingly dangerous on the receiving end.

Bardia Bill and Perimeter Pete will doubtless live long in the saga of the British Eighth Army. More than likely they will be treated as comic interludes in the campaign, but the joke actually lies in the men behind the guns, not in the guns themselves. This is a fact to be borne in mind. A thorough technical knowledge of any weapon at hand may be of more far-reaching importance than the weapons themselves.

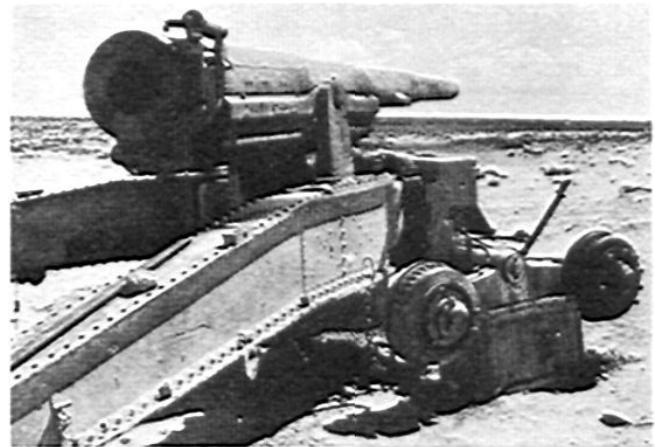


Photo 3

ALL GOOD THINGS MUST END

"Grasshopper" planes have seemingly led charmed lives, largely due to the sound principles under which their pilots were trained and later operated their own ships. Although used constantly since our North African landings in 1942, not until late the following September was an artillery liaison plane brought down by enemy planes.

This "grasshopper" was flying near Acerno at about 1,800 feet when it sighted two Me-109s. It immediately made for the ground, but the enemy planes made 3 sorties past it and finally hit it at approximately 400 feet. It was landed in an olive tree; although damaged beyond repair, it did not catch fire. The pilot suffered head injuries, but his observer merely had one hand cut by glass.

SURVEY at MUNDA

By Capt. George T. Fielding III, FA

We landed on Rendova with the Division Artillery Commander, in the first infantry wave. My battalion survey section and I comprised an advance detail for our outfit, with instructions from the colonel to meet him when he arrived with the battalion the following morning and guide the batteries into the positions which, by then, we would have chosen and surveyed in. It all sounded so simple, and in my mind I had it all figured out. I had studied the maps of the landing area in detail, and knew just where I would go and what I would do, even to counting on knocking off work at precisely 1200 to munch on a "D" ration bar.

Well, it didn't work out that way. What I hadn't figured on was the Japs running around among the coconut trees on shore, shooting at us as we landed and, worse still, having possession of our gun position area-to-be. As my instructions did not include taking our area by storm I thought it advisable to turn that matter over to the infantry, so we dumped our survey equipment on the beach to pitch in and help unload the swarm of lighters as they came racing in. Thus we initiated our survey operations on the New Georgia Islands—perhaps not the "school solution," but what could we do?

The survey problem was an interesting one from the beginning. Here were the usual large, volcanic, jungle-covered islands, surrounded by barrier reefs and small coral islands—an ideal set-up for triangulation. The difficulty in this case was that our target area, New Georgia proper, was 10,000 yards away and shielded from our view by its barrier reef and by several islands, large and small. No points affording unobstructed view of the mainland were immediately available.

My battalion of 155-mm howitzers arrived the following morning (we barely had time to get to Kokorana Island and choose and mark the battery areas, aside from even attempting any survey) and moved into position without incident. The Division Artillery survey officer established control in the position area, locating two points which gave us a known base for triangulating in nearby islands and OPs, and enabled rapid extension of survey control. This was of much more immediate value to us than the time-honored "Point A and line AB," or one point and a line of direction.

The battery sections tied in the guns, and our problem was to extend control to the New Georgia mainland. We decided to put in two widely separated points on our nearby barrier reef to use as ends of a long base. At least that was the plan, but even according to the supplemented TBA we didn't rate a motorized rubber boat or, in fact, any kind of a boat. There we were on a tiny island 200 yards wide and 600 yards long, and the other end of our base a good 5,000 yards (and several islands) away.

I don't blame the Navy for not furnishing us with a personnel boat then, because they more than had their hands full and, after all, we were granted the use of a small engineer assault boat (rubber) which belonged to another outfit. The designers of these little rubber boats must have gotten their ideas from a saucer or a spinning top, because that is the way they behave in the water.



Jap bombers and fighters littered the edges of what had been Munda Airfield. This background gives a good idea of the way artillery fire alters the terrain, and suggests the way aerial photos change from day to day as a result.

Perhaps the navy crew could handle them, but for the average landlubber to paddle 5,000 yards and back again—that's asking too much. We finally found an old round-bottomed rowboat (which leaked a little), and in that we managed to get our work done, paddling some 6 miles on one occasion. Later we found a large rubber boat, minus outboard motor. We still have these two boats with us, carrying them faithfully wherever we go. Some day we hope to find an outboard motor.

In this area a battalion survey section must have a decent boat to get around in. You can't count on hiring a native canoe, and without a boat you are simply stranded and cannot do your job. A little rubber boat is better than none at all, and good for short distances, especially when landing on reefs from a personnel boat, but I have often thought how embarrassing it would be if some Jap with a light machine gun opened up on us as we set foot on some strange island. I feel sure that the little saucer-boat would do its best to rotate us all in turn into the line of fire before we could get away.

But to get back to the story. When we did get up to both ends of our base, results were not satisfactory. It was like trying to see a movie from behind a big hat. The view to the mainland proper was almost entirely obscured by the barrier islands in front of it, with only patches visible here and there. So we went through the preliminary step of locating the barrier islands accurately, and hoped from that to get a rough map K.

Meanwhile, we had to be content with firing by air observers and by observers on a meager OP on a low hilltop which afforded some view of the mainland in the vicinity of the air strip. An observed fire chart was built up, and later on two better OPs were constructed in some jungle tree-tops. Even with a captured 20-power Jap BC scope, however, it was impossible to make out many details at this 13,000-yard range.

A photomap, an uncontrolled mosaic with the 600-yard JAN ("Joint Army-Navy") grid, was used as the firing chart, and targets were assigned on it. Although we of the survey section were not satisfied with this arrangement we had to bide our time until we could establish better control ourselves. Fortunately, most of the artillery fires at the time were "saturation fires," covering area targets; for these the photomap was sufficient.

While waiting to get more favorable OPs, we spent a few days making up a controlled map of Rendova and the surrounding smaller islands, whose coastline it was our secondary

mission to defend in the event of enemy landings. We also carried control to other artillery units located on two islands 10,000 yards to the right front. Here we used a 1,400-yard short base (600 yards taped in knee-deep water), and we encountered some difficulty in seeing their marker. Although it was a white sheet five feet square, we couldn't pick it up in the transit until we went over and raised it to a height of twelve feet. Apparently the earth's surface does curve.

It pays to erect 8- or 10-foot tripods faced with cloth as markers in doing this island survey, for flags on poles are indistinguishable at long distances and triangulation calls for goodly use of markers. This type of marker, with the station plumbed below, has the additional advantage of allowing an instrument to be set up beneath it without disturbing the marker—and further, its three white panels will never go limp on a windless day. (P.S. When within plain view and rifle range of the Japs, don't use the white cloth; just put up the tripod.)

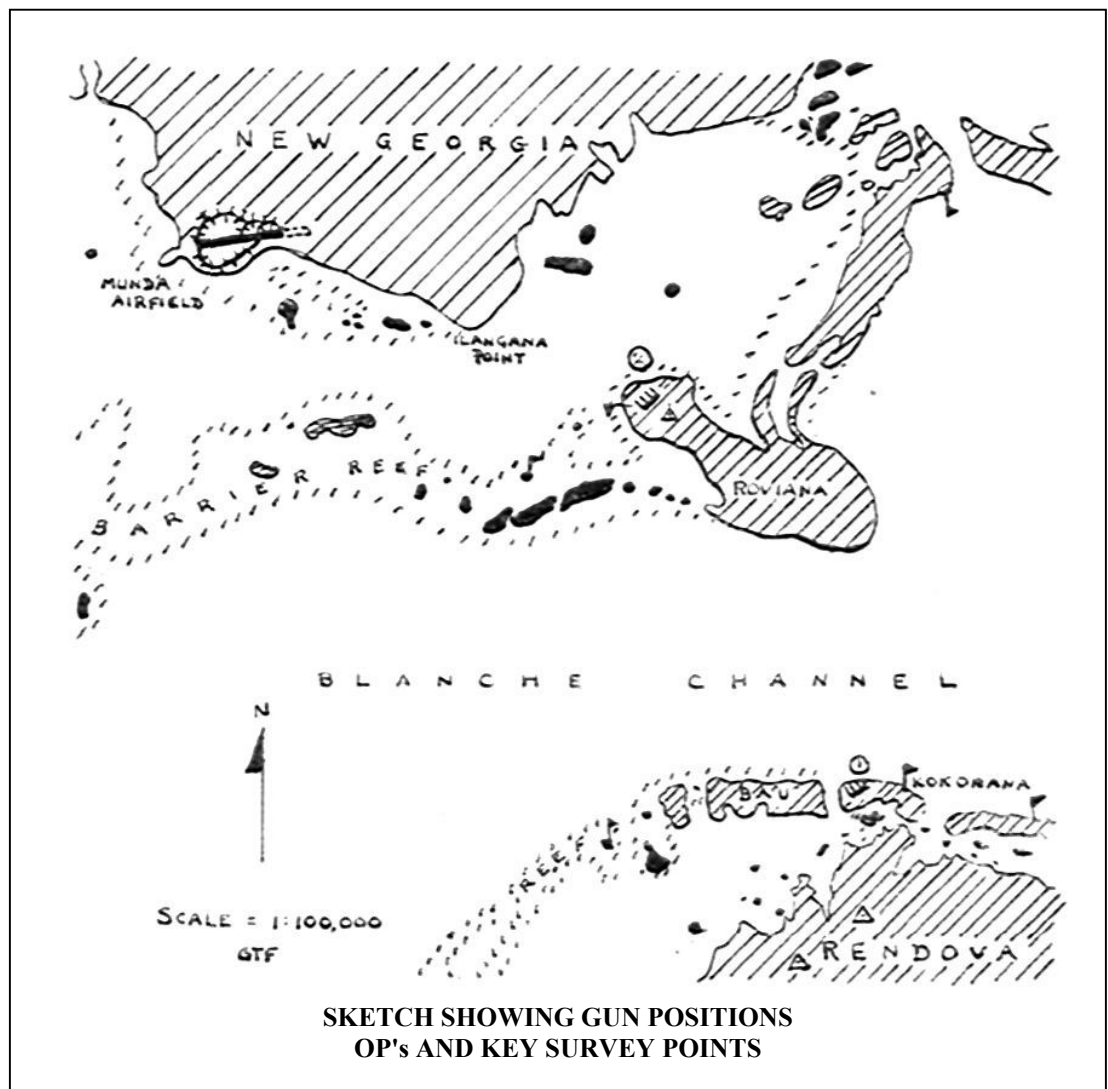
The advance of our infantry soon was forcing the enemy out of our already-strained range, and it was necessary for our battalion to displace forward to an island only 7,000 yards from Munda Airfield. Roviana was in the New Georgia barrier group, and afforded an almost unobstructed view of the field from its backbone hill. This was what we had been waiting for. The thoughtful placing of an undershirt on a palm tree during the preliminary reconnaissance enabled quick location of our new positions, and extension of control from there to our tree OPs and several islands to the flank was a simple matter.

From that time on the survey problem cleared up. We located a number of points in the target area and then a few airphotos began to filter down to the battalion, ones that we didn't have to return in a half-hour. We took a strip of these verticals (1:5,000), determined the overall scale of the carefully assembled strip mosaic, and proceeded to grid it with a 1,000-yard artillery grid, matching the coordinates of our surveyed firing chart. The photo interpreters usually marked enemy installations on these

photos—such things as bivouac areas, ammunition dumps, dual purpose guns, strong points, etc.—and locating these on our firing chart became merely a matter of reading the coordinates of the target on the photo and plotting it on the firing chart. Then, by registration on a check point (identifiable on photo), any number of accurate concentrations could be brought down on these targets by *K*-transfer, targets that could not be seen by our ground and sometimes even by our air observers.

We gridded the first set of photos by determining the scale (using known points), constructing a 1,000-yard grid at that scale on tracing paper, plotting in the control points on the overlay, and placing the paper on the photo so that the plotted points coincided with those on the photo. This oriented the grid, and it was transferred by pricking through the intersections on the photo and inking in the lines. Subsequent photos could be gridded by transferring the grid lines by inspection from the master set (picking out two identifiable points through which each line passed), or new targets could be transferred to the master (gridded) set of photos by inspection, and the coordinates so obtained.

Again we traced in the coastlines on our firing chart, based on the survey control points, and this gave us a dependable 1:20,000 map. Base angles were obtained by getting the difference between the surveyed (not measured) *Y*-azimuth of



the orienting line and the computed *Y*-azimuth from the guns to the base point (from coordinates).

As far as an accurate firing chart was concerned, then, we were well set up and could execute unobserved fires on point or area targets with good effect. Admittedly, vertical control was not complete, but some control was present and we filled in with the contour lines taken from the Hasty Terrain Map. Our missions, however, were assigned by coordinates taken from the photomap, using the JAN grid, so it was necessary to superimpose the JAN grid onto our photos and firing chart as best we could.

I say that we transferred the JAN grid lines from the uncontrolled mosaic to the surveyed chart as best we could. It was a rather trying affair, for when the grid was transferred to the single vertical photos line by line, by inspection, it became apparent that some sizeable errors had been made in the preparation of the mosaic and our grid squares sometimes became trapeziums with 400- to 600-yard sides, instead of 600-yard squares. In other words, the 600-yard squares shown on the photomap were not, in fact, 600-yard squares on the ground.

By compromise, we were able to line up the grids on features on the coastline common to photomap and firing chart, and we did a passable job of superimposing the grid in the target area onto the firing chart, lining it in with red ink. Trying to transfer the JAN grids from adjacent sheets of the photomap yielded only a hodgepodge of lines varying in both interval and direction. The *K* of the photomap was not constant in range or deflection. Wide-angle photos would have been welcome indeed, but we never did see any.

Then we ran into the problem of locating the front lines. The infantry had been attempting to locate themselves in the jungle by inspection on their lithographed copies of the photomap, and artillery forward observers were trying to do the same. While this was fairly simple to do when following along the coastline, it was an almost impossible feat back in the hills, even for a photo expert.

The artillery had been locating the front lines every day to its own satisfaction by plotting in the night protective barrages which their observers adjusted in every afternoon as a countermeasure against enemy infiltration after dark. Nevertheless, more tangible data was asked for and we were told to "survey in [i.e., by traverse] the front lines." So out we went.

Now I don't mind being shot at by enemy snipers in the jungle (though I can't say I particularly care for it, either) if I feel that the work is necessary. The snipers usually miss, anyway. But in this particular case I did not think that it was necessary and said so. Being an armchair efficiency expert, I thought that we could do the whole job sitting back at the CP, getting the coordinates of what infantry panels were displayed at the front lines on the daily photos by transferring those points to our gridded photos. But my plan must have sounded suspiciously easy, and furthermore the regiment we were to locate hadn't put out any panels for several days. Thus we soon set out on foot, reinforced by eight volunteer guards from HQ Btry, including a cook who was "tired of hanging around the kitchen."

We drew the regiment on the right flank as ours to locate, and they were well back in the jungle. We surveyed up the twisting peep trail for over a mile (28 legs), trying hard to disregard the "crack," "crack" of the snipers' rifles from the green foliage on

both sides. The phrase "aiming point this instrument" kept running through my mind as I watched the transit operator and the stadia man working, but I didn't feel it necessary to tell them so.

With half a mile still to go to reach the regimental CP, we ran into a road block that the Japs had just established. Several peep drivers and linemen tried to get through, but were ambushed and we were advised to wait until the situation cleared up ("No need to expose your men to danger"). The trail was cut off there for two days. Soon thereafter the lines moved rapidly ahead and the idea of locating this regiment by traverse was abandoned. Other more accessible regiments were located by traverse, however, but they soon outdistanced the survey in their rapid advance on the airfield.

I like the panel location method. By using it and informing the infantry commanders of the exact map location of their panels, they are in turn able to orient themselves on the map and they have a starting point to refer to as they move forward. And then on one series of photos is a picture of the entire front lines, from one end to the other. True, the method may be slow due to the lapse of a day in the receipt of the air photos, but that could be taken care of with faster photo service. In very dense jungle where there has been little artillery fire, it may be impossible to find clearings for the panels. In such a case other methods could be used.

For sheer simplicity and speed, front lines should be located by having forward observers adjust on a point at a specified distance ahead of them, *after* a check point registration (perhaps by another observer), and then plotting in the point fired on by using the adjusted range and deflection, less corrections. This method was widely used by direct support artillery.

If the terrain at the front is open enough or high enough to permit any kind of observation, the forward observers may locate themselves by resection from known points on the map. While results may be approximate if a prismatic compass is used instead of an aiming circle or BC scope, they should, nevertheless, be satisfactory.

Another possible method of locating front lines (which we did not use in this operation) would be to have the infantry send up pyrotechnics or even set off smoke pots on a prearranged time schedule, and locate these by simultaneous readings by an OL and an OR, much like a CI adjustment.

Traverse, then, in my opinion, is a poor way to locate front lines and should be used only as a last resort, especially when that traverse must be run any considerable distance over jungle terrain. If you have to do it, OK; but if you can think of an easier or a faster way to get the same results, don't traverse.

We attempted to furnish some forward observers with 1:5,000 photos of their sectors, to enable them to get a better picture of the ground and, when the photos were gridded, make it possible for them to report location of targets or their own location, by inspection. Once the jungle growth has been cleared away to some extent by artillery fire an observer can locate himself by inspection on a good photo, provided that it is a recent one (incessant artillery fire causes considerable changes in the appearance of wooded terrain on photos). Our efforts were only partially successful because of the difficulty in coordinating the procurement of sufficient copies of the photos, the gridding of them, and the placing of them in the hands of the forward observers. It is believed, however, that forward observers should be given priority on such photos, and every effort should be made to furnish them with *good* (large scale) photos.

The battalion continued to pour shells into the Jap lines from Roviana and gradually the spasmodic enemy bombing attacks slackened off and their erratic counterbattery fire ceased. On August 5th we watched the final assault on the Munda Airfield from a grandstand seat on Bibilo Hill; the tanks and infantry stormed the last Jap positions in the middle of the airfield while the souvenir hunters closed in on the wrecked Jap planes on the edge of the field. The show was over.

A few hours later I fulfilled a long-standing ambition of standing on our base point (the shattered concrete steps where Kokengolo Mission once stood). That was quite satisfactory. Then I walked around and looked at some Jap installations that we had been studying for so long on the air photos, and had fired at so often. That was fun, too. I was continually impressed by the extent to which the Japs were dug in, and realized all the more that near-direct-hits are required to put their AA guns out of commission or destroy their logged-over dugouts and ammunition dumps. They're no dummies.

So our job was finished for the time being, and we knocked off for a few days to write letters, go fishing, and make bracelets from Jap airplane aluminum which we had picked up on Munda. We even got to see a movie, complete with Spanish sub-titles. Now we'll probably have to go over and police up the battlefield, but we'll still be ready to put on another artillery demonstration for the Japs whenever we're called on.

Before closing I'd like to say a word about our survey instruments. The transit was found to be invaluable and was used almost exclusively in the target area survey, having the advantages of a strong power telescope (which enabled identification and location of distant and ill-defined points) as well as greater accuracy over the aiming circle. The aiming circle did come in very handy for measuring angles from the crotch of a tree where even a monkey could not set up a transit. The stereoscope and the illuminated magnifying glass were both worth their weight in gold in picking out surveyed points and targets on the airphotos. The range finder, on the other hand, was taken out of its case a few times, cleaned, and carefully put away again. If anyone wants a perfectly good range finder, notify the writer (and don't forget the signed memo receipt!).

In conclusion, I have a number of recommendations which I hope may be of some benefit to battalion survey officers who anticipate taking part in South Pacific Island amphibious operations:

1. *Trust your men.* You can't be with them all the time, so train them until you have absolute confidence in their work.

2. *Take a boat with you.* A large rubber boat with an outboard motor is preferable, but any kind is better than none at all.

3. *Get there early.* When the battalion moves, precede them. Then you can initiate survey operations and at the same time gain a knowledge of the position area which will greatly facilitate the debarkation of your battalion on a strange (to them) island.

4. *Yell for photos!* You've got to have them, and don't be afraid to say so! If they don't come to you, go after them!

5. *Grid the photos.* When you get them, grid them with your coordinate system and transfer all identifiable targets to the firing chart.

6. *Make your firing chart into a controlled map.* Build up the coast lines and islands around your surveyed control points, and be prepared to lay down defensive fires on beaches in any direction.

7. *Use the battery sections.* You can't do everything at the same time, by yourself. They want to work too, and they can build swell tree OPs while you're using the boat.

8. *Exchange information.* When you get something, send it out to the other battalions. They can use your answers and you can use theirs.

9. *Remember the front lines.* Locating the front lines will be one of your jobs, so keep it in mind when you plan your work.

10. *Give "Task Force Training."* Concentrate the training of your section to best prepare for the job ahead of you. All operations will be amphibious, so practice amphibious survey. Stress triangulation, work on air photos, and preparation of 1:20,000 grid sheet maps of shorelines and islands. Have your section practice reducing and blowing up maps to scale, and prepare in advance a number of 1:62,500 overlays of the area in which the operation will take place. These make handy orientation maps for the battalion officers on the ground. And keep working your men with photos. Give them photos to determine the scale of, reconstitute targets from, assemble, grid, and transfer grids from one to another. You'll seldom get enough photos, so make sure your men know how to make full use of the ones you do get.

11. *Win the colonel's confidence.* Convince the battalion commander that he can trust your work, and then go out and do a job for him. After the operation you'll know that you did your part, and feel that yours is the "best damned artillery in the U. S. Army."

When you come out here, remember that the Japs fear nothing more than our murderous artillery fire. The prisoners all agreed on this point. So give them plenty of it, and give it to them where it hurts most.



