

The
FIELD ARTILLERY
Journal

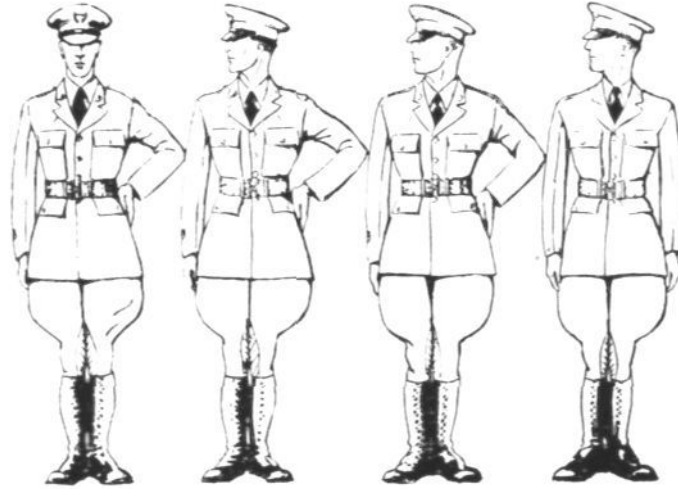


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AUGUST, 1941

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The Field Artillery Journal

A Publication for the Field Artillery of the Army of the United States

AUGUST, 1941—Vol. 31, No. 8

SHORTLY AFTER the fall of France an American officer who has a deep knowledge of military affairs in Europe, and who is himself a graduate of the Ecole de Guerre, said, "After the War of 1914-18 the Germans sat down and analyzed the causes of their defeat. The French will do the same after this war. For that reason we may expect eventually to receive better data from them than from the Germans." For the last year very little from the French viewpoint has been available in this country. Recently, however, THE FIELD ARTILLERY JOURNAL has made contact with several French officers who participated in the most intensive fighting of 1940, and who are able to furnish valuable lessons from what they experienced. Lieut. Dupont's article in this issue is only one of several such accounts which we will present in forthcoming issues. Next month the JOURNAL will contain the first of a series by Capt. Leo Framery, who was a battalion executive in the divisional artillery of the French 2d Light Mechanized Division. This unit fought through the Flanders campaign, and the author was evacuated with the British through Dunkirk. His detailed account will be of immense value historically as well as professionally.

MANY OFFICERS as well as civilians have stated recently that they find the current news of the European War very confusing. And no wonder! The newspaper headlines rarely accord with the facts, or even with the news stories under them. The ordinary reader of the newspaper has a vague idea that the headlines should give him a brief word picture, or summary, as it were, of the war news of the day. Such is not the case. The headline seems to be designed solely to attract attention, and it too often gives a completely erroneous impression of what has occurred. The military reader who is not in a position to obtain the facts from other sources would do well to consult a map for a few moments each day, and attempt to determine from the map, and with the aid of the news dispatches (not the headlines), what advances if any have been made. Excellent maps for studying the situation may be obtained at almost any stationers' store. The few moments spent with your map each day will repay you in an increased and more accurate knowledge of what is occurring on the battlefields.

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FIGHTING THE PANZERS

By Lieutenant Jean Dupont

Editor's note: Lieut. Dupont is a young French officer who on the outbreak of the war was called to active duty with an artillery regiment of a reserve division. After serving on the Alsace frontier during the static period of the conflict, he saw strenuous service in the Battle of France commencing June 5, up to the armistice. Dupont was forward observer for a battalion of 155-mm. howitzers, which gave him opportunity to be with the most advanced elements. Thus he saw the German tank attacks on French infantry; and later he was involved in the use of 75-mm. guns which were thrown into the maelstrom in a desperate attempt to stop the panzers. *The Field Artillery Journal* is proud to publish this, the first really professional account printed in America, giving the French side of the story. We hope to follow this with further articles by Lieut. Dupont and other French officers now in the United States.





There is no doubt for me that tanks were responsible, more than any other weapon, for the lightning success of the German armies in France. The kind of war which they imposed upon us was not the kind for which we had been instructed. It was so totally different from the War of 1914-18 that one who has not participated in it cannot readily grasp its bewildering character.

My division, thrown into the line toward the end of May, 1940, in the A ----- pocket, was attacked June 5 by a panzer division and two infantry divisions; two days later it had practically ceased to exist. On the evening of the first day all the 155-mm. howitzers of my battalion and the 75 which had been attached to us for antitank defense had been put out of commission, and only two out of the eight howitzers could be transported on the road.

I am led, of course, to emphasize the deadly effect of tanks because I saw my division destroyed by them. But what I saw later during the retreat to the Oise, around Paris, in Beauce, in Sologne, and in Poitou—all this confirms my opinion.