Heavy blasting by artillery is the only way to rub out Jap resistance for the sake of our advancing infantry. This gunner died with a Jap flag wrapped about his middle. His piece was a 37-mm infantry accompanying weapon.

ROUGH BUT READY SOUND RANGING

By Lt. Verne C. Kennedy, Jr., USMC

In the jungles of the South Pacific the need for an acceptable method of sound ranging in counterbattery work is very apparent. To be successful such a system must employ a minimum of special equipment, be simple, and require no special training.

Our regiment devised a simple and successful method based on the fact that the velocity of sound (unlike its apparent direction) is not affected by terrain, jungle, or—to an appreciable amount—wind. The only important factor is the effect of temperature, which is negligible in our work. (For the velocity of sound we use 380 yds/sec.)

This method of counterbattery location is based upon the physical law that sound originating at a point source sets up a circular wave that travels in all directions with equal velocity (see Diagram No. 1). If it were possible to locate three stations A, B, and C, equidistant from an enemy battery, the sound of the report would reach each station simultaneously. In all practical cases, however, three points will not be equidistant from the enemy battery (points X, Y, and Z in Diagram No. 1). The sound

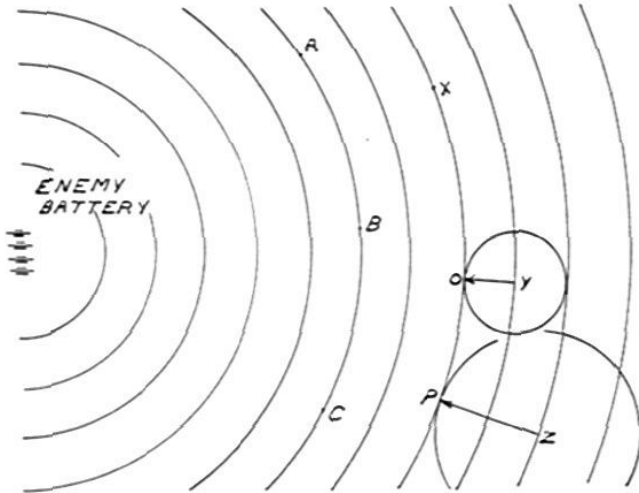


DIAGRAM NO. 1

reaches point X first, and then Y and Z, with a time lag equal to the difference in distance they are from the enemy battery—that is, distance YO and ZP. If a circle is described about Y with radius equal to YO and about Z with radius ZP, it can be seen that the circle with its center at the enemy battery passes through X and is tangent to the circles about Y and Z.

Various methods of construction could be used to find the circle passing through X and tangent to the circles about Y and Z, but far simplest is to use the template described below.

Two methods can be used to determine the distances YO and ZP. The first procedure is far less accurate than the second. In each case the counterbattery officer establishes the three stations where they can hear the enemy fire. They are then located on the map or photomap that will later be used for plotting.

The sound ranging method devised by this Marine outfit is peculiarly well adapted to use in jungle and island warfare, or in any situation where the enemy is using only a very limited number of pieces or batteries and our own observation facilities are limited. Under those circumstances it should yield quite satisfactory results regardless of the caliber of the weapon being located, but two limitations on its effectiveness must be borne in mind: (1) the roughness of resulting data, and (2) the difficulty of correlating the records from the same sound source.

Procedure 1

In the first method the three observers start their stop watches together, and move out to their stations with watches running. For an hour they watch their watches and record the time for each round they hear fired. At the end of this period the data is collected and the differences between the recorded times are averaged. These differences are converted to yards, giving the differences in distance to each station.

But in the course of an hour there is considerable error in the watches, and since the times are recorded without stopping the watches the results are inaccurate. This system is theoretically sound, but the method of determining time must be more accurate.

Procedure 2

It is apparent that it is necessary to start the watches for each round that is fired, and stop them when the observer hears the report. To accomplish this the second method is used. Each station is equipped with a radio, and a fourth station is established closer to the enemy battery than any of the base stations. Although this forward station is several thousand yards from the enemy battery and can not see its flash, the observer hears the report some time before it reaches the base stations. This gives him an opportunity to give a radio signal to all base stations simultaneously. At this signal the observers start their watches and stop them when they hear the report.

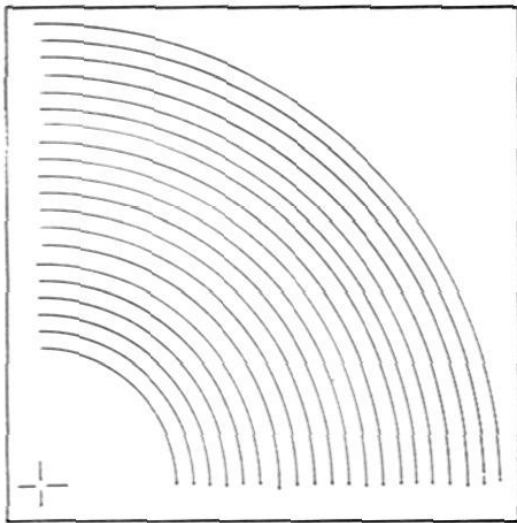
It must be emphasized that no limitations are placed on the forward station, other than it must be closer to the enemy battery than any base station. The forward station need not be located on the map, nor does this observer record any time.

As soon as each observer at the base station has noted the time lag from the radio signal to the sound of the gun firing, he reports by radio to a central station, which may be any of the base stations; each observer then resets his watch in preparation for the next round.

LOCATING SOUND SOURCE

The mechanism of locating the enemy battery on the map is the same with either method. The distances from the far stations (OY and PZ in the illustration) are determined by the difference in the recorded times of the stations multiplied by the velocity of sound. This information is then plotted on the map, giving a point at the closest station and two circles about the far stations. Again it is plain that the location of the forward station is not needed for this construction.

To facilitate determination of the tangent circle, a template can be made from a sheet of celluloid about a foot square. On this are scribed concentric circles about 1/10" apart (use a pair of dividers). These enable the operator to lay the template over the map and move it about until one circle is found that passes through the point and tangent to the two circles.



SOUND RANGING CIRCLE TEMPLATE

The center of this circle is the location of the enemy battery. For accurate results fine lines must be used, and careful work done throughout.

EXAMPLE

A battery is firing from the jungle. Three stations (R, S, and T in Diagram No. 2) are established a thousand yards or more behind our lines. These are located by map inspection or survey. A forward observer is established as close as possible to the enemy. He need not be accurately located, since all he will do is give a radio signal every time he hears a gun fire. Stations R, S, and T record the time lapse from the radio signal to the report of the gun, and report by radio to any one station. The following data is recorded:

R	S	T	(S minus R)	(T minus R)
2.3	5.4	3.9	3.1	1.6
2.5	—	4.2	—	1.7
2.7	5.7	4.1	3.0	1.4
2.2	5.3	—	3.1	—
2.5	5.7	4.0	3.2	1.5
2.3	5.2	3.9	2.9	1.6
2.7	5.8	4.1	3.1	1.4
			<u>618.4</u>	<u>69.2</u>
		Mean difference	3.1	1.5

$$3.1 \times 380 = 1178 \text{ yds.}$$

$$1.5 \times 380 = 570 \text{ yds.}$$

From this calculation it is determined that the distance SM (Diagram No. 2) is 1,178 yds., and TN is 570 yds. Circles with these radii are determined by the map scale and drawn around S and T. The celluloid template is then placed over the map and moved about until one circle (the broken line in the diagram) is found that passes through R and tangent to the circles about S and T. Now the location of the battery is pin-pricked through the center of the circle.

EFFECTIVENESS OF METHOD

This regiment tested this method as far as possible under varying conditions. We have used it through the jungle and over rough country, and (all too often) in the rain. Results have been reasonably accurate, consistently giving the location of the battery within 150 yds.—close enough for effect from counterbattery fire. The establishment of four to six observation

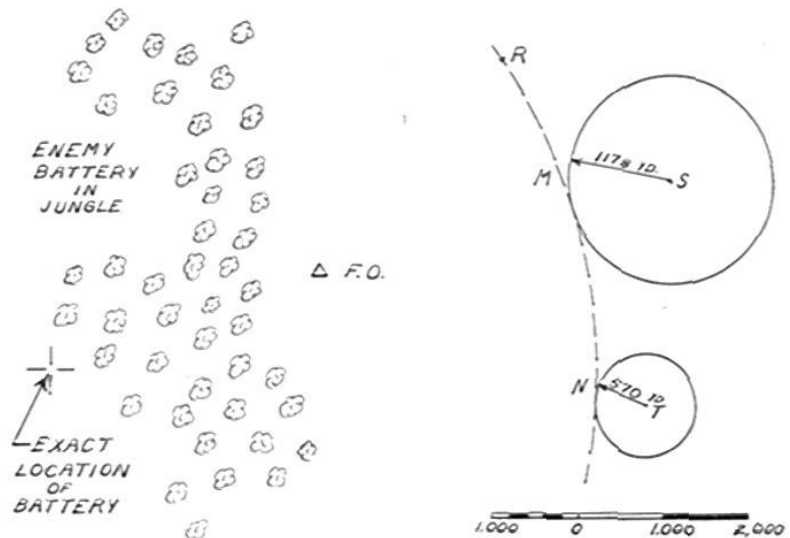


DIAGRAM NO. 2

stations instead of three will give more accurate data, if this is necessary.

There are several inherent difficulties in sound ranging. First, all stations must be within hearing range of the battery and they must be accurately located. Terrain, wind, and conflicting sound cause considerable difficulty in hearing the firing: in one case our base stations were only about 3,000 yds. from a firing battery, but in a deep wooded valley and the observers were unable to hear the firing. To aid in the selection of position each station should have an accurate map and locate its exact position by inspection. In rough terrain the best results were had by placing the base stations near the crest of hills, since the sound was much more distinct.

Our tests have been made with at most three batteries, all firing generally in the same area. More batteries over a greater area would cause some confusion, but this will be true for all methods of sound ranging.

It has been found that the base stations should be at least 1,000 yds. apart. Also, no two stations can be in line with the firing battery as this gives only two points from which to determine the location of the tangent circle.

This method is simple and direct and requires no special personnel. The total equipment needed is the scribed template, 3 stop watches, 4 radios, and a drafting compass.

There are many possible variations in the method of construction used to locate the battery firing. For example, the forward station may be assumed as one base station, and circles drawn about the other stations with radii equal to the time lag. This introduces some error due to the shorter base. An interesting point arises by plotting in this manner: it is not necessary to convert the differences in sound into yards. All that is necessary is that the radii of the circles be proportional to the time lag, but by converting to yards it is much easier to visualize the work.

This system is not yet completely developed and many changes can be made. Phones can be used in place of radio. If time and equipment are available more than three base stations may be used. In some cases it may be possible to locate a base station to the flank of the enemy battery, thereby greatly increasing the accuracy of the determination. As the entire system is based on the velocity of sound and the few factors which materially alter this velocity, it is limited only by the ingenuity of the operator.

ROUTES INTO EUROPE

A Study in Terrain

PART VIII — THE LOW COUNTRIES

By Col. Conrad H. Lanza

BELGIUM

Belgium has a sea frontier of only 42 miles. All of this is low, bordered by either sand dunes or dikes; both form obstacles having military value. Beaches are excellent, with smooth and gentle slopes. Landing craft can debark troops and materiel anywhere.

Back of the coast the country is flat. At the western tip, near Veurne (Furnes), it is as much as 7 feet below sea level. As far as the Meuse River the land gradually rises toward the interior by a fairly constant and gradual inclination. Beyond, it rises rapidly to form the rough Ardennes region of the southeast. All important rivers and their tributaries flow northeast; in order from the sea these include the Lys and the Escaut (or Scheldt) which join near Ghent, and the Sambre and Meuse, which join near Namur.

Belgium is very densely populated, but not evenly so. The people are divided into two races, each with distinct languages and ideals and inhabiting separate districts. If a line be drawn from the north edge of Courtrai in western Belgium to the north edge of Liege in the east, it will divide the country into the north or Flemish section and the south or Walloon section. One exception is that Bruxelles (Brussels), which lies slightly north of the line, has a large Walloon population.

The Walloons inhabit the higher part of Belgium, including the hilly country. In this area the soil is relatively poor and the density of population consequently less. The Flemings occupy a low and very fertile area and have a higher density of population. They outnumber the Walloons in a proportion of about 5 to 4, which proportion is slowly increasing. Both races have highly industrialized cities.

Walloons are of a taller and heavier race than the Flemings, and have a longer average length of life. A Latin people, they speak French or some dialect thereof. The Flemings, Teutonic origin, speak a variety of Dutch. The two races, although joined into one nation, by no means always agree. They have certain antagonistic interests. Both Walloons and Flemings are conservative, law abiding, honest, and hard-working people. The official language is French. For military purposes a knowledge of this language will suffice, as it is understood everywhere.

Belgium is crossed in all directions by excellent and extensive systems of hard surfaced roads and good railroads. Military forces of any size can readily be supplied over existing lines of communication. This is one reason why Belgium has been invaded so often. All that part of Belgium north of the dividing line indicated above is open to military maneuvers and to rapid movements across country. For ages it has been the main invasion route between north France and Germany, having been so used in both directions.

Belgium south of the dividing line has (until the current war) been an invasion route for but minor forces. Although it was supposed to be an impracticable route for main armies, the Germans in 1940 demonstrated that very large forces could cross the Ardennes and invade France south of the dividing

line. So it would be practicable to do this again, going in the opposite direction in an invasion of Germany.

THE COAST

Starting north from the French frontier, sand dunes line wonderful beaches for 8 miles to Nieuport. The dunes have an average depth of about a mile and a maximum of 1½ miles. In some sectors they are 100 feet high and often reach 70 feet. They form a serious obstacle for motor vehicles. Nieuport is a resort town, with a very fine beach which extends far from shore at low tide. The sand is often soft, and for that reason not very suitable for driving vehicles over it. The town is covered by a thick dike about a mile long, the top of which is the local boardwalk. It will be impracticable for vehicles to cross it, until passageways have been opened. There is a small port, which would probably be found blocked by the enemy; after clearing it would be suitable for landing-craft or small vessels.

From Nieuport there is a good to excellent road parallel to the sea, either along the beach or not far from it. For the first mile this extends through the sand dunes to Westende, the first of several small resorts on the 8-mile stretch to Ostende. Each town is covered by a dike, which in each case is the local center of social activity as its top forms the boardwalk. The land side is lined by hotels, restaurants, and the usual seashore establishments.

These dikes are very solid and are important obstacles. That at Ostende, which is about 2 miles long, is made of enormous stone blocks and is 30 feet high and 100 feet thick. Even at the smaller towns the width seldom falls below 60 feet. In normal times flights of steps lead from the boardwalks down to the beaches; it is to be presumed that the enemy has, or will, destroy these. All these dikes afford the enemy protection for defense installations built in rear of them.

Ostende is one of the most widely known sea resorts in Europe. Its entire sea front is lined with first class hotels, with usual accessory buildings. The enemy is reported to have destroyed those not capable of being converted into centers of resistance. Where not destroyed, openings between buildings have been walled up, as have doors and windows in defended structures. Where the forward line of buildings has been destroyed, as not capable of being defended, a similar line of connected walled-up buildings parallel to the beach has been formed on an interior street. Where necessary the foreground has been razed to afford a good field of fire. The beaches in front of the dikes are covered by mortar fire from batteries in rear which are well sheltered against attacking artillery. Wire is plentifully used over all water fronts.

Ostende has a good port which can handle small and medium transports. As soon as this is cleared and opened it would be suitable as a base. It is not large enough to supply very large forces, but would be a valuable auxiliary.

Continuing up the coast, dunes are found for 7 more miles. Here they have an average width of only ¼ mile and a maximum

of ½ mile, and are consequently much less of an obstacle than those on the other side of Ostende. As it would be difficult to get combat vehicles off beaches in front of the dikes, the narrow dunes indicate a preferable sector for invasions.

Eight miles from Ostende is Wenduyn-sur-mer, covered by the usual dike. At this point jetties normal to the shore project into the ocean as part of a sand control program, at intervals as close to each other as 200 meters; they form potential landing points and extend the remaining way up to Zeebrugge. At Wenduyn the dike is 2 miles long and 65 feet thick and, as already described for Ostende, has been prepared for defense. There is also a pier 1,000 feet long; built for resort and amusement purposes, it could be converted to aid in debarking troops and supplies, if not totally destroyed beforehand. Zeebrugge, an artificial port, is suitable for a base after necessary reconditioning. Large transports can use this harbor and its two piers. The southern one, after extending out into the sea for ¼ mile, curves northward to form a quarter circle 9,000 feet long over all. The north pier is perpendicular to the shore. Both piers are massively constructed, and the south one is strongly fortified: its outer end has a concrete wall 30 feet high behind which are the customary harbor utilities, but they also contain batteries which fire across the entrance to the harbor or into the harbor.

In 1918 the enemy installed for the defense of this town, on a 2,000-meter front, 189 guns of 6" to 15" caliber and 89 more of lesser size, exclusive of machine guns and small mortars. There is no information as to his detailed strength in this sector at this time. In an attack by the British on Zeebrugge in 1918, a cruiser successfully came alongside the outer end of the south pier; Marines were able to land, but could not maintain themselves. Ships steamed into the port and sank themselves in an effort to block the channel to what was, and still is, a submarine base. This was only partially successful, as the enemy artillery fire was so heavy as to make it impracticable to sink the ships exactly at the selected points.

A ship canal available for all but very large ships extends inland from Zeebrugge to Brugge (Bruges), 8 miles away. A second canal to the north of the ship canal extends in an easterly direction parallel to the Dutch boundary; this can be used by barges and small vessels. Counting all facilities, Zeebrugge is an important port and would make a good base.

Across the canals from Zeebrugge is Heyst, practically a suburb of Zeebrugge and like it covered by a dike which extends along the beach for about a mile. Thereafter the sand dunes run for 6 miles to Holland; they average about a mile in width. There is one small town in the center of this strip—Knocke-sur-mer.

The entire coast is strongly fortified. Dikes, on account of their great thickness, afford excellent cover for supports and

weapons close to the beach. There are reported to be a very large number of big guns (intended to keep ships far off), with smaller guns to fire on barges. Beaches are covered by medium artillery, machine guns, and mortars.

Not all the dunes are bare of vegetation. Many have been planted over with trees or grasses, with a view to stabilizing them in place. Parallel to the coast is a canal, at a distance of one to two miles from the beach. This is an antitank obstacle which will prevent any immediate dash of combat vehicles into the interior until crossings can be effected and protected.



Beach, dyke, and Kursaal at Ostende

Canals or canalized rivers extend inland from Zeebrugge, Ostende, and Nieuport; they divide the coast into sectors, and can not be crossed until proper arrangements have been made. The dunes afford opportunities for camouflage, available to any party holding them.

In 1918 the Germans depended upon railroad artillery to furnish much of the fire support for this sector. There is no information as to this practice at this date.

It seems more probable

that motorized artillery will be used rather than batteries on the railroads, as they have greater mobility and their emplacements are more easily found.

In rear of the coast are a great number of villages, detached stone houses, small woods, orchards, etc., all capable of becoming centers of resistance and camouflaging defense installations. Canals are common, and have been arranged to serve as antitank obstacles.

The enemy is in a position to move troops about in this area rapidly. Latest reports indicate that the coast is only lightly held by maintenance forces and coast guards; the latter are strong enough to meet hostile Commando parties or raids. The sea is patrolled by light naval forces, and by air; these are expected to signal the approach of an invasion force at least an hour before it can debark. German light naval forces occasionally go out as far as the English coast, and planes reconnoiter this area daily. From these security measures the Germans expect, under unfavorable circumstances, to have at least one hour's warning of the approach of an invasion force; under favorable circumstances several hours' notice might be had.

The number of German divisions immediately adjacent to the Belgian coast is not known. This force is part of the same command that defends north France. Divisions are shifted to meet what are believed to be authentic leads as to impending Allied attacks. It may be assumed that at least 5 infantry divisions and at least 1 Panzer division will be found on or near the Belgian coast at all times, in addition to the forces garrisoning the fixed coast defenses.

An invasion force could from the beginning have ample

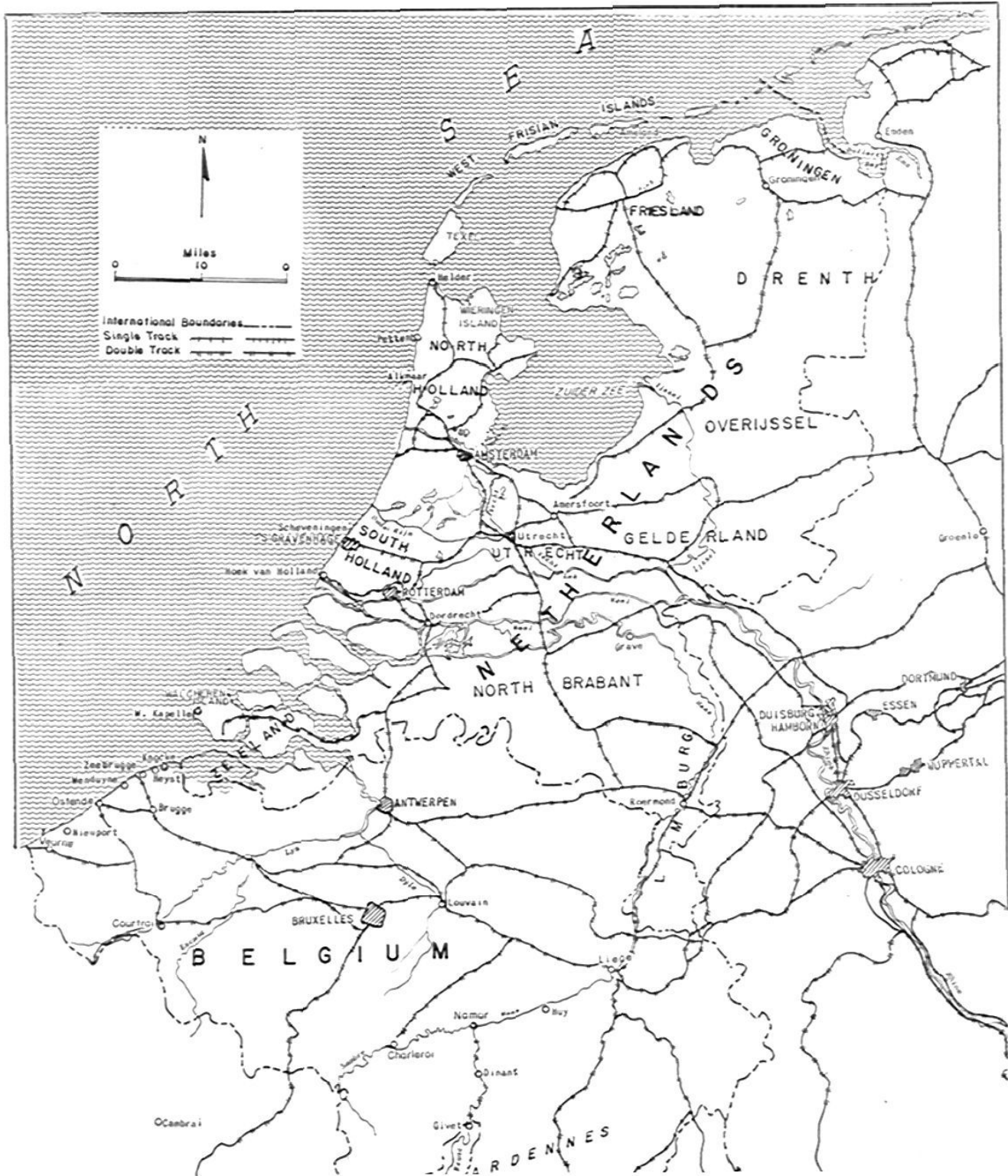
overhead cover based on airfields in England. It could continue to use such fields for operations anywhere in Belgium, no part of which is over 250 miles from England. During the winter season (through the months of October to March) drizzly winds and mists are normal. These are accompanied by low clouds which interfere with air reconnaissance and bombing. While this affects both sides, it will deprive an invasion of as efficient an air support as could be had during the better season.

FORTIFIED BELGIAN AREAS

From an invasion standpoint, the most important is Antwerpen (Antwerp or Anvers). Belgium's fortification of the

area around this city was primarily a precaution against a German invasion. It was intended to afford a refuge for the Belgian army at a place where it could receive reinforcements by sea, specifically from England. The original defense was mainly limited to a land attack from the south and east; later it was extended to include all-around defense.

Two lines of forts were constructed, at intervals of from 1 to 2 kilometers from each other. The inner line was about 6 miles out from the center of the city. The second, which is a more modern line, is about 15 miles out; it had not been completed in 1939. These forts were steel cupolas, containing heavy guns which fired over the surrounding flat country, part



of which can be inundated. About 100 years ago, during a war between Holland and Belgium, Dutch gunboats sailed over the inundated areas and were thereby able to secure artillery fire superiority over the Belgians. To prevent this happening again, the areas subject to flooding have dikes across them to prevent navigation.

Antwerpen lies astride of the Escaut River, a bridgehead on both sides of the stream. From behind its fortifications, a hostile force holding Antwerpen could launch attacks on an invasion landing anywhere on the Belgian coast, or on either side of the Escaut. It would not be safe to pass this fortress and advance inland into the heart of Belgium, unless this city was covered against an attack issuing from it. The best way to do this would be to capture it—it would then be available as a base. One of the great ports of the world, it is suitable in every way for a major base.

Liège is a fortress of the same type as Antwerpen, having a ring of forts about the city some 6 or 7 miles from it. The mission of this center of resistance was to block an invasion of Belgium from the direction of Germany by closing the space between the rough Ardennes country to the south and the boundary of Belgium on the north—both being less than 10 miles away and within range of the guns of the defense. A secondary mission was to deny to an invader from Germany the use of the important roads and railroads which pass through Liège. In 1914 the fortress accomplished its mission for an appreciable time. In 1940 the enemy went through the Ardennes, which were not so impracticable as had been supposed, and passed around the north end by violating the neutrality of Holland.

Another but smaller fortress exists around Namur, with the object of barring an important crossing of the Meuse River. Minor fortresses are at Huy and Dinant and near Givet, which together with Namur and Liège form a belt along the Meuse River which has been thoroughly fortified by the enemy and comprises one of his major defense lines. It extends southward into France and is reported to be completely equipped with a multitude of small posts, none individually important but so arranged as to block efforts to penetrate the zone they cover. Minimum depth of the zone is 10 miles, the maximum 30 miles. The small posts are supposed to break up invasion forces and afford opportunities for armored troops to counterattack under favorable circumstances.

An advance defensive line extends along the Sambre River, with a fortified center around Charleroi. The territory between the Sambre and the Meuse is hilly and rough and affords possibilities for good defensive positions.

In both 1914 and 1940 the elaborate fortifications of Antwerpen and Liège were rather rapidly reduced—much more rapidly in 1940. In each case selected forts were reduced; troops then advanced into the interior of the fortress, resulting in its then early fall. In 1914 the forts were taken primarily by use of heavy artillery, particularly 12" mortars using precision fire. The shells broke the steel roofs of cupolas and demolished the concrete roofs of the shelters.

Improved types of overhead cover were provided for 1940, when the Germans used a different technique. One method was to emplace at night high velocity guns of about 6" caliber at not over 1,000 meters from the fort. Rapid fire was then directed against the gun ports. At this short range the dispersion was so small that almost every round was a hit, and the guns of the forts quickly became unusable. It was then possible for foot troops to approach the fort and attack its entrances.

Another method was to send forward a small patrol, sometimes just one man, under cover of smoke or fire. The patrol would climb onto the roof and opposite gun ports let down TNT charges which would destroy them. In other cases the TNT charge was detonated at the ground level; air inlets would then be destroyed and the fort would have to capitulate.

A prior knowledge and study of the fort to be attacked is required. From this a decision is made as to the method of attack to be employed. Then the right kind of troops and equipment are made ready at the right time and place.

As the Germans have been leaders in modern methods of reducing forts heretofore supposed to be of a permanent type, it is to be expected that the Belgian type of concrete fort (with deep underground shelter from which cupolas and turrets protrude to fire over the surrounding country) will be abandoned. In their place will be something else. It is quite possible that Antwerpen and Liège are now defended by the defensive zone system already mentioned which affords no key point the loss of which would mean the fall of an entire area.

Experiences of the present war indicate that the passive defense of a fortress does not succeed and will cause but limited delays. Real defense resorts to the tactical offensive. This requires that besieging troops be constantly attacked by sorties from the area under siege or from outside areas, with a view to disrupting the enemy's preparations and preventing him from closing in on the fortress. A fortress should be but an accessory to field troops.

Antwerpen and Liège should be considered in this light. They are centers of resistance capable of defending themselves for short periods and from which (or near which) violent enemy attacks may be launched against invasion forces.

AN ADVANCE INTO THE INTERIOR

A small scale landing in Belgium is not likely to succeed against the preparations the enemy has made. A large invasion would cover all of the Belgian coast, which would require a minimum of about 10 divisions in the first line. Or it might cover part or all of the coast, in conjunction with an invasion of adjacent northern France.

The mission of an invasion by the Allies has been announced officially to be the liberation of enemy occupied territories and to march on Berlin. Both these tasks require an advance throughout Belgium.

After a beachhead has been secured, the next move would naturally be to advance to the line of the Lys and Escaut (Scheldt) Rivers, about 40 miles inland. The intervening country (with one exception) is flat and densely cultivated and peopled. The exception is the southeast sector, where there are low hills. At first these would not seem to offer any special difficulty to an attacker. But they include the area around Ypres, and during the first World War these same hills, with surrounding mines and mine dumps, turned out to be excellent sites for defensive positions.

The next line beyond the Lys—Escaut would be a modification brought about by advancing the south wing across the Lys and occupying the triangle between that river and the Escaut. The entire line would then be along the Escaut.

The course which an invasion beyond the Escaut might take can not be predicted, as there are too many unknown or uncertain factors—particularly as to whether the invasion of Belgium was the main invasion or just the left flank of an

invasion further south in France. An invasion of Belgium alone does not have a front wide enough to promise success for continuing onward into Germany. An invasion of France would be required, and this might take several forms. Ultimately a line would be established continuing any held in Belgium.

An invasion in France which advanced beyond Cambrai would probably force the enemy to retire in Belgium to in rear of the Meuse River, and no heavy fighting might be necessary in this sector. In this case the enemy might hold the line Antwerpen—Dyle River—Louvain—Namur—Meuse River. The weakest section of this position is the flat, open country between Louvain and Namur. This is 45 miles wide, and could be made 60 miles by extending north of Louvain along the Dyle. This sector is suitable for use of armored troops. It is an ancient route for invasion armies, and has been so used in both directions from time immemorial.

If this gap is forced and regardless of whether Antwerpen has been taken or not, a further advance is possible to the line of the Meuse River as far as its junction with the Rhine in Holland. An offensive operation through the gap can be supported over a thick net of excellent roads and railroads. This will bring the advance up against the enemy's major interior defense line.

Breaking of this line will be strenuously contested. The attack may be made either in Belgium or in France, and it is impracticable to foresee how this could best be done. Liège and Namur are anchor points on this line, where the enemy has fortified bridgeheads straddling the Meuse River which are large enough to enable counterattacks to be delivered from them in any direction on either side of the river.

South of Liège the Meuse runs through a rather narrow valley with bluffs about 200 feet high. If not under fire the river can be bridged easily, and approaches down from the highland could be made at many points. The use of parachute and air-borne troops to secure temporary bridgeheads covering the construction of a river crossing for combat vehicles is indicated. While a hard task, it should not be a too difficult one.

COMMENTS

An invasion of Belgium will facilitate one in north France, of which it would be the left wing. Clearing the Belgian coast and securing for use the ports of Antwerpen, Zeebrugge, and Ostende would materially aid an invasion of Germany based primarily on France. After passing Antwerpen the north flank would be covered by the Rhine River in Holland as far as its junction with the Meuse. As the Rhine is a difficult obstacle to cross against opposition, it could be watched by minor forces. It is very doubtful that the enemy would try to attack across it, but if he does there should be sufficient time to assemble necessary forces for appropriate counter-measures.

HOLLAND

GENERAL

Certain topographical features differentiate Holland from other countries. It is mostly low and flat, and traversed in every direction by an extraordinary number of canals and dikes. The roads are on tops of dikes, and higher than the surrounding fields. Consequently movements for vehicles off roads is limited as to possibilities, and is often quite impracticable. Cities and towns are equally cut up by canals. Most of the canals are navigable and not fordable. They are crossed by a vast number of drawbridges. The people generally live in solidly built cities. Country homes with gardens, so common in

some regions, are found in Holland to a limited extent only, near the largest cities.

Hills are scarce. On the coast sand dunes rise to over 100 feet, but elsewhere there are no hills at all except in the east and southeast sectors. In the latter district they rise to slightly over 1,000 feet; nowhere else do they exceed 200 feet.

The provinces of North and South Holland, the west half of Utrecht, the northwest part of Brabant, and all of Zeeland (less a small strip along the Belgian border), which together form about 25% of the state, are from 1 to 7 feet below sea level. To keep the sea and the numerous rivers and canals from overflowing the land, an extensive system of dikes has been constructed. Their tops are broad and form the roads, which usually have borders of trees. They have widths up to 300 feet, and an elevation above sea-level of from 10 to 25 feet.

The Dutch canal system is exceptionally complete. There is hardly any place in the low areas which does not have a canal. Many canals are available for ocean-going ships, which are found far inland.

The two northeast provinces of Friesland and Groningen have an elevation of about plus 3 feet. As this is not much, dikes are necessary to protect against high tides.

In all the above-mentioned provinces are a vast number of polders, which are fields surrounded by dikes and provided with irrigation and drainage. Polders are areas reclaimed from the sea or from swamps, and are of extraordinary fertility. Being below sea level, they are dependent upon pumps to prevent flooding after rains or from irrigation water. Pumps habitually were worked by windmills—of which there are an extraordinary number, forming one of the peculiar characteristics of Holland. At this time many windmills have been replaced by steam pumps. The windmills remain, however, and are used for many purposes—grinding grain, sawing wood, etc.

On account of the low elevation of the country, the ground water is usually just below the surface and will flood any trenches dug in the soil. If the pumps are stopped due to employees' becoming refugees, flooding of the polders is to be expected. The irrigation and drainage ditches in the polder country are often bordered with growths of stunted willows, which form additional obstacles to cross-country movements.

Much of the territory can be flooded by opening gates in sea, river, and canal dikes. This was supposed to cause impassable obstacles. The experiences of 1940 did not bear this out. On that occasion it was found that the water was not deep enough in most places to prevent foot troops from passing. In others it took too long to accomplish the designed flooding, and the enemy passed before it was completed. Taking into consideration that cross-country movements for vehicles are impracticable in any case, the flooding of fields will in most cases not materially affect the military situation.

Military operations in Holland have always centered around cities. It was so in 1940, and probably will be in the future. The cities are the important road, railroad, and canal junctions, and centers of activity. At them are the bridges over large streams. Nearly every one of the cities was originally fortified; for its size, Holland has had more defended places than any other country. The more important ones were constructed or designed by Lieut. Gen. Coehorn, inventor of the Coehorn mortar used in our service; others are copies of his designs. His system lies in employing an extreme number of salients adapted to the terrain and having no special geometrical figure. For low lying lands this type of trace is suitable to this day, as affording minimum targets for hostile

artillery to range on. The original works are now obsolete, though, and many have been removed or have been incorporated into expanding towns.

The east part of Holland is sand and gravel, is above sea level, and has numerous patches of heather and small woods. Low hills less than 200 feet high are found. There are swamps and marshes along the German boundary, extending south from the Dollart as far as Groenlo, and also on the west side of the Maas from Grave south to the vicinity of Roermond. These are obstacles and, outside of the rivers, the only natural ones in Holland.

All rivers have their origin in other countries, and all empty into the North Sea. The main ones are the Scheldt (Escaut), the Maas (Meuse), and the Waal (Rhine). All enter Holland from the south, and all make a left turn to the west. Their principal mouths are interconnected to form a single intricate system of waterways at the southwest corner of the state. The Waal has two branches—the Ijssel and the Vecht—which turn off northward from the main stream and empty into the Zuider Zee. The foregoing rivers are navigable.

Holland's most important river bridge is the Moerdyk railroad bridge over the Waal, south of Dordrecht (sometimes called Dordt). In 1940 the German invaders seized this bridge with parachute troops, supplemented by additional forces who descended the Waal hidden in freight boats. The Moerdyk bridge has fourteen 100-meter spans and is the only bridge between the sea (40 miles to the west) and a point 20 miles to the east.

The provinces of Overijssel, Gelderland, Limburg, the central part of Brabant, and part of Utrecht are all above sea level, so cross-country movements are practicable therein. The country is rolling, with an average elevation of about 75 feet. Except in Limburg no part exceeds 200 feet in elevation. In the latter province are hills up to 1,000 feet high and containing coal mines. This is the only mineral area in Holland.

Excellent roads and railroads extend everywhere through Holland, and with the innumerable navigable canals the problem of supply should be easy for troops within the country.

THE DUTCH COAST

The coast forms two wide curves, the southern are extending into the land and the northern one into the sea. The entire coast is bounded by sand dunes, with excellent beaches which descend very gradually into the sea. It is possible for landing craft to beach at almost any point.

The south and north ends consist of series of islands. These do not affect the dunes, which continue all along. The dunes vary in width from $\frac{1}{4}$ mile to $2\frac{1}{2}$ miles and in height from a few feet to nearly 200; they average about 30 to 35 feet high. On the sea side the slope is usually very steep, sometimes nearly vertical (supposedly the result of wind and sea erosion)—in any case an obstacle to motor vehicles. A large number of the dunes are partially or completely planted with long grass or trees. On the inner side fresh-water springs are common; these lead to occasional marshes in low spaces between dunes. This sand coast divides itself into three sections: southwest, or estuary area; central area; and north (or Frisian Island) area.

THE ESTUARY AREA

An invasion of Holland south of the Scheldt (Escaut in Belgium and France) is practicable, or useful, only in connection with an invasion of Belgium. An invasion south of the mouth of

the Scheldt is blocked by the fortress of Antwerpen, which prevents land access to or from this part of Holland, except through Belgium. As the reduction of Antwerpen has been discussed previously, it will not be repeated here.

An invasion of Walcheren Island was attempted by the British during the early Napoleonic wars, and ended disastrously. This island is connected with the mainland by dikes over which a railroad runs. On the sea front the dunes have been replaced by the Westkapelle dike, one of the most massive in the world. Its length is about 4,000 yards, with a sea slope of 100 yards covered with large rocks. It is unsuitable for landings. The top is 40 feet wide and has a narrow gauge railroad for maintenance purposes.

Walcheren Island might be useful if a siege of Antwerpen becomes necessary. It will afford a site for batteries for operations against the north side of that city and a base for supplying troops engaged in the investment.

The remaining islands of the estuaries would be useful only as steps to the reduction of the great port of Rotterdam, if direct operations on the mainland require assistance. The islands are in character the same as has been already described for the low part of Holland, of which they form a part. An expedition against these islands would be justified only under exceptional circumstances, and for special operations.

THE CENTRAL AREA

This is a 75-mile stretch of coast extending from the Hock van Holland to Helder. The south 20 miles as far as the Oude Rijn River is the sector for an invasion whose objective would be Utrecht, 35 miles inland and considered as the military key to Holland. Were it captured, the enemy would probably find it necessary to evacuate all of the Dutch coast region in this area.

At the center of this coastal strip is the capital city of 's Gravenhage (The Hague). Through its suburb Scheveningen it reaches the sea via city streets, so here an invasion force would have no sand dunes to cross. Combat vehicles could be diverted to both right and left in rear of the dune zone, which on both sides is about two miles wide.

Back of the dunes, north and south of 's Gravenhage there are an extraordinary number of canals and dikes, which make this very difficult country for military operations. An advance through 's Gravenhage is indicated as the most promising method of advance. This would involve street fighting for which troops should be properly equipped, using lighter artillery and medium and heavy tanks. Once captured, operations could then be directed against enemy forces to the north or south, and to attacks against other cities. Pack troops and supply trains might be useful. Parachute troops dropped in rear of designated enemy positions would often be of value.

The enemy has fortified the sea approach to 's Gravenhage, as has already been described for coast cities in Belgium, by lines of defenses through the city and parallel to the sea. Other cities back of the coast have been prepared for defense, as they are almost certain to be the focal points of military operations. The strength of the enemy garrison normally present is unknown. It forms a part of the same command which defends Belgium and North France, with a total force varying from time to time between 30 and 40 divisions. The distribution of divisions changes in accordance with estimates as to where the invasion is likely to land.

Rotterdam, one of the great ports of this part of the world, lies in this sector. It has water communication into the interior by means of the Waal (Rhine) and Maas (Meuse) Rivers. It would therefore be of value to the Allies for supply purposes as soon as the invasion front reaches the line of the Meuse River.

North of the Oude Rijn it is 35 miles up the coast to opposite Alkmaar. At the north end of this stretch is the great dike extending from Petten to Camperduin (Camperdown of naval history). It is some 6,000 yards long and by reason of heavy rock slopes is unsuitable for landings. With this exception all of the remainder of this sector is open to invasion parties, landing on good beaches opposite sand dunes. The dunes run to well over a hundred feet in height.

An invasion of this sector would presumably be directed against the line Amsterdam—Utrecht, which if reached would probably result in the enemy's evacuating all the rest of the west central sector. Unlike the territory south of the Oude Rijn, that north of this river contains a number of lakes and a greater number of deep canals parallel to the sea. These additional water features would be an aid to the defense.

From Alkmaar south to the estuary region, there are a railroad and good roads parallel to the coast and within 5 miles of it by which the enemy can readily move heavy weapons laterally to threatened sectors.

North from Alkmaar the coast extends 20 miles to Helder. All of this is suitable for landings, but not the north end bordering the Marsdiep (entrance from the North Sea into the Zuider Zee); a sea wall, this is not suitable for landing. This sector does not have any important objectives. It used to be a peninsula, with its base at the south end. In this direction access to the erstwhile peninsula is through Amsterdam, seizure of which would automatically have cut off the territory towards Helder. In recent years the north end of the peninsula has been connected to the mainland by an enormous dike which, starting from east of Helder, connects with Wieringen Island and then continues on across the mouth of the Zuider Zee to near Makkum in Friesland Province. This has a road and a railroad over it, which presumably might be cut by bombing. This dike enables the enemy to reach Alkmaar from the north, provided he can maintain his line of communication over the dike.

An invasion between Alkmaar and Helder would be useful only in connection with a major one to the south directed toward Amsterdam. If an attack on this city fails to progress an extension of the front to the north would lead to an envelopment of Amsterdam from that direction and thus aid the main attack.

All cities in the coastal area are reported as prepared for defense. Street fighting is to be expected as normal.

THE NORTH (OR FRISIAN ISLAND) AREA

The value of these islands lies mostly in their ability to furnish possible landing fields. They might be very useful after an invasion of Holland (or of northwest Germany) had been initiated. There are no difficulties about landing, which is practicable on all islands. The center island, Ameland, is connected with the mainland by a dike.

An invasion of the provinces of Friesland and Groningen, by passing through the intervals between the Frisian Islands, is not promising. The water inside the islands is so shallow that invasion vessels would be largely confined to channels, where they would be open to attack by artillery fire, mines, and bombing.

At the east end of the chain the islands are only 5 miles

offshore and so within easy artillery range. Their distance from the mainland increases toward the west, the end island (Texel) being over 20 miles from the mainland east of the Zuider Zee and comparatively safe from artillery fire from this direction; it is only 4 miles from Helder on the west side of Zuider Zee. All the islands are populated and cultivated. They are also summer bathing resorts.

OPERATIONS IN THE INTERIOR OF HOLLAND

An attack south of the Maas River must be based on Belgium, and consequently would follow an Allied invasion reaching the line Antwerpen—Liège. This area constitutes North Brabant Province. Its eastern part, which is within the bend of the Maas, is swampy and hence not a suitable route for the invasion of Germany. A force from Belgium would probably not have its left further north than Roermond. An Allied advance to this vicinity would probably result in the enemy's abandoning Holland south of the Maas without contest.

A major Allied invasion north of the Waal, after it reaches the vicinity of Utrecht, would continue to be resisted. In this flat country there is no natural line where the enemy can be expected to make his main stand. The narrowest front possible would be just east from Amersfoort, where the distance between the Zuider Zee on the north and the Waal River on the south is only 25 miles. Any line further to the east will be longer.

The line of the Ijssel River would be 50 to 60 miles long. This was supposed to be the Dutch main line of resistance against an invasion coming from Germany. It is not a particularly good line of defense, but is as good as any in this region and the last short line the Germans would have.

A possible line of resistance extends southward from the Dollart, at first following the Ems River. This river is swampy on both banks and is a good obstacle to an invasion. South of the swamps is an 80-mile space opposite the east Dutch border in which there is no obstacle to an advance. When the Allies reach this line they will be in Germany.

COMMENTS

The best sector for an invasion of Holland is that between the Waal and the Oude Rijn, then east through Utrecht, clearing out en route the ports of Rotterdam and Amsterdam. Such an invasion should be in conjunction with an invasion of Belgium and north France, and in this case would have a good chance of success.

The distance from the nearest English ports to Holland is about 110 miles, as against 25 to 80 across the better part of the English Channel from England to France. Opposite Holland the enemy would have more time for (and a better chance of) discovering the approach of an invasion fleet. It would therefore be more liable to air attack en route. If several invasion forces leave England at the same time, until they land the enemy would be unable to tell which if any were feints. Until the landings were actually made the enemy would have only a very general idea of their relative strengths.

It is improbable that the enemy would commit his reserves until he had a fair idea of the composition and the probable mission of several invasions. Troops landing would on the first day meet only local garrisons and their immediate supports, and should be able to establish themselves on shore. The difficult part will come after the enemy's reserves are engaged. The one invasion experience had at Dieppe is not a guide. On that occasion there was no other invasion force, and enemy reserves on the ground and in the air could be sent at once toward the Dieppe area. In a major invasion, with strong forces landing simultaneously in several sectors, there will be some delay before the enemy's main forces intervene, during which interval he will seek identifications and other information.

All necessary air support for military operations in Holland can be furnished from air fields in England. Fields in Holland will be useful later, but are not essential.

Field Artillery Chaplain

By Chaplain Evans T. Moseley

Everyone knows that a chaplain's duties are substantially the same wherever he works in the Army, so you probably didn't know that there is such a thing as an "Artillery Chaplain." That's because you may never have talked with your chaplain about his assignment. It's a safe bet that he takes real pride in serving with you. I suppose that by the same token there are Infantry Chaplains, Engineer Chaplains, Service Command Chaplains, and all the rest, but your chaplain is definitely "artillery" and he'd like for you to think of him as such.

Wherever you find him he "asked for it," because entering the Chaplain Corps was a matter of his own choice. For that reason he probably isn't hunting pity or seeking special privileges and consideration when he talks with you about his work in your command. He is approved by his religious denomination in the job he holds, and is commissioned by both his church and his country to go along with you to war.

He knows that providing religious opportunities for soldiers is a command function and that he is on hand to help you get the job done. He knows that his Commanding Officer is running an Army and not a church. But he also knows that his position with you is justified by the history and experience of the American Army. Withal he'll probably draw his full pay and allowances from the nearest finance officer at the end of the month whether he conducts one service for you or a hundred.

POST

Garrison duty will find your chaplain with a definite place for services. Perhaps he will share a chapel with other chaplains where he will have his office, but the chapel may not always be the best place for this office. It would strain a point in some situations if he tried to use a chapel for services of worship. He'll want to carry his program to the center of your troop area with a conveniently located office and a schedule of services conducted in some central place.

He'll bother you about information from service records for a personnel file and an accurate survey of denominational preferences in your command. He will want to interview new men joining the unit and will seek your cooperation in reaching them.

A regular visitation program among patients and prisoners will be a part of his plan of work, so he'll want to know who they are. Any suggestions you offer to help his ministry to them will always be appreciated. He is concerned with every welfare problem and personal interest of the men of your command, but he remembers that they are your men and that it is your privilege and obligation to face these matters with them. We wait to bring you his own training and experience in this command function.

He will want to keep some evening office hours because he knows that he can't go to the office at the time of morning drill call and leave it when your men stand retreat, and still minister to their needs. There will probably be an arrangement with the Commanding Officer about making the chaplain's services available to the men after their regular duty hours. For that reason there may be mornings in the week when he won't get "on the line" as early as you.



You will work with him in the sex morality lecture—he's there by order too. It is one time when his subject matter is dictated for him by higher authority. He's there in his own capacity and will want to approach the subject accordingly. As he is neither a disciplinarian nor an authority on venereal diseases, he'll probably resort to "preaching" as his only remaining angle. As a man of God he wishes to lay the claims of morality and religion upon your men. That's why there are three such talks instead of one.

He is in your command to help all men and will call upon chaplains and ministers of faiths other than his own to help in his program while he is on a post. He will be interested in cooperating with local churches near the post, for he knows that the day will come when he will be the sole source of formal religious ministrations in the unit. That's why he'll probably encourage men to attend civilian churches and will use musical programs and entertainment projects made available by local civilian congregations.

This, coupled with his interest in local servicemen's organizations and other community cooperation, will probably cause him to ask for some of your good transportation for this and that. (You'll never break him from believing that an artillery unit always has plenty of vehicles!)

Preacher that he is, he will consider the worship services a very big part of his work, and he will try to guard some of his time for meditation, prayer, and the preparation of sermons. Naturally he'll want crowds to attend the services, but he doesn't want any soldier to feel that someone is making him fill a seat to inflate the chaplain's ego or to make some organization look good. The chaplain knows that it takes a great deal more ability for an officer to keep men informed and encouraged in matters of church attendance than it does for him to bluff up a crowd at the last minute to attend some service.

He respects the good American right a man has to stay at a good, safe distance from church, and he knows that he's no longer dealing with what he once called a "flock." He is in the Army—an Army that reflects command—and he is interested in seeing religion have its proper place in your set-up.

FIELD

Once you go afield the chaplain will want to make more of the fact that he is on the staff of the Commanding Officer, and will further consider himself to hold the same relationship to the various battalion commanders in the larger unit he serves. He will hope that battalion commanders will want to see a schedule and summary report of his work among their

men. He will take as much pride in rendering a weekly report of his activities to his Artillery Commander as any other officer. He knows that any information he can keep at the Commander's fingertips about troops who are no longer garrisoned in a small area under his constant observation, will contribute to the complete picture that officer wants of his unit.

The chaplain will want to confer regularly with the executive officers to be sure his program is coordinated to fit the unit's disposition of troops and the present training schedule.

If you are an S-3 he'll probably heckle you a lot. He must know something of the operations of your unit to cooperate in arranging times for his services and visits which will not interfere with your work and which will prove profitable to his own. He will need now to be included in certain distribution lists and be informed on matters which were not considered his concern at the garrison. He will expect to be notified of changes in schedule which will necessitate cancelling or changing the time for services.

Battery services will become the order of the day in the field, and if a chaplain is covering the entire division artillery he will probably be having twenty services a week or as many of that number as his church usage will permit. That may cause your "Sunday morning" to fall on Thursday afternoon, and he will want to consider with you the best time for services.

When entering your area he should be courteous enough to report to you as battery commander or the senior officer present, but he comes primarily to see your men and you'll probably see more of him than you did under post conditions. He will want to be acquainted with your camp lay-out, gun positions, etc. (Be sure he knows the location of your mess hall!)

He will want to visit your beach, mountain, or similar defenses and is interested in the location of OPs which you man regularly. Close contacts with men in these outposts will be appreciated.

Ask him along when your group does a problem. He will like to attend service practice, but may prefer to stay at the guns. (He won't know what's going on there either.) Ask him to live in your area and move with your battery during an alert or similar operation. He will appreciate it as a part of his own training, and he will learn to know more of your men at such times than he will ever learn in church.

COMBAT

When the day comes to throw away that personnel file he bothered you for and "strip for action" he will hope he has been with you for a long time. He likes to go to war with men he knows. Formal services are out for the time being; he will want to make his presence as a friend felt as his principal ministry until the situation will admit of a regular worship service again.

He will lay aside his insignia of grade when he puts on the combat uniform, but he will want to continue to wear his cross

at all times. He will refuse your offer of a weapon as a matter of regulation. That has nothing to do with his personal opinions about participation in war: he has settled that to some satisfaction or he wouldn't have on a uniform.

Some of his units may now become the responsibility of other chaplains according to the plan of committing the various combat teams, but if the artillery battalions occupy positions allowing them to mass their fire he will probably have access to all batteries throughout the action. In that case he will want to make his base at the forward CP.

He won't be a stickler for his own transportation now (believe it or not), and he will probably prefer to travel with staff officers, with messengers, with wire crews, with survey parties, with anyone whose business it is to know the situation. (It's a poor time to trust his own knowledge of changing positions, etc.)

It will be his policy to check in at battalion CPs and then move among the men at the gun positions and other installations. He will try to visit all units frequently, keeping his whereabouts known at the Artillery CP.

He will want to secure any articles he can for your men and run any errands the situation admits. Some day he'll probably show up with a handful of toothbrushes instead of Testaments. He will probably see your wounded first at the forward hospital. Forward collecting stations will usually be cared for by infantry chaplains. In an emergency he will do everything possible for the dying of all faiths.

His interest in graves registration will cause him to hope for immediate evacuation of the dead to the rear cemetery. Temporary burial will be necessary in cases of men lost at forward OP installations, but men killed at the battery positions can usually be wrapped, tagged, and placed in vehicles going to the rear without interfering with the conduct of fire.

He now has a sense of "belonging." If he ever felt like a fifth wheel in the military, his combat experience will dissipate the notion. If he shows a desire to be everywhere at once it won't be his curiosity. The men are glad to see him now, and he knows it. He has a new kind of pride in the organization. It isn't the kind he talked about at length on peaceful Organization Days, and he probably wouldn't care to talk about it at all, but he's completely sold on you now; what's more, you probably begin to see why you carted him along.

His job is religion. Regulations keep him from being your censor, your special service officer, and your court or board member, but with your help he'll probably be able to find enough to do without taking these jobs. You will find he isn't too sure of the "answers": Perhaps he's still trying to get some of life's "questions" straight, but he wants to be accepted as a minister first of all. He aspires to be a saint but he hasn't reached perfection yet.

He's a "Field Artillery Chaplain."

JOURNALS OVERSEAS

"The JOURNAL is easily my favorite reading matter over here. I read it as soon after receiving it as I can find time and then start passing it around. Our enlisted men found the summer series on "our" theater especially interesting. My particular job in the special kind of outfit we are has me working in close cooperation with infantry officers who do the same work. We trade our respective JOURNALS back and forth many times and so we're never at a loss for fresh fuel for arguments, bull sessions, etc."—LIEUTENANT, FA

AMPHIBIOUS 105s

By Captains O. M. Doerflinger and Parker M. Holt, FA

When 105 battalions started training for their part in the operations which recently annihilated Japanese forces on Attu Island, outermost rock of the Aleutian chain, they found themselves at once untrammelled and unguided by established practice. Hypothesis, trial, and error were necessarily relied upon to resolve problems as they arose. With the able advice of Pacific Fleet Marine officers and extensive army-navy maneuvers, problems were solved and Attu taken. Solutions reached in the course of these operations are offered in the hope that they may save time and trouble for other artillerymen who must inevitably contend with similar difficulties in the near future. They are not, of course, the only answers.

First, get rid of impedimenta. Space, transportation, and mobility are at a premium. Incompetent officers or men have no place in your organization. Then consider the materiel at hand.

EQUIPMENT NOTES

Trucks are not suitable as prime movers. They take too much room in landing boats, bog down in sand, and cannot go through the soft muddy places frequently found behind beaches. Above all, they are extremely vulnerable to wetting. When a boat hits the beach it is vital that the engine of any vehicle aboard be running and stay running until boat and beach are cleared and the battery position is reached. One good wave shipped between transport and beach can stall a truck, and if this hazard is avoided final debarkation will involve negotiating (occasionally) still waters or (usually) surf seldom less than two feet deep and often higher. A prime mover with towed load cannot run between waves like a jeep. If it stalls at the water's edge a broached boat and lost or damaged cargo are very likely to result.

A diesel-powered, track-type tractor is not subject to these weaknesses. The overall length of the "Caterpillar" D-6 makes it suitable for loading on medium landing craft. Immersion for short periods has little or no effect on it. Its flotation in sand, mud, or snow is high, and its power is entirely adequate. For ideal utility your rig should be equipped with winch, belly-guard, radiator guard, and front pull-hook.

The wider your tracks, the better. If operations are to be conducted in snow it is absolutely essential that they be snow type. These tracks are fitted with a special sprocket which forces snow through a hole in the track plate to prevent packing and consequent immobilization. Some tracks at least should be equipped with ice grousers, the sharp type grouser that digs into ice for a solid grip.

Angledozerers are preferable to bulldozers for two reasons. The bulldozer simply pushes dirt ahead of it and soon proves difficult for an inexperienced driver to handle, while its irreducible width increases the problem of boat loading. Angledozerers shove dirt to one side as they progress, considerably simplifying the cat-skinner's job, while their adjustable width is helpful in negotiating narrow loading spaces. The blade should be cable- rather than hydraulic-controlled both for ease in repair and because in cold weather rubber hoses become brittle and break and oil will be sluggish. Cabs are of course desirable in northern climates, and cold weather starting devices often speed displacement. On the initial landing it will not be necessary to carry oil in addition to that in the pressure lubricating gun since the proper interval between crank case oil changes is two hundred hours. You will need an extra 5-gallon can of gas for the starting engine. Each tractor should have at least one set of pioneer tools, and if the rig has no winch a good hundred feet of cable should be provided, complete with clamps.

Editor's Note: Most of the information contained in this article was from the Attu operation, in which the terrain conditions were unusual. No LCTs were available for the assault, so the 105s had to be landed in LCMs.

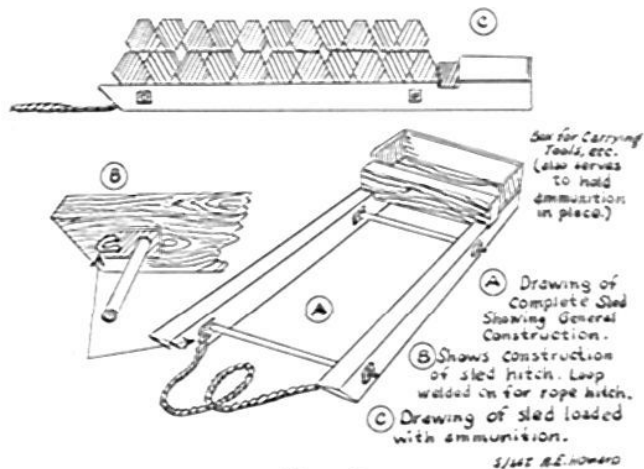


Figure 1

Minimum transportation may be furnished by 6-ton track-laying Athey trailers and home-made wooden sleds (see Fig. 1). For the Athey trailers a braking arrangement must be improvised. Two wooden blocks 6" x 6" (one for each track) and fastened to the wagon with a chain long enough to reach either front or rear, will do the trick. In planning your loading it will be necessary to check whether ship booms are strong enough to lift the trailer loaded and whether there is enough overhead clearance in cargo holds.

A typical distribution of vehicles will give four D-6s to each gun battery. If you are operating under the old T/O one D-6 from Service Battery may be attached to each gun battery ammunition section. Wooden sleds may be made by sections as required.

TRAINING

In training for amphibious operations your field artillery battalion will naturally require all the basic training that is common to all branches: that is, wet and dry net training, instruction in life aboard ship, and repeated practice landings with as much equipment as possible. Of course, for assault landing groups training cruises are of the greatest value. Lacking these, talks by men who have actually taken part in amphibious operations clarify a great many questionable points. In dry and wet net work one of the worst bottlenecks occurs when lowering hand-carried equipment from deck to boat. Be sure to have plenty of lashing, lowering and guide lines, and hooks. Regular teams should be assigned to each net in order that speed and assurance may be developed. A miniature 5' x 5' cargo net for each of these teams will come in handy.

PACKING

Primary consideration must be given to methods of packing materiel. Ammunition may be lashed to the howitzer trails or placed in the empty center tool box just behind the cab of a D-6 "Caterpillar." It may be hauled in greater quantity on Athey trailers, and finally on the home-made sleds that each section drags behind its howitzer.

The section chest may be roped or clamped to the trails. An L-shaped section chest bracket and strap (see Fig. 2) are easily fashioned in your own shop. Should you expect to land on soft ground where timber is scarce, trail logs lashed between the trails may prove well worth the trouble. As many picks, axes, and shovels as may be reasonably tied on the howitzer will not be surplus. Rope is a fine thing to have around; as much as a hundred feet of 1 1/4" per section will simplify a great many situations when the going becomes tough.

During actual loading and unloading from holds gun tarps should be laid over tubes and breechblocks, brought down to cover sight

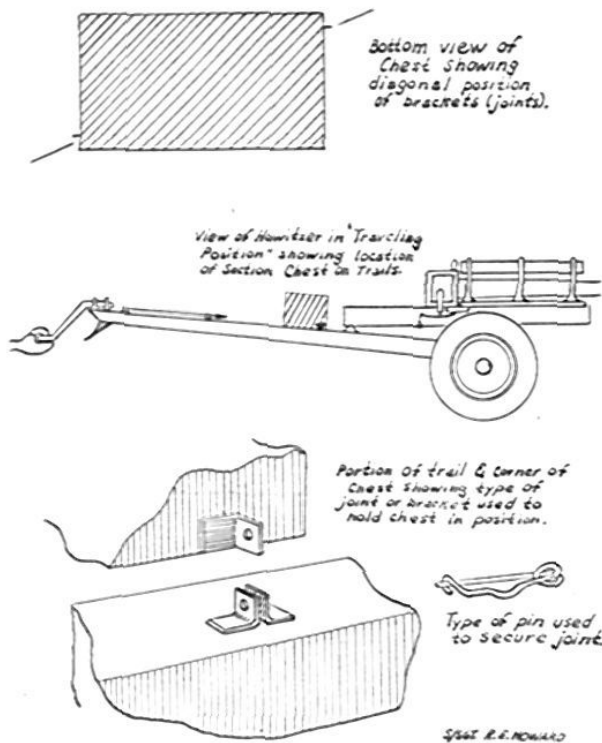


Figure 2

mounts, elevating and traversing handwheels, and finally tied together under the carriage. If this is not done it is remarkable how many ropes, cables, and projections between hold floor and boat will hang up brackets and handwheels and leave them bent and broken. If the gun tarp is lashed to provide a smooth surface these accidents can be eliminated entirely.

LOADING SHIP

Actual loading of the ship and assignment of cargo to holds and deck areas concerns the Transport Quartermaster primarily. This independent and frequently maligned individual is usually an officer of the line who is given special training and assigned to a particular ship. Details of loading are his worry and, barring intervention by the ship's captain, his decisions are final. Just how he elects to load the ship depends on several factors: the tactical situation, capacity of booms, size and shape of holds, and such special conditions as hot water pipes or probable leakage in certain locations.

Loading will take place during the week or more preceding arrival of troops at the pier. If at all possible, however, it will be desirable for the artillery commander to have a commissioned representative in the advance party in order that artillery interests may be protected. If the TQM is not an artilleryman there is little probability of his being familiar with the particular needs and tactical requirements of our materiel, and usually he will welcome reasonable suggestions and explanations.

In most cases it is desirable to provide your own howitzer loading slings. Those that the ship has may or may not be satisfactory. Any type of sling is suitable as long as it does not bind the howitzer and put extreme strain on vulnerable projecting points. If boom and hold capacity permit, get each tractor and its towed load in the same hold. Most ships require that vehicle fuel tanks be not more than three-quarters full to prevent splashing. If you enter or expect to pass through a cold climate remember to put anti-freeze in the radiators, and if debarkation is to be in freezing weather oil should be winter weight. Anything to be hand-carried ashore by troops should be tagged for troop compartments.

AT SEA

The main problem of training at sea is to keep everyone busy. A

marked increase in administrative and fatigue details is to be expected, but a good deal of slack time still remains. Part of this must be devoted to calisthenics and physical conditioning, and abandon ship and fire drills. The remainder may go to visual signaling, telephone operation and procedure, fire direction training, instruction in climatic, social, and topographical conditions at your destination, and map reading (particularly of the coming combat area). Radios cannot be used aboard ship. A telephone net connecting troop compartments, message center, S-1 and S-3 offices, and key officers' quarters will be a great convenience and excellent telephone training. Films stressing aircraft identification and particular problems that you expect to meet on shore are very desirable. Do not be optimistic enough to think that mimeograph machine, typewriters, and a copious paper supply will not be necessary. They will.

If the ship is to be at sea long, and particularly if you are in a cold climate, it is important that the condition of materiel in the holds be checked from time to time. Sweating may be very marked and since you may need to go into action immediately after hitting the beach packing in heavy grease or cosmoline is not practicable.

THE LANDING

D-day, H-hour will see the doughboys first ashore. With assault battalion commanders will go liaison officers and forward observers, followed shortly by battery commanders with their parties and later by the guns. When your materiel goes over the rail be sure to have a competent artillery officer in supervision. Watch the slings. If possible get each section together in one boat—gun, tractor, and crew. If you can't do that land the tractor first and have it meet the gun at the beach; if you don't, the beach party will simply haul your guns off the beach and drop them. When the hatch covers are off start warming up your vehicles. Don't be in too much of a hurry to move equipment into the hatch center for unloading. Wait till the winch load that went before it has cleared the hatch. There's many a slip.

The 50-foot landing craft has room for a D-6 and a 105. If the D-6 is equipped with a winch you can load the 105 slightly athwart the boat with its muzzle aft. Tractor and towed load cannot be coupled in this case. In any event be sure that the weight of your load is as near dead center as possible. If the tractor is loaded tail forward the gun remains straight, trail under the D-6's radiator. In any case, the gun will always be loaded first.

Athey trailers should go on loaded if weight permits. If ammunition is in the same hold it may be loaded by net directly into empty trailers. If it has been necessary to remove trailer sides and top brackets be sure that they are all aboard—without them the Athey is of limited value.

One jeep will fit easily into a 36-foot landing craft and two in a 50-foot craft. Larger craft will take an entire battery.

During the trip ashore be sure that brakes are locked, and when you hit the beach stand clear of materiel: it may pitch forward. The engine should have been running for at least twenty minutes on the way in. When the ramp drops, if the gun is askew the D-6 will pull forward about three feet and cannoners couple. In crossing the ramp there must be no babying of materiel or hesitancy on the driver's part. If men remain aboard after the gun and tractor have cleared they should not attempt to land until the coxswain has compensated for his suddenly lightened load and rebached the boat.

By the time the firing battery lands the BC should be familiar with the situation and have his GP selected. A guide will be waiting at the beach to guide the guns into position. If he doesn't show up immediately, clear the beach and wait for him.

As soon as a normal gun position has been established ammunition becomes of prime importance. All available personnel with Athey trailers and sleds return to the beach and pick up ammunition that has been hand-carried ashore or landed prior to the firing battery.

During initial action batteries will probably be attached to infantry battalions. When the regimental commander comes ashore the artillery battalion commander and his party will normally be in the same boat. Headquarters Battery will ordinarily land at approximately the same time. The battalion commander's first problem is to find out where his batteries are. In this he may be aided by the shore party's operation map and by inquiring at the infantry battalion CPs. Once the batteries are located it only remains to set up the CP, establish communication, and carry on under battalion control. You're back in your own element.

FIRING IN YOUR OWN BACKYARD

One Division Artillery's Experience with the Modified Bishop Trainer

By Lt. Richard B. Cowdery, FA

There is no substitute for service practice, but there is an alternative. With shortages of gasoline and maximum use of ranges keeping you in garrison sometimes—to say nothing of the ever-present ammunition situation—some method of instructing officers and non-commissioned officers in the conduct of fire without cannon is essential to the technical efficiency of the unit. In the 78th Div Arty the new model Bishop Trainer with compressed air propellant has been found to provide a most satisfactory device for this purpose.

The Bishop Trainer has been a first class training aid since it first made its appearance. But the .22 blanks used to fire it were ammunition, with the difficulties adherent to the acquisition thereof, and they fouled the bore to such an extent that no amount of reaming could do much about excessive dispersion. Some new propellant was needed.

A little history: Rumors grew of a compressed air attachment to send the steel ball "on the way." Our S-4 got on the beam. Ordnance provided a homemade air chamber, SFE funds the valves. The power came right out of the TBA: the basic battery compressor. Then the fun began. The valves leaked. The compressor failed to provide enough pressure for a reserve. Overall results—more dispersion than ever.

Back to Ordnance, returning finally with 3-cubic-foot compressors and reserve tanks. Back to the SFE funds for improved valves. Final modifications by Ordnance provided the approved solution which you can obtain now in the form of items of issue. A good deal of work went into the development detailed above, but we had something good when we finished—and something worth getting is worth working for. Dispersion is now negligible, and operation very simple. The only loss is the action of loading the shell in the breach, which wasn't even remotely like service of the piece anyway.

Now for the firing range. When the division was activated each battalion laid out a range. Only a very small area is required: the RF is 1/100 (50 yards give you a range of 5,000). One battalion selected a raised field, surrounded on two sides by a cut road. This automatically puts observers down where they belong, close to the ground. Remember, a 6-foot man standing is equivalent to observation from an altitude of 600 feet. This, incidentally, gives you the opportunity for using air-ground methods.

Another unit preferred to dig pits for observers, using a field with a little slope. Still another took a flat plot of ground and made no changes in the position area. The student lies on his belly for forward observation and to obtain the effect of poor OPs. Sitting in a camp chair gives one a 400-foot hill, which is not too hard to find in many parts of this world.

Don't be misled when we say "flat" plot of ground. The natural configurations of any field give some amazing draws and hills at Bishop Trainer scale. If you desire (as did one battalion) an elaborate panorama with all possible terrain features, a little digging and heaping will do the job. The range runs from Mt. Etna to Death Valley, yielding some very interesting problems.

Targets do not present much trouble. TM 6-225 gives you actual dimensions for the wooden blocks that will represent enemy

batteries, trucks, or houses. For realism and facility in target designation, two battalions have fashioned their blocks into little models, even painted them different colors. A network of cindered roads completes the picture. Warning: spike your houses in position (for a particular shoot), because the projectile has a way of bouncing things around. Woods? The grass that God grows.

You can pace out positions for blocks marking every 1,000 yards, assisting in range determination. Some prefer to let their officers estimate, or learn the ground pretty thoroughly.

What can we do with this setup? Practically everything except time fire (one officer even has an idea on that). The unit which dug itself in placed the pits to give axial, small-, and large-T problems from a permanent concrete gun emplacement. The others move the OP or the guns at will, to give all possible situations.

One thing to keep in mind is one of the few limitations: the 1:100 scale puts a pretty long base between the student and the officer in charge of the firing point unless care is taken almost to rub elbows. With this slight care taken we avoid those unhappy disagreements on sensings.

Someone is going to say, "A steel ball does not burst like a 105 shell; isn't sensing a little strained?" We can turn the tables on him. In the first place we do get a kind of burst, even though not quite comparable to that of service ammunition: the ball puts up a puff of dust which you can catch all right with your naked eye and pretty well with your field glasses. But you've got to be quick, and this is a decided advantage in training.

The next criticism will probably be, "This sounds like an officers' diversion, and battery officers only, at that." Not here, sir. Each battalion has scheduled hours in which non-commissioned officers are instructed in the conduct of fire. And at every practice the guns are manned by soldiers acting as chiefs of section and gunner corporals. They got invaluable practice with the panoramic sight, mounted at first on a homemade gadget, now on a regular Ordnance appliance. Aiming points can be selected around the clock, testing executive and gunners alike on the age-old adage, "Open in front, close in the rear." In most cases the gun crews see the target and can note their effect. Even the caddy boys (running after the balls—so fortunately unexpended after being fired) are given "the big picture" and a session at the guns for their own instruction.

Not only firing personnel benefit. Telephones connect GP and OP and often as not pass through a switchboard. We have used radios and their remote control attachments to give practice in setup and procedure.

The survey section gets out and, though it doesn't get much physical conditioning, turns plenty of angles and does a lot of computing. I learned a good deal about a transit, turning angles for a contour map of one of these ranges designed as a Lilliputian Fort Sill. We haven't seen any aerial photographs yet, but there's no reason why you couldn't walk around the range on stilts and get obliques and verticals to your heart's content.

Everyone is involved when we do a battalion problem, farming out one to a battery. FDC is set up far enough away to

require a complete communications net. AC 1 adjustment is something to follow through. Two battalions have even practiced the GHQ tests in this fashion.

Have we any proof of good results? Of the four battalion commanders, all call it an invaluable aid and improvement to the efficiency of their units. Three of these lieutenant

colonels say it is inferior only to regular service practice, and one even prefers it to 37-mm sub-caliber practice.

Each battalion keeps records of its officers' firing, of course, and each attributes the upward turn in marks to the intensive use of the popgun howitzer. Two units also keep charts on the trainer problems themselves. The improvement on the service firing chart went hand-in-hand with that of the trainer chart.

Massing Fires in Miniature

By Lt. Col. Harlo W. Higby, FA

To train troops quickly and thoroughly in the effective, battle-tested technique of massed fires, the 422nd Field Artillery Group at Fort Sill has devised a massing of fires in miniature that produces virtually a "backyard full of automatic cannon." Details were worked out by Col. Frank C. Mellon and Capt. Frank J. McLoraine, to give every soldier in the group the "big picture" of Field Artillery in action.

The four guns of each battery are set up on a full-width battery front, but the fire direction and command centers are brought up to easy view. Except for length, communication lines meet battle requirements. Thus the individual soldier can observe with his own eyes and ears the whole group in action—from the aerial observer in the Grasshopper plane above, to radio and telephone operators receiving the messages at division artillery headquarters, to telephone operators receiving the messages at battalion FDCs for translation into fire missions, to orders to cannoneers on 105-mm howitzers. Not a single round is fired (although the gun crew goes through every detail including loading practice ammunition, crouching low, and pulling the lanyard), but officer umpires are assigned to check the accuracy of each gun squad, telephone operators, and FDC. Every howitzer is checked for accuracy after each mission is "fired."

The group stages these practice sessions on the rolling terrain at the south base of Medicine Bluff No. 4, after a day's firing for the School. Each battalion has been assigned as general support, direct support, and in groupment, so it can act in any capacity and in any combination with any other battalion.

A permanent stake marks the location of a battery position in the training area, which is just a little more than a city block from the tent encampment of the troops. The wire communication, which takes less than a mile of wire for each battalion, is left as a permanent installation. All that is necessary to establish complete communication is to "hook up" switchboards and telephones when the outfits move in for another practice session. Total time for a complete battalion to put howitzers into position, establish communications, and set up its FDC, is only 15 minutes.

So proficient have the men become that in 1½ minutes after the coordinates (map location of the target) are announced at the FDC, the command to fire is given at the batteries. While the plan has been called "massing of fires in miniature," the only thing "miniature" about it is the geographic distance between FDC, firing batteries, OPs, and forward observers. An air observer isn't always used as the same results can be had by simulated observations' being telephoned in.

The distance between FDC and the three firing batteries is approximately 60 yards. The width of a battery front (distance

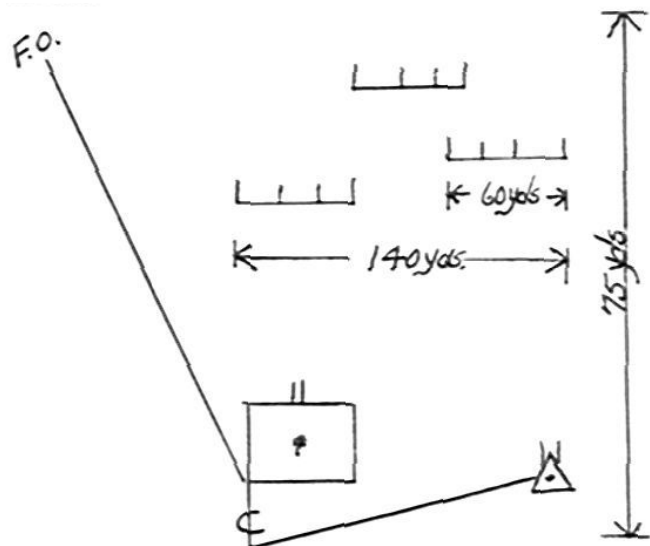


between farthest guns) is normal for either the 105-mm howitzer battalions or the 155-mm gun battalion. The entire position area covered by a single light battalion is 140 yards long and 75 yards wide. The heavy battalion takes a 300-yard front and is 100 yards in depth. Since this is non-firing, the batteries of a battalion may be staggered or echeloned in width as desired.

Howitzers are brought into position and laid for direction by various means (compass, base angle, or an aiming point and deflection). Photomap and grid coordinates are assigned for howitzer positions, base points, and restitution points.

Arbitrarily the map elevation for gun-target range is altered a few mils and an arbitrary deflection correction is assigned. This is used as adjusted data by the battalion teams, and their GFTs are set to apply these corrections.

All the coordination and teamwork of battalion FDC, telephone operators, recorders, executives, and howitzer squads has been accomplished so that every soldier can readily see and understand what part he plays in the Field Artillery machine.



Schematic diagram for battalion miniature massing of fires, 422nd FA group.

A DAYLIGHT POLARIS

By Capt. Pau Hartman, FA

The sun can be used by the Survey Officer for every purpose for which he uses Polaris. He should consider the sun a "daylight Polaris," to be used with equal facility. The only additional equipment required is a solar ephemeris, which tabulates the sun's declination and the equation of time for each day of the year; most transit manufacturers distribute these small paper-covered booklets gratis.

To determine azimuth from the sun does not require any knowledge of astronomy. The procedure outlined in this article can be followed mechanically by anyone who can interpolate and use logarithms. Survey Sergeants have been taught to take sun shots and compute azimuths therefrom in a few days.

Time should be known to within ten minutes, but even if there is a larger error in your watch the method is still accurate, for it is possible, as will be shown, to compute the time the shot was taken and then recompute azimuth on the basis of corrected time. It is also necessary to know the latitude and longitude of your position to within two or three minutes.

BASIC DATA

Let us assume that on 29 April 1943 at Latitude 38° 18' N and Longitude 77° 18' W at 17 hours 49 minutes and 00 seconds Eastern War Time (EWT), we measured the altitude of the sun to be 23° 11' and the clockwise angle from a distant point on the ground to the sun to be 46° 48'. To compute the azimuth of the sun and from it the azimuth of the line the following formula* must be solved:

$$\cos Z_s = \tan h \tan L - \frac{\sin D}{\cos h \cos L}$$

where Z_s = azimuth of sun measured from true south (clockwise in PM, counterclockwise in AM)

h = altitude of the sun

L = latitude of observing station

D = sun's declination.

" h " is measured directly, but must be corrected for parallax and refraction. These corrections are combined in a simple table in any solar ephemeris. The combined correction (which is always subtracted from the measured (apparent) altitude) varies with the altitude and temperature. Variation with temperature is so small that a 10° (F) error in temperature would not have any appreciable effect. For a temperature of 50° and an apparent altitude of 23° the correction is 2.12'. For the same temperature and an apparent altitude of 24° it is 2.02', so (interpolating for the measured altitude, 23° 11') we obtain a correction of 2.10'. Since the apparent altitude is measured only to the nearest whole minute, however, the correction should also be so taken and " h " is then equal to 23° 09' (23° 11' — 0° 02').

" L " is determined from a large or small-scale map or it may

*In the Southern Hemisphere consider latitude to be positive and change the sign of the second term on the right-hand side of the equation. This will give the azimuth of the sun measured from true north.

[†]Of which reprints are available at 25c.—Ed.

be determined by a meridian altitude shot on the sun (see Capt. Amory's article in the November, 1942, JOURNAL[†]).

The declination, "D," is determined by interpolation in the solar ephemeris. The various ephemerides differ somewhat in set-up. Some give the declination for 0000 hours (midnight) Greenwich Civil Time (GCT) (which is standard time in England), while others give the declination for Greenwich Apparent Noon (which varies as much as 17 minutes from standard time, the exact variation being given in the ephemeris). Rather than involve the reader in a discussion of time the two will be considered separately for the moment. A simplified explanation of time appears later herein.

Assuming that we have an ephemeris which gives declination for 0 hours GCT for each day of the year, our problem is merely to convert our time to GCT and then correct the declination by multiplying the hourly variation of declination given for that day by the hours past 0 hours GCT, and adding or subtracting the product to or from the tabulated declination. The sign of the hourly variation tells you which to do. To get back to our example, the sight was taken at 1749 EWT, which is 1649 EST or 75th Meridian Time. For every 15° of longitude west of the prime meridian (0° longitude which passes through Greenwich, England) add one hour to the time to obtain GCT. Thus GCT time of our observation was 2149, whereas if we had been east of Greenwich we would have subtracted the 5 hours. For 0 hours on 29 April 1943 the declination is + 14° 07' 00" and the hourly variation + 47.2". The correction is then 47.2" × 21.8 hours (converting 2149 to hours and tenths) = +1029" or +17' 09". The declination for the time of the observation is then + 14° 07' 00" + 17' 09" = + 14° 24' 09". Accuracy to the nearest minute is sufficient so we will take "D" = + 14° 24'. (Note that if "D" were negative the sign of the second term of the equation must be changed.)

If the ephemeris gives declination for Greenwich *Apparent* Noon obtain GCT exactly as above, subtract 12 hours, and add the equation of time algebraically. This is tabulated in the ephemeris beside the declination. The result is the hours past Greenwich Apparent Noon if it is positive, or prior to noon if it is negative. This is applied to the hourly variation in declination with proper regard for sign and the tabulated declination corrected by the product. The declination so obtained will be within a few seconds of that obtained with the other ephemeris. For precise results the tabular value of the equation of time should be corrected in the same manner as the declination, but since the variation from day to day in the equation of time never exceeds one-half minute it may be neglected in these computations.

A third variation in ephemerides tabulates declination for Greenwich *Mean* Noon, which is 12 hours past 0 hours Greenwich Civil Time. Declination is determined exactly as outlined for the ephemeris using 0 hours GCT, with the exception that 12 hours are subtracted from the GCT determined before applying it to the hourly variation in declination.

SOLVING

Now with "h," "L," and "D" determined, the equation may be readily solved.

log tan 23° 09' = 9.63101	log sin 14° 24' = 9.39566
log tan 38° 18' = 9.89749	*colog cos 23° 09' = 0.03646
9.52850	*colog cos 38° 18' = 0.10525
	9.53737

antilog of 9.52850 = 0.33768
antilog of 9.53737 = 0.34464

Subtracting we obtain — 0.00696, which is the natural cosine of Z_s. Since the cosine is negative, the value of the angle is 180° minus the angle corresponding to + 0.00696. Z_s = 180° — 89° 36' = 90° 24' and the azimuth of the sun is 180° + 90° 24' = 270° 24'. The azimuth of the line is then 270° 24' — 46° 48' = 223° 36'.

Time can be determined from the same observations used to obtain the azimuth of the sun. The computations are mechanical and can be made by following the procedure outlined below. The writer has found, however, that if a simple explanation is made of the apparent movement of the sun around the earth, the computations can be followed much more easily.

Since the sun rotates (or rather, appears to rotate) about the earth once a day, it could be used as the hour hand of a clock with a 24-hour dial. The instant that the sun passes directly overhead (meridian transit) would be noon and every 15° either side of this point would represent one hour of time. Actually this is a system of time which is used by astronomers; it is known as local apparent time.

There are, however, two drawbacks to its use: the first is that the sun does not rotate (let us dispense with "appears to" from now on) at a uniform rate about the earth, and the second is that each meridian of longitude would have its own time. To eliminate the first difficulty the astronomer has invented a fictitious or mean sun which revolves about the earth at a uniform rate. This would appear at first glance as a complication beyond the average Field Artilleryman, but it isn't. In the ephemeris we are given the "equation of time," which is merely the number of minutes the real sun is ahead of or behind the fictitious sun. Or in other words, it is the difference between local apparent time and local civil time, the latter being then the time determined by the position of the fictitious sun.

The second difficulty is eliminated by using time zones. The earth is divided into zones 15° wide in longitude, the time in each zone being the local civil time of the central meridian of that zone and this time is known as "standard time." Thus the local civil time at the 75th Meridian is the standard time for a belt extending from the 67° 30' Meridian to the 82° 30' Meridian (this is not always strictly so since these zones are sometimes arbitrarily altered for local convenience).

To further explain the time system let us assume that we are at the 80th Meridian and the equation of time is + 10 minutes (which means that the sun is 10 minutes ahead of the fictitious sun). Now at the instant the sun passes directly overhead our watch, which is set to Eastern Standard (75th Meridian) Time, reads 1210. Actually, since the sun is directly overhead (or on the meridian) the time is 1200 local apparent time (LAT) or 1150 local civil time (LCT), since the fictitious sun is 10 minutes behind the actual sun. Since the actual sun has traveled through 5° of are since it passed over the 75th Meridian the local apparent time there is now 1220

*The colog is 10.00000 minus the log. Adding the colog is the same thing as subtracting the log and saves a step. With a little practice it can be read directly from the tables.

(each degree of are equals four minutes of time) and the local civil time there is 1210, which is the standard time for the entire Eastern Standard Time (EST) zone.

To determine the angle between the sun and our meridian, which is known as the hour angle, the following formula must be solved:

$$\cos t = \frac{\sin h}{\cos L \cos D} - \tan L \tan D$$

Note that with the exception of "t," the hour angle, the angles involved are identical with those used to determine azimuth. The angle "t" is obtained in degrees and minutes of are and then converted into time (see Table XIX, TM 5-236, which converts time into are and are into time). The time thus obtained is the hours prior to (for an AM observation) or after (for a PM observation) local apparent noon. To convert LAT to LCT we must subtract the equation of time algebraically since we are converting from actual sun to fictitious sun time. (The equation of time given in the ephemeris is the relation of the actual sun to the fictitious sun, hence the algebraic subtraction above.) The result is local civil time which we must convert to standard time. To do this we find the difference in are between our meridian and that of the nearest standard time meridian (a multiple of 15°) and convert are into time by dividing by 15 or using Table XIX of TM 5-236. The resultant time interval is added to (if our position is west of the standard time meridian) or subtracted from (if our position is east of the standard time meridian) the local civil time to obtain standard time.

Continuing with the data assumed to illustrate the computation of azimuth, we compute the hour angle as follows:

cos t = $\frac{\sin 23^\circ 09'}{\cos 38^\circ 18' \cos 14^\circ 24'}$ — tan 38° 18' tan 14° 24'	
log sin 23° 09' = 9.59455	log tan 38° 18' = 9.89749
colog cos 38° 18' = 0.10525	log tan 14° 24' = 9.40952
colog cos 14° 24' = 0.01386	9.30701
9.71366	
antilog of 9.71366 = 0.51720	
antilog of 9.30701 = 0.20277	

The difference = 0.31443, which is the natural cosine of "t." "t" = 71° 40' (nearest minute) or 4^h46^m40^s, since this was an afternoon shot.

LAT = 16h46m40s	
Eq of T = (—) + 2 40	
LCT = 16 44 00	
Long. Diff = + 9 12	(77° 18' — 75° = 2° 18' W = + 9m12s)
EST = 16 53 12	

To obtain Eastern War Time add one hour. The correct time is 17^h53^m12^s and the watch is 4^m12^s slow. This error in time affected only the declination, and it is so small it can be ignored. In fact, an error of one hour in time causes an error of only 47 seconds in the declination on this particular day.

The technique of taking sun shots is simple but must follow a standard procedure. The basic idea is to catch the sun tangent to the vertical and horizontal hair at the same instant in one quadrant with the telescope direct, and then repeat the procedure in the diagonally opposite quadrant with the telescope inverted. Since it is difficult to follow the sun with

both motions the quadrants should be so chosen that one motion can be used to keep the corresponding hair tangent while the movement of the sun itself brings it tangent to the other. Remember that the prism eyepiece is inverting and therefore the sun will appear to be rising when it is actually setting, and vice versa.

By shooting the sun in diagonally opposite quadrants of the cross-hairs the semidiameter of the sun is added in one case and subtracted in the other so that the average of the readings gives the correct vertical and horizontal readings which correspond to the averaged time of the two shots. Plunging the instrument between shots eliminates instrument errors. The two shots should be taken within 15 minutes of one another, however, so that the average time will correspond to the average horizontal and vertical angles. In averaging we assume that the path of the sun is a straight line—which it is for all practical purposes over small periods of time. The transit should not be leveled between shots.

For accurate results shots should not be taken within two hours of noon nor when the sun's altitude is less than 10°. The sun should appear in sharp focus and the cross-hairs should also be sharply focused; this requires some practice.

Except on the brightest days the sun may be viewed directly, using the filter on the prism eyepiece. When the sun is overcast

it is often possible to pick it up in the telescope although it is not visible to the naked eye.

When the sun is too bright to be viewed through the filter, shots may be taken by casting the shadow of the cross-hairs on a piece of paper held a few inches from the eyepiece (without using the prism eyepiece). The technique of catching the sun on the cross-hairs is exactly the same as for direct viewing. However, this method is somewhat more difficult and not quite so accurate (it should give results to within two or three minutes, though). Focusing the shadow of the cross-hairs on the paper throws the telescope out of focus for direct observation so the eyepiece must be refocused each time the ground mark is sighted upon to prevent parallax. With a little practice the average survey sergeant should be able to get acceptable results with this method.

It must be kept in mind that the azimuth obtained is a true azimuth and not a grid azimuth. The difference between grid and true azimuth is given in Table L of TM 5-236.

In long traverses the writer has used the sun as a distant aiming point for checking direction, taking simultaneous single shots at each end of the traverse. The difference between the two horizontal angles obtained (from the sun to a line of traverse) should be equal to the difference in the azimuths of the two lines being checked.

WHY A CORRECTOR?

By Maj. Wagner J. d'Alessio, FA

With a mechanical fuze setter the corrector served the useful purpose of keeping the time of burning corresponding to the burst elevation desired. Differences in time of burning due to non-standard conditions of weather, ammunition, or materiel were taken care of by the corrector for the day.

But mechanical fuze setters are no longer supplied; perhaps it is a good thing, as the simple hand wrench (now being issued, or which can be made by any battery mechanic) now does the job. It is smaller, lighter in weight, and has no working parts to get out of order. In speed it is almost as fast as the old fuze setter if the ammunition is handed conveniently to No. 3, who sets the fuze. As for accuracy, it is probably superior. It eliminates the mechanical errors due to worn gears or knobs and improper turning of the shell. The chance of human error in setting the net time with the hand wrench is matched by the requirement of setting both corrector and fuze range (or time) on the old fuze setter. The use of the hand wrench requires a positive visual check of the alignment of the time index, whereas with the mechanical setter a false confidence was developed and the settings were seldom verified. It is of course necessary to have a good man to set the fuze (another place for the best man in the battery), but the job is simple and the chief of section and assistant executive can make frequent checks without slowing the fire.

With only a hand wrench to set off the time of burning it is necessary to combine the corrector and time into a single net time. The question arises as to who should make this combination: the officer conducting fire, a computer at the OP, the executive, or some computer at the gun position. Based on experience at the Field Artillery School and in a division artillery headquarters, the

Editor's Note: Methods suggested herein have been in use for some time in the Gunnery Dept., F.A.S. Bear in mind that the new fuze setters M15, M16, M17, and M21 are now being issued.

writer is convinced that the responsibility for making the adjustment in time of burning belongs to the officer conducting fire, who is responsible for all fire commands. When fire is being adjusted by a forward observer using air observation methods, the time adjustment should be made at the FDC, where all fire commands originate in this type of adjustment. In other words, make the individual who is conducting fire do the entire job.

Having given the officer conducting fire the responsibility of combining corrector and time and having given the gun crew a hand wrench with which to set off the net time, we now ask—why have a corrector at all? Since corrector and time must be combined at the point of the shell, there is no reason to separate them in different commands at the OP. With a very slight change in procedure the command for corrector may be entirely eliminated.

A few definitions will help in handling this problem, and the following are suggested. The only new word proposed is "book time" to express more conveniently "fuze setting for graze burst corresponding to the elevation, secured from the firing table or GFT." "Adjusted time," determined from firing, is the time of burning which will give a zero height of burst when fired at the adjusted elevation with the true site. "Time correction" is the difference between "adjusted time"

and "book time." "Corrected time" is "book time" plus "time correction." The words sound more involved in description than they are in actual use: these terms have exactly the same meaning as the "adjusted elevation," "elevation correction," and "corrected elevation" with which artillery officers are already familiar.

Actually, the adjustment for time is made to follow the same principle and nomenclature as the adjustment for elevation and deflection. Without a corrector, the adjusted time is determined directly by firing at the same elevation and bracketing the time of burning. After the adjusted elevation is determined by either the quick or the precise method, time is moved until a 4-point (4/10 second) time bracket is secured. Two rounds are fired at the center of this bracket and the adjusted time is determined in the same manner as was the old "corrector for the day."

Assuming 105-mm howitzer, charge 5, map range 5,000, adjusted elevation 290, there are three possibilities:

EXAMPLE 1		EXAMPLE 2		EXAMPLE 3	
<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>
<i>Commands</i>	<i>Sensings</i>	<i>Commands</i>	<i>Sensings</i>	<i>Commands</i>	<i>Sensings</i>
Ti 16.8	G	Ti 16.8	G	Ti 16.8	G
Ti 16.0	A	Ti 16.0	A	Ti 16.0	A
Ti 16.4	G	Ti 16.4	G	Ti 16.4	G
Ti 16.2,		Ti 16.2,		Ti 16.2,	
2 rds.	AG	2 rds.	AA	2 rds.	AA
		Ti 16.4,		Ti 16.4,	
		1 rd.	G	1 rd.	A
Adj Ti is 16.2		Adj. Ti is 16.3		Adj. Ti is 16.4	

"Book time" (from GFT) for elevation 290 is 16.8. Therefore, using the adjusted time of 16.3 in Example 2, the time correction is —.5 seconds. This correction is not a constant, but more nearly a ratio correction, and with a GFT it is simple to set it off as a ratio. Draw a short line with a soft pencil or ink on the indicator over the adjusted time (if a pencil is used it may be necessary to roughen the indicator; ink is easier to use, but will wash off in the rain). In Example 2 the GFT would be set by placing the adjusted elevation of 290 under the map range of 5,000 and marking the indicator for the adjusted time of 16.3; the complete GFT setting may then be

expressed as 5,000/290/16.3. Both time correction and elevation correction are now applied. For subsequent firing it is only necessary to read the GFT—no computations are needed: at range 4,000 the ink mark shows Ti 12.7 and the hairline of the indicator shows elevation 220. This method increases still further the value of the GFT.

If no GFT is available the time correction may be applied as a constant. Continuing Example 2 above, at elevation 220 (range 4,000) the book time of 13.1 minus the time correction of .5 gives a corrected time of 12.6. Note that this time differs by .1 second from the GFT corrected time. Applying the time correction as a constant is not so accurate as considering it a ratio correction, but where no GFT is available this method is easier and is sufficiently accurate at elevations near that of the check point.

For observed fires the time correction is not essential, as the height of burst may be moved more easily by changes in site. Book time can be used without correction. This is the method followed in our division artillery.

Eliminating the command for corrector has worked well in our own artillery battalions. Besides simplifying the time adjustment it has speeded fire by eliminating one command which must go through communication channels. And even one command saved, with its three or four necessary repetitions, is a real gain.

This suggestion is the combination of two ideas. Bracketing time at the adjusted elevation, with corrector 30, came from our Corps Artillery Officer. One of our battalions had its own SOP of omitting the corrector command whenever the corrector was 30. Putting the two together eliminated the corrector in all cases. Our division artillery is now following this procedure.

Our division had already adopted the practice of adjusting with interior pieces and using an interior piece as the base piece, similar to the recommendations of Col. Gjelsteen in THE FIELD ARTILLERY JOURNAL for last May. This procedure eliminates centering the sheaf. We also make it SOP to have an approximate 100-yard battery front; thus opening or closing the sheaf is exceptional, as most of our targets are area targets.



A remarkable record was just established by the very young crew of a self-propelled tank destroyer. Fire was delivered on a 6 × 10 moving target at a speed of 10—20 mph at 800—1200-yard ranges. Only 5 rounds were fired to obtain the amazing 5-round group shown here. Maj. Gen. John H. Hester, commanding general of the TDC, writes:

"The sergeant in this picture was a corporal the day before. I observed this firing and sent for Cpl. Smith (now sergeant) to congratulate him. When asked his age he replied with enthusiasm and pride. 'Sir. I am going on 19.' I asked him if he liked Texas and he replied, 'Yes, sir, I like Texas, but I want to go overseas. I don't want to have to tell my children that I fought the war in Texas.'

"Next oldest man in the squad is 22 years old. All the rest are under 20."

THAWING YOUR CLASS

By Maj. W. P. Woodruff, FA

Paragraph 38c(3) of TM 21-250, *Army Instruction*, states in part, "Spontaneous participation should be stimulated at the outset and maintained throughout the discussion. The instructor should encourage *all* members of the class to participate." Other portions of this really superior manual describe the following techniques to accomplish that mission:

- (1) Give a question, story, or explanation to start men thinking.
- (2) Build on previous experiences of the men.
- (3) Ask relatively simple questions to hesitant men.
- (4) Compliment men who give good answers.
- (5) Distribute questions among members of the class.
- (6) Don't use sarcasm.
- (7) Let students do the talking (don't repeat correct answers).

Experience at the Field Artillery School and other outstanding training agencies shows that when a class realizes you are trying to thaw it, it will melt for a while but may soon refreeze. To avoid "re-freezing" the military instructor must use many different techniques to encourage class participation. Additions to the "bag of tricks" given us in TM 21-250 might be classified as penetrations (direct frontal attacks) or envelopments (which seek to motivate indirectly).

DIRECT TECHNIQUES (PENETRATIONS)

1. *Asking Class for Comments and Questions.* Occasionally pause and ask, "Are there any questions or comments?" But do not expect any immediate reaction, especially if the students don't know the instructor or each other. And as TM 21-250 points out in par. 39b(1), if you are trying to test, state a specific question. Nevertheless this technique, used in moderate doses, does help to build up an atmosphere of freedom. It shows the men they can and should feel free to ask questions and make comments, and hints that any learning involves some mental reaction on the part of the learner. Further, the pause gives the learners an opportunity to examine their own minds to see if they don't have a question.

2. *Asking a Specific Person if He Has a Question.* Assuming the instructor is closely watching the faces and eyes of his group (as he should be) he can usually tell from the expression whether or not a learner is actually following the instruction. Another indication that an individual is having trouble is that he leans over and speaks to the man next to him. In military classes it is usually safe to assume he is not asking his pal, "Did you get that date with the beautiful babe?"; he is merely trying to get squared away on an item he missed. When a man thus shows he is lost it is a good idea to ask him personally, "Jones, do you have a question?"

Author's note: the "strait laced" title for this article might be *Motivating Class Participation in Conferences*. Drawings are by Pfc. Vernon G. Steffen.

3. *Use of Incorrect Statements.* "In my summary at the end of this period I will make some incorrect statements about the material we have covered and I will expect you to correct the wrong statements." While the main participation secured by this technique is to be expected at the end of the period, still it will cause some to raise questions during the main presentation so they can fix the data in their minds.

- a. Give the advance warning.
- b. Correct all erroneous statements which the class fails to pick up.
- c. Do not use this technique during the main presentation as a technique to check reading assignments (get at this by direct questions), nor when introducing a new subject.

4. *Direct Question to a Named Person.* The uses of a question, characteristics of an effective one, and the technique of asking questions, are covered in par. 39, TM 21-250. In addition to the guides in subparagraph c, "Asking the questions," the following tips are helpful:

a. *Do not precede questions with phrases as:* (1) "I'd like to ask a question," (2) "I have a few questions here which I think I'll ask," or (3) "Your common sense should give you the answer to this question." The military instructor who uses such expressions will probably "piddle and sub-piddle" with such phrases as "*I want you* to move over there," "*If you will* pick up your graphical firing tables," "In this period *I will try* to cover . . .," etc. Such language has no place in military training. The class would show equally impossible military procedure if it rose and said, "Wait, we are going to take a vote to see if we will let you ask the question."

Be decisive. Go ahead and ask your question. Don't ask; give orders. For example, "Move over here," or "Pick up your graphical firing tables." One can give orders without being a haughty, arrogant mule-driver. Rather than "I will try to cover . . ." say "In this period we will learn . . ." Note that *we*. After all, training is conducted for the benefit of the learners. You teach men, not subjects. So let the men know this is a joint effort.

b. *Apply the guide, "The instructor should put the question to the class, pause, and then call on a student to answer it"* (par. 39c, TM 21-250). This general rule always applies to questions asked in the presentation step (getting the principles and data fixed in the minds of the learners). It is often proper even in the applicatory phase of instruction (using questions to give students practice in applying principles to unfamiliar situations). In at least one case of artillery training, however, it is wise to call on the learner *before* stating the question. That is the case of blackboard firing. There the learner should be on his feet, and be given the essential data (for example, last elevation, value of *s* or *d*, etc.) before the instructor indicates the next burst on the blackboard. Then the student can promptly give the next command. NOTE: In this case the purpose is to develop facility and accuracy in the use of principles already learned.

c. "Questions should be distributed among the members of the class" (see par. 39c(2), TM 21-250). This may also be accomplished by having different members of the class answer different parts of the same question. For example, there are at least eight measures to secure secrecy in a night attack (par. 34g, FM 7-10). You could ask four learners to name two measures each, or ask two learners to name four measures each. While this procedure does not give one student a full test, it does provide wider spot checking and more class activity.

5. *Illustrative Problem.* Besides the common use of this as a method of executing the applicatory step, the illustrative problem can also be used as a technique in conducting conferences.

INDIRECT TECHNIQUES (ENVELOPMENTS)

1. *Group Response.* Par. 39d(5), TM 21-250, properly discourages "concert answers by the class." To prevent continued mental loafing by some of the students and to let the instructor know who is in error, these precautions should be observed by the instructor who uses group response as a class thawing technique:

a. Use only as an initial "ice breaker" when students are not yet acquainted with each other.

b. Use for a very short period of time only.

2. *Helping Students Who Have Trouble Answering.* The ordinary procedure used when a man says "I don't know," or bogs down while answering, is to seat him and then furnish the answer yourself or call on another member of the class. If the question is used as a "wake-up" procedure this action is probably correct (see par. 39c(3), TM 21-250). Since inability to answer may be caused by a poor question or an improperly timed one, how about giving a helping hand? For instance:

a. *Ask a question which will help the student call to mind a fact needed at the moment.* For example, in a class in automotive electricity when the class needs to know that batteries can be damaged by charging them at an excessive rate, you might ask, "What is the effect on a storage battery if it is charged at a rate too high for the battery's condition?"

b. *Furnish some essential data.* You are instructing a class in Infantry and Artillery in the Offensive, and are now concerned with missions and plans which the Bn CO of the organic division medium Bn must plan to and be prepared to execute. You get to the place where you want the students to keep in mind that when the reserve Infantry Regiment is committed, its normal artillery will revert to its direct-support role. You have asked, "What other reinforcing missions must you be prepared to execute?" The student Bn CO replies, "I don't understand." You might then say, "Well, that Infantry in reserve back there might be committed."

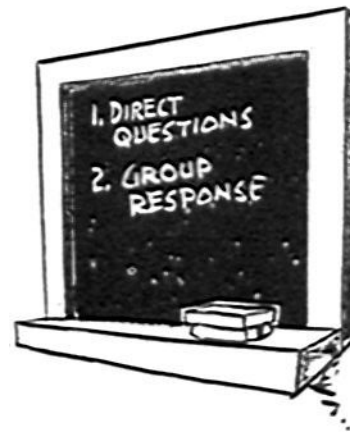
c. *Put a leading question to him.* Continuing our illustration of reinforcing fires, assume the student fails to realize the 3d FA Bn will assume its direct support role when the reserve infantry regiment is committed. Then try, "What will be the main mission of the 3d FA Bn when the 3d Infantry is committed?" Surely he will answer, "Direct support." Then ask, "If the 3d FA Bn needs some help, what is the logical unit to furnish it?" Answer, "Medium Bn." "All right, now what is the name given to missions you fire to aid that light battalion?" These are examples of leading questions which require more than a mere "yes" or "no" for the answer.

3. *Call on a Student by Name When You Have No Immediate Volunteers—Keep the Instruction Moving.* Even after the class feels free to pitch in, occasionally you will get no volunteer to answer a question. In that case, call on someone by name (don't just point and say "you"). Don't let the instruction die.

a. *When to call for volunteers:* (1) You have been with the class for a few sessions, AND (2) the class has become fairly well acquainted.

b. *How to call for volunteers.* Never ask, "Who will volunteer to . . ." Make it a challenge (for example, "Who can give me . . .") or inviting (like, "Who wants to shoot this one?"), or, after stating a regular question, look the class over and then make a gesture with your hand indicating anyone may answer.

4. *Let the Class Have Freedom of Expression.* Suppose I am conducting a conference on the material in these notes. The class has suggested the following points which I have put on the blackboard:



We have completed our comments on "group response" when you suggest, "Give a verbal pat on the back for good suggestions and comments." I reply, "That is the eighth technique, and it should be stated, 'Good answers deserve recognition.'" Would you desire to attempt another contribution? I could not have frozen the class any harder if I had announced

at the beginning of the period, "Gentlemen, in this period you are to guess the techniques of encouraging class participation not only in the words I have selected to express the techniques, but also in the sequence I have listed them!" If you are going to list items on the blackboard, list them in the students' words and as they suggest the points.

That last sentence needs a little qualification. Suppose you are selling the fundamentals of effective field camouflage before taking your men out in the field to show and have them do the job. FM 5-20, par. 4, lists four fundamentals which have a wide spread in relative importance: Selection of position, Camouflage discipline, Erection of material, and Selection of material. Here it is important to stress the fundamentals according to relative importance. One inoffensive way to arrange these items in sequence of relative importance is this: if the first man called on suggests one which should be remembered as least important, put it at the bottom of the board; if "camouflage discipline" comes up next, put it near the top but leaving room for "selection of position"; etc.

It is better to use the exact language of the student. If he gives a song and dance too long to put on the board, have him condense it.

5. *Sharply Distinguish the Right from the Wrong Parts of a Student's Answer.* It is indeed rare that an entire answer is incorrect (assuming the question was a good one and was used at the proper time). The correct parts must be sifted out, labeled as being correct, and the erroneous parts corrected. Just as the "dumb question" must be treated with courtesy, thoroughness, and patience (par. 38b, TM 21-250),

so the "dumb answer" must be handled with equal tact. Assure your learners by voice, language and manner that surroundings are friendly, that fulfillment of impossible requirements will not be demanded of them.

6. *Appeal to Their Sense of Responsibility.* Before appealing to a sense of combat responsibility you frequently have to develop that sense. Ways to do it are:

a. *Requite students to give their personal decision in an official capacity.* Letting a student speak of some nebulous T/O personnel in some non-existent outfit makes instruction artificial and boring. An example of such an answer is, "The signal sergeant would . . ." Immediately stop the man who says that. Tell him again, "It is not a question of 'the' or 'a' signal sergeant, but you are the signal sergeant. What is *your* action?" Actually you are forcing your learner into an expression like, "As signal sergeant I do [so and so]." By tying men down to field jobs we can do much to prevent the men from stumbling into pitfalls.

b. *Require students to give necessary orders.* Don't let the chief of section get away with, "As chief of section I would have the section do . . ." Make that young man answer with a specific order to his section. If it will help, designate a portion of the class as his section and ask, "What is your order to it?"

c. *Realistic questions.* Since our army is approaching an equality with the enemy in troops and materiel, the success of engagements will turn on our knowledge and proficiency in the field. Give all questions a flavor of combat. For example, "You are the Bn survey officer. Your outfit has just landed in the Philippines. This happens . . . What should you do?"

7. *Must Develop Students' Confidence in You.* Two ways to accomplish this are:

a. *By asking worthwhile questions.* All questions must deal with points the men simply MUST know (par. 14, TM 21-250).

b. *By giving an answer to all questions asked by students:* (1) If the answer is to be covered in a later period, say so. And it is frequently well to add, "If the problem is not answered to your satisfaction in this [named] later period, please bring up your question again." (2) If the question does not justify answering to the entire class, tell the student to see you at the break. CAUTION: Do not preface your statement with, "Your question does not justify the time of the entire class," or, "I haven't time for that now, but . . ." (3) If you don't know the answer to a question, say so. Be honest. Look up the answer and the next time you are with the group give the correct solution. CAUTION: Obviously, a constant "I don't know" will cause the men to lose confidence in you.

8. *Let Students Do the Talking.* Par. 39d(2), TM 21-250, states, "Answers given by students should not be repeated by the instructor." Question: "Does this apply when some in the back of the group did not hear?" Certainly not. But ways to avoid need for repetition include: (1) Break in immediately and require learner to speak louder when he cannot be heard easily. (2) Have men face bulk of class, when answering; not you. The guide in the TM does not bar bringing out a refinement or caution yourself, or by another question to a different person.

Discussion between members of the class can also be obtained by asking another student what he thinks of the answer given; for instance, "What do you think of that

answer?" or, "Is that correct?" or, "Do you agree?" CAUTION: It is important to confine such possible debate to very important points only, because such discussion consumes time very fast.

9. *Indicating Points You Had Difficulty learning.* Besides "humanizing" the instruction, this envelopment will many times succeed where all others fail. The class gets the idea, "Well, if he had trouble learning that point maybe I'd better recheck myself and ask a question to be sure I am not all balled-up."

OVER-ALL CAUTIONS

1. *Purpose of the "Thawing" Techniques.* All of them are ways of exhibiting a helpful and friendly attitude toward the men being trained. They seek to block the so-called "fear instincts" in students. Yes, I know the psychologists are still arguing whether or not we have instincts. But you and I know, regardless of what it's called, that many learners are held back by fear. I don't mean physical fear; rather, fear of failure, fear of appearing ridiculous, fear of seeming to lack the intelligence and knowledge one should have. While this "fear" cannot be entirely eliminated, we can block it so it won't shut off the student's mind from learning and expressing himself.

2. *Our Efforts Must Be Sincere.* No false appeals can be made. For instance, suppose I have asked for comments and questions and have used many of the envelopments, but every time you tried to participate I promptly seated you or gave the impression I was going to make the same comment myself? Or, that I often slipped into the repulsive "the school thinks" or "the school teaches." Won't my *demonstrated* attitude refreeze the class? Lack of sincerity is fatal to effective instruction.

Lack of sincerity shows itself in many and sometimes humorous ways. One of the antics of some new instructors is so bad it is funny: Because of inexperience and uncertainty they sometimes have an almost uncontrollable urge to impress their students with superior accomplishments and knowledge. They try to make the work hard by taking what may be called an "off the precipice" attitude. This attitude seems to say, "This is a very difficult subject and I doubt that you will ever get it as well as I know it, but I'll do my chore and plunge in."



The finest appeal any instructor can make is to seek the experienced officer's help when instructing advanced officers, and when instructing young officers and enlisted men to approach with a becoming modesty. After all, the instructor is merely another training aid. He is present for the purpose of aiding students learn.

Not in the BOOK

HIGH ANGLE TABLES

	DPT	ML	RM	ML	DPT
3	57	1163	3500		
	56	1150	4000		
	55	1134	4100		
	51	1118	4200		
	49	1101	4300		
	46	1083	4400		
	44	1065	4500		
	42	1048	4600		
	40	1032	4700		
	37	1000	7800	1158	56
	35	975	4900	1145	55
	33	946	5000	1132	53
30	911	5100	1119	51	
27	874	5200	1106	49	
		5300	1091	47	
		5400	1076	46	
		5500	1061	44	
		5600	1044	42	
		5700	1027	40	
		5800	1008	38	
		5900	988	36	
		6000	966	34	
5	57	1163	6100	942	32
	56	1153	6200	913	30
	54	1144	6300	876	28
	53	1134	6400	821	24
	51	1124	6500		
	50	1113	6600		
	49	1103	6700		
	47	1092	6800		
	46	1080	6900		
	45	1068	7000		
	43	1056	7100		
	42	1044	7200		
40	1030	7300			
39	1017	7400			
37	1002	7500	1163	57	
36	987	7600	1155	56	
35	970	7700	1147	54	
33	942	7800	1139	54	
31	912	7900	1131	52	
30	910	8000	1123	51	
28	882	8100	1114	50	
26	848	8200	1105	49	
		8300	1096	48	
		8400	1087	47	
		8500	1078	46	
		8600	1068	44	
		8700	1058	43	
		8800	1048	42	
		8900	1037	41	
6	57	1163	9000	1020	40
	56	1158	9100	1015	39
	55	1152	9200	1003	38
	54	1145	9300	990	36
	53	1139	9400	977	35
	53	1132	9500	962	34
	52	1125	9600	947	33
	51	1118	9700	930	31
	50	1111	9800	911	30
	49	1104	9900	899	29
	48	1097	10000	882	27
	47	1089	10100	862	24
46	1082	10200			
45	1074	10300			
44	1066	10400			
43	1058	10500			
42	1049	10600			
41	1041	10700			
40	1032	10800			
39	1022	10900			
38	1012	11000			
37	1002	11100			
36	992	11200			
35	981	11300			
34	969	11400			
33	956	11500			
32	943	11600			
31	929	11700			
30	913	11800			
28	894	11900			
27	873	12000			
25	845	12100			
22	792	12200			

HIGH ANGLE FIRING TABLES

Direct support of infantry in the jungle frequently requires very close-in fire. Trees are very high, and to avoid tree bursts we fired high angle on many such missions. Use of firing tables for such elevations is slow. Frequently the observer will misguess his range by several hundred yards, and the charge must be changed, thus introducing differences in drift — which becomes quite important at long ranges when firing close to our own infantry. Various means, such as graphical firing tables, can be improvised to expedite the handling of fires at FDC. We have found the accompanying table quicker and not so likely to introduce error. Such a sheet can be folded into FT-105, where it is quick to use for selecting proper charge and determining drift differences and elevation.

MAJ. JOHN R. CROSSEN,
FA

"LIGHTS OUT"

The confusion encountered at a night position when the order "alert your battery! Fire mission!" comes down from FDC is well known to all artillery officers and especially battery executives—the confusion being, of course, the locating and lighting of the aiming stake lights.

A simple and efficient method of eliminating this confusion is to have at the gun position a switch controlling the aiming stake lights. This can be done by connecting three BA-27s in series and either placing them in the old electric brake battery box or on the right trail and attaching a

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.

simple switch on the side of the box, or by carrying a prepared box along with the section chest. You need 120 yards of W-110 wire rolled into a loose coil, with one issue aiming stake light or issue flashlight spliced to one end of the wire, and another stake light or flashlight fitted with test clips for clipping at or near the center of the wire.

Three batteries in series are needed because of the resistance in the wire. If regular issue aiming stake lights are used only two batteries are needed, as their bulbs are weaker than those in the flashlights. If flashlights are used the bulbs can be covered with vari-colored paper to identify individual sections.

An extra 20 yards of wire are advisable so that the aiming stakes can be placed at the most desirable location, and so the wires may be tied-in or raised overhead.

To use this set-up, the ends of the wires have merely to be connected to the switch, the aiming stakes lined in, and the lights attached. Each Chief of Section can then control his lights at will by snapping the switch. A gunner can verify his own lights by a flip of the switch. Between fire missions the lights can be switched off to save batteries, and on any other occasion the lights can be switched off immediately.

LT. PAUL JOHNSON, FA

MEASURING MILS WITH A WATCH

In addition to keeping oriented in time and direction with his watch, the soldier can also use it as a rapid and fairly accurate means for measuring angles in mils, when no other instrument is available. The dial of the watch is graduated into 60 minutes or 60 intervals. Therefore, with 6400 μ in the circle each of the 60 graduations is equal to 106.666 μ , or roughly 107 μ . Twelve, three, six, and nine o'clock on the watch dial correspond to 0(6400), 1600, 3200, and 4800 μ respectively on the aiming circle.

To measure an angle with the watch, simply lay the 12-6 o'clock (0-3200) line of the dial on the reference point. Do this by sighting across the dial with a straw, pin, splinter, or any small straight object which can be used as an indicator. Then, leaving the watch in that position, move the indicator until it is aligned on the point to which the angle is to be measured. Note the reading on the dial directly beneath the indicator, and figure the angle in mils.

Reading from the nearest quarter-circle point (12, 3, 6, and 9 o'clock) on the dial makes the reading faster and also more accurate since it eliminates the extra 5 μ which are accumulated in each quarter

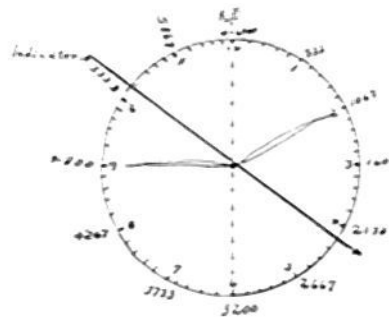
of the circle when using the graduations as 107 μ each.

The diagram shows the mil reading at each 5-minute mark on the dial of the watch. In this instance the indicator is read from 3 o'clock (1600 μ). Since the final reading is to be taken at 21 minutes past 12 o'clock, there are 6 additional minutes to be

computed after reading the 1600 μ at 3 o'clock. These 6 intervals at 107 μ each, equal 642. Thus the angle is 1600 μ + 642 μ , or 2242 μ .

If a more accurate reading is desired, subtract the extra 1/3 μ which is accumulated in each graduation counted as 107 μ . In the case shown, subtract 2 μ from the total: the angle is actually 2240 μ .

PVT. DAWYER D. GROSS, FA



Diary of War Events

(As Reported in the American Press: Edited by B. H. W.)

NOVEMBER, 1943

- 1st The 4 leading powers of the United Nations agree at Moscow to fight the enemy to submission on terms of unconditional surrender and to continue to act in unison as a guarantee of international cooperation and security.
Allied armies in Italy capture Cantalupo.
- 2nd U.S. 5th Army cracks the German line between Mount Massico and Matese Ridge.
The new 15th U.S. Air Force flies a 1,400-mile round-trip to bomb the Messerschmitt assembly plant at Wiener Neustadt in Austria.
Destroys 30 planes, loses 6 bombers.
- 3rd 400 Flying Fortresses raid Wilhelmshaven.
Marauders hit airfields in France and the Netherlands. Shoot down 48 planes, lose 5.
5th Army in Italy captures most of Mount Massico and gains control of the Garigliano valley.
Allied fliers in the Southwest Pacific raid Jap concentration of war and merchant ships at Rabaul. Sink and damage 3 destroyers, 12 merchant ships, and 9 heavy cruisers. Destroy 85 planes, lose 9 bombers and 10 fighters.
- 4th British 8th Army captures Isernia. 5th Army breaks Massico-Venafra line and advances to within 6 miles of Isernia.
Secretary Stimson reports Allied casualties in the Mediterranean theater during the past year totaled 100,000 compared with 600,000 for the enemy.
RAF bombs Duesseldorf, Ruhr armament center. Other British and U.S. bombers raid Wilhelmshaven and Cologne.
- 5th Allied armies capture San Salva and advance to the Garigliano River.
700 U.S. bombers raid Gelsenkirchen Muenstern.
MacArthur reports that the Japs have reinforced Rabaul, New Britain.
Senate votes 85 to 5 to approve United States participation in a general international organization to keep peace.
- 6th MacArthur's fliers sink 2 Jap cruisers and damage 8.
Soviet troops recapture Kiev, capital of the Ukraine.
British 8th Army captures Vasto while U.S. 5th Army takes Venafro.
U.S. and R.A.F. bombers make 36-hour raid on Akyab, principal Jap base in Burma.
- 7th Red Army captures Fastov, vital German rail junction.
British 8th Army advances to within 11 miles of Sangro River.
U.S. Flying Fortresses raid Dueren 20 miles southwest of Cologne.
- 8th Russians advance to within 140 miles of Rumanian border and 30 miles from the old Polish border.
Allies in south Pacific destroy 63 Jap planes and 1 heavy cruiser.
- 9th Japs land enforcements on Bougainville Island.
- 10th U.S. Army troops land on Bougainville to support Marines who landed Nov. 1st.
Heavy bombers raid Villa Perosa and Genoa.
More than 500 Allied planes raid Chievres, Belgium, and northern France.
- 11th The 8th Army advances to the Sangro River while 5th Army holds line at Garigliano.
French Committee declares martial law in Lebanon.
- 12th German forces land on Leros, the important island in the Aegean Sea.
- 13th U.S. Flying Fortresses bomb Bremen. Shoot down 43 planes. Lose 15 bombers and 9 fighters.
German paratroops and sea-borne invaders recapture Leros.
- 14th British 8th Army captures Atessa.
British Mosquito bombers raid Berlin.
Allied bombers drop 223 tons of bombs on Alexishafen and Madang, New Guinea.
- 16th Flying Fortresses and Liberators of the 8th Air Force fly into Norway to wreck Knaben and Rjukan. Shoot down 6 planes, lose 2.
- 17th U.S. 7th Army Air Force bombs Jaluit and Mili atolls in the Marshall Islands and Makin Islands in the Gilberts.
Army and Navy planes bomb Kara airfield on Bougainville.
Germans push Russian troops back around Zhitomir. On other fronts Russia advances.
- 18th R.A.F. bombs Berlin and Ludwigshafen, chemical center.
U.S. bombers destroy airplane repair base at Kjeller, Norway.
U.S. Liberators bomb Jaluit in the Marshall Islands and Tarawa in the Gilberts.
- 19th U.S. Flying Fortresses blast western Germany during daylight.
Germans force Red Army out of Zhitomir.
- 20th R.A.F. bombs Leverkusen, the suburb of Cologne.
British 8th Army advances 4 miles and captures Perano. U.S. 5th Army limits activity to artillery due to bad weather.
War production in United States last month shows greatest gain since April, 1943.
- 21st U.S. Marines and Army forces land on Makin and Tarawa atolls in the Gilbert Islands.
Russian troops advance southwest of Kremenchug and north of Nokopol.
The release from prison and reinstatement of the Lebanese President and Cabinet member restores peace.
- 22nd Allied troops in New Guinea advance to within ½ mile of Sattelberg.
R.A.F. raids Berlin with 775 bombers. Worst bombing ever administered.
- 23rd U.S. Marine and army troops continue to push the Japs out of the Gilbert Islands.
Weather halts ground activity in Italy.
R.A.F. again raids Berlin.
- 24th British 8th Army in Italy captures Alfedena despite bad weather.
Allied troops capture the Gilbert Islands after 100 hours of fighting.
Kill some 5,000 Japs.
- 25th Russians break through German defenses between Smolensk and Gomel.
Chinese troops encircle strong force of Japs near Changteh, North Hunan Province, and kill 5,000.
Secretary Stimson reports that the Japs lost 553 planes and 74 naval and merchant ships in Southwest Pacific since November 1st against our 91 planes and 1 destroyer-transport.
R.A.F. bombs Berlin for 5th consecutive night. Stuttgart also receives staggering blow.
- 26th Russian troops capture Gomel and extend their breach of the Nazi defense lines 70 miles above Gomel.
U.S. bombers blast Bremen, 2nd largest seaport in Germany. Shoot down 56 planes and lose 29 bombers.
Allied forces capture Sattelberg, New Guinea, the last Jap stronghold on the Huon Peninsula.
Allied forces in China kill 8,400 Japs during last 6 days and encircle 100,000.
- 27th British 8th Army extends bridgehead across the Sangro River, U.S. 5th Army stops Germans' advance west of Venafro.
Marines win at Betio Island on Tarawa, but lose heavily in men.
South American Republic declares a state of belligerency with Germany after the loss of a second ship to U-boats.
- 28th U.S. 5th Army in Italy captures La Falcona.
Allied fliers in the South Pacific sink Jap cruiser. Others bomb Rabaul, New Britain, Wewak on New Guinea, Buka and the Buin airfield on Bougainville.
- 29th U.S. Flying Fortresses, escorted by Thunderbolts and Lightnings, raid Bremen. Destroy 35 planes. Marauders and Allied fighters shoot down another 10 over Chievres, Belgium.
- 30th Allied troops in Italy break Germans' "winter line."
Russian troops abandon Korosten, northwest of Kiev, but gain on other fronts.
Allied forces in New Guinea capture Bonga and advance to ward Wareo.



For Heroism and Service



BATTERY C, 27TH FIELD ARTILLERY BATTALION *Cited for Outstanding Performance*

On December 6, 1942, the battery position near Tebourba, Tunisia, was strafed and bombed by ten Messerschmitts for ten minutes when thirty enemy tanks, supported by infantry, attacked the battery in front and flank. All the battery guns engaged in direct fire against this superior force, but at 1120 hours the tanks, firing their machine guns, passed through the battery positions and overran the machine gun posts, then turned and again passed through all the battery positions. Shelling from the tanks eventually destroyed all the 105-mm self-propelled guns of the battery, which continued in action until set afire and the crews dispersed, injured or killed by machine gun fire. The last section seen in action discharged its gun point blank at a Mark IV tank; both tank and gun fired simultaneously and each was destroyed by the other's direct hit. At this point, another battery arrived at the scene of the melee and, firing directly on the tanks, caused their withdrawal and the retirement of the enemy infantry, thus enabling the scattered remnants of Btry C to assemble. During the melee all members of the battery remained at their posts performing assigned duties until killed, injured, or their equipment destroyed.

SOLDIER'S MEDAL

1ST LT. PETER J. ALFANO, for heroism not involving actual conflict with an enemy. Address, 436 West 5th St., Junction City, Kansas.

CHIEF W.O. WILLIAM J. DALY (then 1st Sgt.), for heroism on December 5, 1941, at Hagerstown, Md. W.O. Daly noticed that the forward end of a gasoline service truck was afire. He ordered the driver to stop, turn off his ignition key, hand out a fire extinguisher, and dismount. He also called upon the battery chauffeurs to bring the extinguishers from their own trucks. W.O. Daly climbed on top of the gasoline cans on the truck and played the contents of his extinguisher on the fire. Without regard to his own safety, he remained on the truck bed unloading gasoline cans and extinguishing the fire, and he would not permit any of the other members of the battery to mount the burning truck in order to render additional aid. The fire was successfully extinguished within 20 minutes and normal activities were resumed.

PFC. LESTER N. MILLARD, on October 13, 1942, with three other soldiers, rescued a soldier who had been injured as a result of the cave-in of an underground personnel shelter in the Hawaiian Islands. Address, General Delivery, Holtville, Calif.

CORP. COURTNEY D. SYME, on October 13, 1942, with three other soldiers, rescued a soldier who had been injured as a result of the cave-in of an underground personnel shelter in the Hawaiian Islands. Address, Moroni, Utah.

SGT. ISRAEL C. WILSON, on October 13, 1942, with three other soldiers, rescued a soldier who had been injured as a result of the cave-in of an underground personnel shelter in the Hawaiian Islands. Address, Bountiful, Utah.

DISTINGUISHED SERVICE MEDAL

LT. GEN. JACOB L. DEVERS, for exceptionally meritorious and distinguished service rendered in the rapid expansion, direction and training of the Armored Force. In a position of great responsibility with limited personnel, by great foresight, force of character, and outstanding executive ability, he directed the development of armored divisions, welding them into aggressive fighting units. As Chief of the Armored Force from July 17, 1941, to May 7, 1943, by his untiring efforts, he

contributed materially to the training of the Armored Force, thereby insuring its early participation in battle.

LEGION OF MERIT

1ST LT. EUGENE F. ADAMS (then 1st Sgt.), for exceptionally meritorious conduct in the performance of outstanding services. For the first five months of the war, Sgt. Adams acted as Battery Executive Officer and Battery Mess Officer in addition to his duties as First Sergeant. He performed all his duties in an outstanding manner in spite of the most adverse conditions. He deserves much credit for the performance of his battery during the period he was required to assume additional duties normally performed by a commissioned officer. His entire service has been honorable and faithful. Address, 2000 Ferdinand Columbia Ridge District, Seattle, Wash.

BRIG. GEN. GEORGE R. ALLIN, for exceptionally meritorious conduct in the performance of outstanding service as Commandant, Field Artillery School, Fort Sill, Oklahoma, from January 20, 1941, until June 5, 1942. He displayed rare qualifications of leadership in the organization and expansion of the Field Artillery School, showing sound judgment, high technical ability, and a comprehensive understanding of existing conditions. At all times he was untiring in energy and unswerving in devotion to his exacting duties. Address, Sewanee, Tenn.

1ST LT. KENNETH A. BRYANT, for exceptionally meritorious conduct in the performance of outstanding services from March 25, 1943, to May 18, 1943. During the Tunisian campaign, Lt. Bryant contributed materially to the marked efficiency of his unit in combat by his outstanding performance in air observation, adjustment of counterbattery fire, and photographic activities. In addition, and on his own initiative, he made many daring flights over enemy positions in order to perfect more accurate methods of adjustment of counterbattery fire. From these efforts, more efficient procedures have been developed which are a valuable contribution in this field. He further contributed to the efficiency of his unit by voluntarily assisting other staff officers whenever their burden of work was extremely heavy or when they were ill or incapacitated from extreme fatigue. During the entire period, his inspirational devotion to duty and enthusiasm were important factors in maintaining the morale of the unit. Address, 758 NW Ninth St., Gainesville, Fla.

M/SGT. MIKEL DE LUCA, for exceptionally meritorious conduct in the performance of outstanding service as battalion motor sergeant

during the period March 3, 1941 to March 3, 1943. His ingenuity and initiative in carrying out the many assignments of his section, together with his voluntary assumption of many duties resulted in an outstanding record of achievement. Faced with many problems of maintenance and supply, he never failed to bring in every vehicle of the command, regardless of time or distance. In addition, he designed and built a mobile fire direction center. As a result of his efforts his battalion has been enabled to set up and take over fire control in less than five minutes after the command post has arrived at the selected areas. Address, 5935 Ayala Avenue, Oakland, Calif.

T/4 JOHN L. DENSON, for exceptionally meritorious conduct in the performance of outstanding services from July 12, 1943, to August 27, 1943. During the initial operations in Sicily he was placed in charge of the railway water service and was personally responsible for the repair of service functions. Working long hours and under the most difficult conditions, he organized crews and made repairs to water supply lines and installations at all stations and developed new sources. His initiative, perseverance, and willingness to do any and all types of work in order to insure the flow of supplies to the United States forces were outstanding and above the normal call to duty. His actions reflect a high degree of credit to himself and to the Military Railway Service. Address, Austell, Georgia.

1ST SGT. JAMES E. FRESHOUR, for exceptionally meritorious conduct in the performance of outstanding service during the battle of Attu. When the battery executive became ill, 1st Sgt. Freshour assumed the unfamiliar duties of executive in addition to his regular duties as 1st Sgt. For a period of two days he performed both sets of duties in an outstanding manner and displayed coolness and intelligent leadership when the battery was under counterbattery fire. Address, 1501 Broadway, Springfield, Ohio.

MAJ. GEN. ALFRED M. GRUENTHER, for exceptionally meritorious conduct in the performance of outstanding service as Chief of Staff, Third Army. In carrying out this important assignment he displayed outstanding organizational ability, keen and accurate judgment, superior knowledge of staff procedure and an unusual understanding of the problems confronting an Army. By his untiring efforts, thoroughness, patient persistence, absorbing attention to duty, and energetic control, he developed an efficient operating staff. Address, 2745 29th St., N. W., Washington, D. C.

COL. BERTRAM F. HAYFORD, for exceptionally meritorious conduct and exemplary fidelity in the performance of outstanding service in G-4 and in the Office of the Military Governor on and since December 7, 1941. As Assistant G-4 in charge of the Transportation Section, Col. Hayford, during and immediately after the Japanese attack on Pearl Harbor, skillfully coordinated the distribution of transportation and greatly facilitated the initial deployment of the garrison and the issuance of supplies. From January 1, 1942, until May 1, 1943, Col. Hayford filled an

important function in the Office of the Military Governor as Director of Planning and Priorities. He supervised the operation of rationing of gasoline and other essential products, as well as the establishment and assignment of priorities for the manufacture and importation of materials and supplies required to maintain the civilian economy of the Territory of Hawaii in order that it might render superior support to the war effort. It was largely through his outstanding efforts, his unflinching diplomacy and unimpeachable integrity that the importation of supplies and reserves of materials and supplies to maintain the civilian economy of Hawaii was effected. Address, 1904 Vine St., Alhambra, Calif.

COL. GORDON M. MCCOY, for exceptionally meritorious conduct in the performance of outstanding services as Commanding Officer, Camp Adair, Oregon. He displayed superior administrative ability, tact, and devotion to duty in handling the problems of his large command. His performance of duty as Commanding Officer, Camp Adair, has been of such a high order as to evoke the enthusiastic commendations of the Division and Corps Commanders whose troops have trained at that post. Address, 701 N. Capitol St., Salem, Ga.

M/SGT. ROY B. MAYNARD, for exceptionally meritorious conduct in the performance of outstanding service. Through initiative and creative ability he developed and perfected a modification of the cable connector assembly on radio sets, which was adopted for use throughout the Army, thus adding to the efficiency of the equipment. Address, 532 E., Fort Sill, Oklahoma.

T/4 ARNOLD NYE, for exceptionally meritorious conduct in the performance of outstanding services in North Africa and Sicily from March 22, 1943, to August 20, 1943. As chief clerk and draftsman, counterbattery section, he spent long hours in collecting, filing, and disseminating information of enemy artillery. Often this work was performed under the most difficult battlefield conditions. The fact that through his efforts information was always readily available for use contributed materially to the ease and speed with which the corps brought fire to bear on enemy artillery positions and installations. By his unselfish devotion to duty and his perseverance, he set an outstanding example, deserving of the highest tribute. Address, 48 Sagamore Road, Bronxville, New York.

S/SGT. CECIL W. PENNINGTON, for exceptionally meritorious conduct in the performance of outstanding service as supervisor of a battery communications system during the battle of Attu May 11-31, 1943. Throughout the battle S/Sgt. Pennington supervised and maintained the battery communications system and thus insured the success of his battery's artillery effort. In addition to this he acted in the capacity of a forward observer and liaison officer. These duties were unfamiliar to him, but he performed both with exceptional diligence and accomplishment. Address, 3011 Sonoma Highway, Santa Rosa, Calif.

ROLL OF HONOR

CAPT. JOHN E. BOHLENDER, killed in action in North Africa, 12 Feb 43.

LT. COL. CUYLER L. CLARK, died at Walter Reed G.H., 29 Mar 43.

LT. COL. LEROY C. DAVIS, killed in action in Tunisia, 31 Jan 43.

CAPT. ELWOOD J. EUART, killed in action in the sinking of the USAT *President Coolidge*, 26 Oct 42.

LT. COL. ANDREW HERO III, died at Walter Reed G.H., 16 Nov 43.

COL. DEAN HUDNUTT, died at New Haven, Conn., 11 Oct 43.

LT. S. E. KELLY JR., killed in action in the African theatre, 1 Dec 42.

COL. ZIM E. LAWHON, died Station Hospital, Camp Reynolds, Pa., 7 Nov 43.

MAJ. CLARENCE LEVIN, killed in action in Tunisia, 31 Jan 43.

LT. COL. RICHARD E. O'CONNOR, killed in action in Sicily, 18 July 43.

COL. HARLEIGH PARKHURST, died at Easton Hospital, Easton, Md., 26 Sept 42.

LT. COL. ALLAN E. SMITH, killed in action in the Philippines, 12 Apr 42.

LT. JAMES A. SVOBODNY, died of battle wounds, 7 Feb 42.

LT. JOSEPH TRIPPE WHITAKER, died in a plane crash, 29 Oct 43.

BOOK REVIEWS



MOTHER AMERICA. By Col. Carlos P. Romulo. 234 pages. Doubleday, Doran & Co. \$2.50.

Mother America is a contribution to intelligent understanding and mutual respect between the United States and the Philippines in particular, and between different peoples in general.

This book has a convincing quality of practical idealism derived from the author's sensitive awareness of a value termed "the dignity of the human soul." It is this concept of human worth which he has taken as a basic instrument for measuring relationships between Occidental and Oriental peoples. Happily the United States attains a creditable score by such a standard.

The author calls attention to the political soundness of respect for humanity by citing the example of responsive Philippine loyalty to the United States in the present war. Inversely he comments on the significance of the fact that Oriental subjects of other more imperialistic countries have shown no great desire to defend the *status quo* of the white man's government against a Japanese new order.

Col. Romulo writes with sincerity and directness. He does not submit an unqualified endorsement of this country's government in the Philippines, but he makes generous allowances and his book as a whole has a tone of hearty response to the democratic freedom extended by *Mother America*.
F. E. J.

THE ARMY PLAY BY PLAY: Five One-Act Plays by Members of the Armed Forces. 178 pages. Random House. \$2.00.

John Golden conducted a playwriting contest for the enlisted personnel of the armed forces. He was astounded to receive 115 presentable plays. A first, second, and third prize were awarded, but the fourth prize was a two-way tie. The five winners were presented on Broadway by soldier casts and the earnings went to the Soldiers and Sailors Club.

Pfc. John O'Dea won first prize with his *Where E'er We Go*; it is purely barracks-room patter. Second prize went to Lt. Ralph Nelson for his *Mail Call*, which deals with a pal's mail after he has been killed in action.

Third prize went to Cpl. Irving Gaynor Neiman for his *Button Your Lip*. This reviewer would have given it first prize. It is the most humorous of the lot. With its setting in the latrine, it deals with a set of lost, misplaced, or stolen processing records. Throw in rumors of spies and Dorothy Lamour's boy friend, and the result is good.

Fourth prize went to Cpl. Kurt Kasznar for *First Cousins* and to Pfc. Alfred Geto for *Pack Up Your Troubles*. The former deals with four allied prisoners aboard a German submarine commanded by the first cousin of one of the prisoners and how, under the American

cousin, they manage to outwit the Nazis. The latter relates an attempt to sabotage a troop train.

All five plays are interesting, but certainly are more on the amateur than professional side. Most of the authors—in fact all but Cpl. Neiman—were associated with the theater in civilian life. Let us hope that more volumes such as this are collected and maybe somewhere we'll run across a really outstanding one.
J. M. C.

REPORT ON INDIA. By T. A. Raman. 224 pages; index; endpaper maps. Oxford University Press. \$2.50.

What you want to know and what you probably ought to know about India is here presented with a brevity and a style equally appealing.

T. A. Raman, an Indian author of distinction, begins his *Report on India* with a short resume of the ancient culture and political history of India's diverse people. This well organized factual background is a valuable introduction to his main theme—Anglo-Indian relations today.

With detached objectivity the author gives an excellent analysis of the near-success of the Cripps mission, resulting current developments, and looming prospects for the immediate future. In addition to a top-flight job of reporting he submits his guess as to postwar India. Remembering that England's offer made by Sir Stafford Cripps still stands, Mr. Raman thinks it probable that the Muslim, Hindu, and native Prince groups will form some sort of federation, and that dominion status for a time is likely to be the final free choice of Indian leadership.
F. B.

FIFTEEN DECISIVE BATTLES OF THE WORLD. By Sir Edward S. Creasy; edited, with 9 new chapters and 30 maps, by Robert Hammond Murray. 620 pp.; index; maps. Military Service Publishing Co. \$3.00.

Member of the English bar and later a professor of Modern and Ancient History at London University, Creasy wrote voluminously. No other book of his gained him the then popularity or the enduring fame that did his *Fifteen Decisive Battles of the World*. One may argue with his selections—after all, it is nearly impossible to gain unanimity on such a question—but not with the high standard on which his choices were based. Creasy abided literally by Hallam's definition: a *decisive* battle is one "of which a contrary event would have essentially varied the drama of the world in all its subsequent scenes." Thus he selected not only the well-known Marathon and Waterloo, but such others as Arminius, Orleans, the Armada, and Saratoga.

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But it is 93 years since this book was first published. Since then the style of writing has so changed that parts of Creasy's text would now seem unbearably dull. Some comments and many a footnote are now out of date. So Mr. Murray has freshened the old text, culling out the inappropriate yet retaining the earlier historian's narrative and expression of opinion. A remarkable job has been done, too.

To the original 15, another 9 have been added, largely from the New World and nearly all (Gettysburg to Mukden) after the period Creasy considered. The old high standard of choice was adhered to, and a clear conception given of the background as well as of the combats themselves.

Considered from any point of view, we have here a notable contribution to the best in military literature. It is a fine example of continuing (and even increasing) cooperation by the one publisher who has ever kept the Army in mind.

JAPAN FIGHTS FOR ASIA. By John Goette. 242 pp.; index. Harcourt. Brace and Co. \$2.50.

Until the Japanese interned him in Peiping on December 7, 1942, John Goette had spent twenty years in the Orient, five of them as INS correspondent with the Japanese Army. Now he has written a book, and just because of his background in the Pacific, and because the book is rational and analytical rather than chit-chatty or hair-raising, its message is all the more impressive.

Japan fights for Asia in two senses. Naturally she wants to conquer it for herself, and so we must defeat her. Underestimating Japan led to Pearl Harbor. If we are now to win in the Pacific in the most efficient manner, we must stop underestimating her. The Japanese is an excellent, tough fighter, Mr. Goette maintains, and Japanese military and industrial machines, her record of exploiting the conquered territories, and her propaganda there are all far better than we like to believe.

But Japan also fights in behalf of Asia, for never again will Asia accept Western imperialism. And that is the essence of Mr. Goette's warning: not only must we defeat a powerful enemy, one ready to make any sacrifice for victory, but we must be prepared equally to solve the problems of peace which her defeat will pose before us.

A. L. O.

THESE ARE THE GENERALS. With a Foreword by Walter Millis. 259 pages. Alfred A. Knopf. \$2.50.

In the past couple of years Gen. Johnson Hagood, Demaree Bess, John T. Whitaker, and others have published a number of portraits of our leading generals in *The Saturday Evening Post*, *Colliers*, and *Life*. Seventeen of these excellent thumb-nail biographies are now brought together. Their effect is cumulative.

Marshall and McNair, MacArthur and McNamey, Eisenhower and Eichelberger, Clark and Chennault—men of this statute are outlined. These are no formal, boring sketches, but lively accounts that give a mighty good idea of what these officers are really like as well as how they earned their positions. Diverse in background, they are utterly alike in what may be summed up as *integrity*. Devotion to duty is another term that might be used. But "duty" with them was never a narrow word; it covered not just the matter of the moment, but the long-term pull, the future and destiny of the country, and personal preparation so that each man might contribute as much as possible.

These essays are reprinted precisely as first published, which is a bit unfortunate since dates of original publication are not given. This will not greatly bother military folk, but the lay reader will be a bit puzzled by references to events of "last year," for example. Precise dates are relatively unimportant, though, and the "big picture" of these leaders can suffer little.

As a study of American generalship, *These Are the Generals* is thoroughly recommended.

THE SPANISH LABYRINTH. By Gerald Brennan, 345 pp.; bibliography; index; maps. The Macmillan Co., \$3.50.

The labyrinth Mr. Brennan describes wound through Spain's tortuous history from the restoration of the incompetent Bourbon dynasty in 1874 to the outbreak of the Civil War in 1936. Vainly seeking a way out of it were the Spanish people, beset by their

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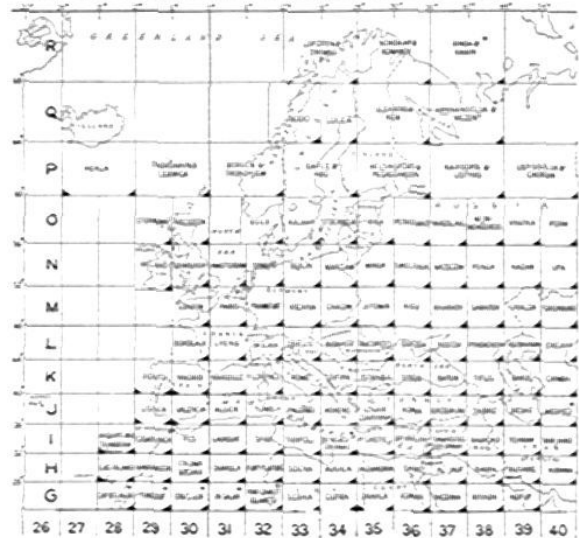
climate, institutions, geographical barriers, and temperament. The Civil War provided no solution to their age-old problems; the social tension simply became too great and produced a purge of blood but not of spirit.

If the test of an historian's impartiality is the elusiveness of his own principles in his treatment of his subject, Mr. Brennan can be judged thoroughly impartial. He lived and farmed for many years in Spain after the last war and observed it in its downward course toward civil war, intimately as a resident and with detachment as a foreign observer without apparent ideological prejudice.

It is strange to note how similar were the tactics of the Catholic Church and the Communist Party, the former containing the great majority of all Spaniards and the latter numbering 3,000 members at the outbreak of the Civil War. Both disdained the slow and tedious work of proselytizing and instead relied upon the power of a state they hoped to dominate to carry their principles into action. The Communists' strength, of course, increased enormously when their party became the funnel through which poured Russian aid to the Republicans. In the same way the Falange became the dominant

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group on the Right as the agent of Germany and Italy.

Back of many of Spain's troubles, as Mr. Brennan clearly shows, was the difficult agrarian problem, in which unequal land distribution combined with lack of rainfall to keep the peasants at a semi-starvation level. (The author has some interesting maps showing the relation of rainfall to the peoples' political sympathies.) A curious fact is that in the 16th, 17th, and 18th centuries the Church was the strongest advocate of collectivism as a solution of Spain's agricultural problems.

Mr. Brennan is not too hopeful about Spain's future, feeling as he does that the Franco regime has contributed nothing positive and is simply holding the old elements of discord in a state of suspension.

L. B. C.

RIO GRANDE TO CAPE HORN. By Carleton Beals. 367 pages: index; end paper map. Houghton Mifflin Co. \$3.50.

This book's contents completely justify the lure of the title. Although not primarily of the travelog type, it has a leisurely quality

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F. E. J.

TULSA: From Creek Town to Oil Capital. By Angie Debo. 118 pages; illustrated; index. University of Oklahoma Press. \$1.50.

Beginning with events of 1836, this book brings the reader up to date on the history, development, and growth of the "oil capital of the world"—TULSA. Those interested in American history will enjoy it.

M. K. W.

ABBREVS: A Dictionary of Abbreviations. By Herbert John Stephenson. 126 pages. The Macmillan Co. \$1.75.

The abbreviations which business people, writers, scholars and laymen need to use correctly are compiled in this single volume. They are arranged in alphabetical form. Legal, medical, theatrical, mathematical, religious, weights and measures, military and naval and aeronautical, scientific, official, political, and many more are listed. Christian names, books of the Old and New Testaments, names of countries and states and counties, foreign monetary units, federal agencies, etc., are in a special list.

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THEY FLY FOR VICTORY. By Keith Ayling. 215 pages. Thomas Nelson & Sons. \$2.50.

In his smooth, easy-reading style, Mr. Ayling brings us a splendid round-up of aviation personalities. Flyers of the last war, inter-war adventurers such as Alcock and Brown, men who burned themselves out over the drafting boards, youngsters who couldn't wait for their own countries to enter the war and so helped form the Eagle Squadron and the Flying Tigers, heroes of the R.A.F. and of the U. S. Navy, Marines, and A.A.F.—these men are the stuff that makes up *They Fly for Victory*. This book has a fascinating flow that makes you regret its ending.

SWORD OF BONE. By Anthony Rhodes. 278 pages. Harcourt, Brace & Co. \$2.50.

Capt. Rhodes, a Territorial, was mustered into service September 3, 1939, as an Engineer Stores Officer. He was soon in France, and his account carries through his Dunkirk evacuation. Throughout he maintains a good perspective and balance. The period of the "phoney war" is described better than I have seen elsewhere. Then, of course, the tempo picks up after invasion of the Low Countries on the 10th of May next.

Rhodes's descriptions often appear detached. He could see and appreciate the significance of blundering attempts at defense, the moods and preoccupations of his British fellows and of French soldiers and civilians. At times he is a bit biting, but his climactic description of Dunkirk is a masterpiece. His title, incidentally, is derived from the well-known reference to the jawbone of an ass!

WINGED VICTORY: The Army Air Force Play. By Moss Hart. 201 pages. Random House. \$2.00.

Here it is—the perfect answer to questions about our Army Air Force. Is training difficult? Are Cadets ever afraid? How great is the moment when the wings are pinned on?

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THROUGH JAPANESE BARBED WIRE. By Gwen Priestwood. 197 pages. D. Appleton-Century Co. \$2.00.

Mrs. Priestwood, who had lived in the Orient since childhood, remained in Hongkong as a member of the Auxiliari Nursing Service after her husband returned to England to serve in the R.A.F. and her mother had been evacuated along with most other civilians. Thus she witnessed the attack of December 8, 1941, and was in the thick of the fray as driver of a commandeered milk truck. Then came the notorious Stanley Prison Camp.

Fifty-four days of a little rice and little else made her willing to take all the risks of flight. So one dark night she went under the wire, along with a British police official. She is the first woman in this war to escape from a Jap concentration camp. By foot, sampan, truck, river boat, and plane, she managed the tedious 1,000-mile trek to Chungking in 24 days. The word she brought as to conditions, and her list of prisoners, were instrumental in repatriating on the *Gripsholm* her 300 American fellow-prisoners.

OUR ARMY TODAY. By Kendall Banning. 255 pp.; index; illustrated. Funk & Wagnalls Co. \$2.50.

Written in exceedingly popular vein, *Our Army Today* perpetuates many a popular misconception and adds quite a few of its own. Granted, this reviewer did not peruse the entire book—but examination of the chapter on field artillery didn't encourage him to go further. A very few examples from the many errors will show just what I'm driving at.

On page 88 Banning says, "So effective was [the famous 75-mm gun of French origin] that it won for the field artillery from Napoleon himself the sobriquet of 'the King of Battles.'" This gun actually was not built until the 1890s; the famous model is of 1897 vintage; and Napoleon had then been moldering for 76 years!

Despite the author's insistence to the contrary, our army contains no horse or horse-drawn artillery.

Mr. Banning says the 155-mm howitzer "is the largest and most

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powerful weapon that is officially a part of the field artillery arsenal. (The 155-mm gun is part of the Corps brigade.)" Isn't corps artillery field artillery? and what of the 8" howitzer and gun, and the 240?"

The gunner isn't the man who fires the piece—and the correct man doesn't *pull* the firing pin by a lanyard or in any other way.

Newspapers to the contrary notwithstanding, the M7 Motor Carriage is *not* a Tank Destroyer. Both design and tactics take it out of that group. Any field piece may fire against tanks, but is not *ipso facto* a Tank Destroyer.

THE WAKE OF THE PRAIRIE SCHOONER. By Irene D. Paden. 477 pages; bibliography; index; maps and drawings by the author. The Macmillan Co. \$3.00.

In these days of hot-off-the-griddle books, it is especially good to read such a carefully prepared one into which has gone so much personal enthusiasm and interest. For some years there have been rumors and occasional news of the Paden family and its hobby of tracing out the Oregon Trail and other pioneer routes into the West; now their vacation treks have ended, and this splendid account collates their research.

But the term "research" does not imply dreary drudgery, for this was all a labor of love. True research it was—through countless letters and diaries, into musty county records, into maps, charts, sketches, and field notes. All this was climaxed by a foot-by-foot retracing of the emigrant trails themselves.

In sympathetic fashion Mrs. Paden has reconstructed the journeys of the western pioneers. Through them sparkle the humor of those early trips as well as of her own. Hardship and tragedy are here, along with all the authentic small details that truly recreate the life and spirit and living of the early days. Both main trails and the innumerable cut-offs and by-ways were covered. Result: a magnificent monument to the hardy (and sometimes foolhardy) souls whose labors opened a continent and founded an empire.

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DESERT CONQUEST. By Russell Hill. 334 pp.; appendices; maps. Alfred A. Knopf. \$3.00.

It was in June, 1942, two years after war first flared in the Western Desert, that Rommel broke the Bir Hacheim—El Gazala line and drove the British pell-mell eastward past the Egyptian border to El Alamein, only 70 miles from Alexandria. Cairo was terror-stricken, for it seemed that nothing could keep the Germans from Suez and India and a junction with the Germans from Russia and the Japanese in the East. Somehow, the Eighth Army stood firm at El Alamein, between the Qattara Depression and the sea, and Rommel was stopped. Through August, September, and October of 1942 Montgomery worked miracles. On October 23d the rejuvenated Eighth Army attacked, and by the beginning of May the much vaunted Afrika Korps and its Italian impediments gave up the ghost at Cape Bon before the onslaught of the British and Americans.

Montgomery's campaign and the landing in North Africa is one of the most brilliant and thrilling events in military history, but you would have a hard time appreciating it or piecing the details together from this book. The excellent maps alone give you a picture of the battles and the advance. The text is full of characterless people and vague units who go through unmeaning and unexplained motions to attain indefinite ends. The military details are of little value to the military reader, and the whole picture is too blurred to give a civilian an adequate idea of this very important campaign.

R. G. M.

A SHORT HISTORY OF THE CHINESE PEOPLE. By L. Carrington Goodrich. 244 pages; index; maps and illustrations. Harper & Bros. \$2.50.

People who have lived and worked closely with the Chinese have been surprised to find how alike Americans and Chinese really are. Despite differences of color, race, and language, these people basically have much in common. In the future our contacts will be greatly increased. Just as your personal friends seem closer when you know their backgrounds, so will our relationship with the Chinese prosper as we learn and appreciate their history.

Columbia's Associate Professor of Chinese covers much ground in a short, compact book, but his job is competent within its space limitations. You are left with a definite feeling of appreciation. Since the Chinese and their history are so very little known to most of us, this is a fine book with which to start getting acquainted.

OTHER BOOKS RECEIVED

THE U. S. - CANADIAN NORTHWEST. By Benjamin H. Kizer. 66 pages; index. Princeton University Press. \$1.00.

Excellent summation of past, present, and probable future of this "coming" (if not "arrived") area.

DILBERT: How NOT to Fly. By Lt. Robert C. Osborn, USNR. About 60 pages. Coward-McCann, Inc. \$1.75.

Grand collection of humorous drawings of the difficulties of a dimwit.

MARCHING HOME. By Richard Hart. 182 pages. Arco Publishing Co. \$1.89.

Advice on personal affairs for members of the armed services and their families.

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