Every French soldier would not agree with me. In the French Army there were three main opinions as to the cause of their defeat:

(1) That of the man whose unit had not been attacked by tanks, but only by infantry. In this case the French unit usually succeeded in stopping the German advance, only to be forced back by the withdrawal of neighboring units which *had* cracked under the panzer onslaught. Such a man blamed his neighbor who had borne the brunt of the armored attack. This happened to us in Alsace and later on the Oise. In the latter area we stood firm for three days, having little trouble in repulsing German attacks—only to be compelled to retreat anyway.

(2) That of the man in the rear areas of the Army, he who had seen no real fighting but had been *bombed*. For such a man the Stukas were the sole cause of the French defeat. This was especially true with civilians who experienced the horror of being caught under the rain of bombs while crawling along the roads. This blinded them to any other consideration.

(3) That of the man, who, like myself, experienced infantry attacks, air attacks, and panzer attacks. This man agrees with me that the tank was the principal cause of our defeat.

It is true that bombing caused terrific damage and sometimes succeeded in blocking roads. It is true also that German wings had undisputed control of the air. *I never saw a French or a British plane.*¹ I admit that the

Luftwaffe contributed heavily to the German success. But I believe that even if they had not ruled the air, the Germans, with their panzer divisions, would have beaten the French Army; whereas with twice as many planes and no tanks they would have failed. This gives a view of the relative part which each arm played.

Our personal observation of the operation of the German armored units was this: Panzers did not function in quite the same manner on an organized front (such as that at A -----) as they did in the open warfare in Beauce and Poitou, where there was no front. On the outskirts of the city of A ----- the lines had been occupied for ten days and an actual defensive position had been organized. True, this was rather weak as our division occupied far too wide a front, and the centers of resistance, set in villages, were far apart. The artillery batteries, however, had been carefully emplaced and some ground protection built up. It was here, in the Somme offensive which commenced June 5, that we saw for the first time and in a clear light our tragic lack of adequate equipment for modern warfare.

On June 4 I, as an observer for an artillery battalion, was in a little village which the infantry had organized as a center of resistance. It was garrisoned by an infantry battalion which was in position on the *avantposte line*. At five o'clock in the afternoon I saw, at a distance of four kilometers, long lines of German vehicles which looked like tanks, headed toward A ----- . All during the night we heard these German tanks rumbling and changing gears as they took position, for the attack, behind a ridge one kilometer to our front. Thus we had a good 12 hours' warning of what was coming, and we spent the night planting a field of land mines in our front.

At two o'clock the next morning we were subjected to a severe artillery preparation which lasted for two hours. After the Armistice I visited A ----- to look for some graves, and I saw the emplacements from which this shelling originated. The Germans had emplaced their batteries very close to the front, farther forward than is considered normal artillery practice.

At 4 AM we saw waves of tanks, without infantry support, coming down the ridge towards us. My telephone line had been cut for some time, but by radio I sent the order to start our protective barrage. In a few moments a heavy concentration from our 155-mm. regiment came down in front. So far as I could observe, this did little or no harm to the German tanks. Neither did the field of land mines appear to have any effect on them. In a short time the German tanks reached the edge of the village (in which I was stationed with our infantry) and surrounded it. The 25-mm. antitank gun²

¹German observation planes were always over us. Day after day a small, slow observation plane circled leisurely over us, directing the fire of long-range German batteries. One of our columns was caught under this fire and suffered heavy losses.

²Our infantry did not possess antitank guns of heavier caliber.

with which I was equipped fired at three tanks. One was stopped permanently, another for a few minutes; the third was unaffected, although we fired many rounds at it at fifty yards' range.

In the meantime the German artillery was hammering us sporadically. We guessed that this fire was directed by observers in the tanks, who sent back requests for fire on the spots where they had encountered the hardest resistance. This kind of fighting lasted two hours, during no part of which did the tanks penetrate the village, but they succeeded in silencing the few 25s which the battalion possessed. At 6:00 AM German infantry who had been brought forward in armored trucks joined the tanks. The tanks, against which no opposition was left, helped them to

far less effective or convenient than were the small "tommy" guns which all Germans seemed to possess and with which they poured fire into us as I have seen gangsters do in American movies. In spite of this, the Germans did not go very far and could not dislodge us from the village. After several hours of this close combat the infantry battalion commander sent me back to my own unit (our communications were broken) to ask the help of the artillery in bringing fire on certain definite spots where fire was acutely needed. I succeeded in reaching my battalion, but only after a very difficult trip. And that is the last I ever heard of the fate of the infantry battalion in the village. None of them ever returned. For a long time we heard the battle raging; but surrounded as



German 20-mm. Flak passing through French village at night. Used for close defense of columns or positions, against low-flying aircraft. Note white markings on rear of truck, for guidance of following vehicle.

destroy the machine-gun nests which were protecting the village. In this manner they made a breach in our line, through which they poured infantry of the armored division into the village. The tanks still made no attempt to enter, though they could have done so at many points. They left this mopping-up job to their accompanying infantry.

Now in the town there developed a hand-to-hand struggle which revealed that our equipment for that kind of combat was also inadequate. In the narrow village streets, from house to house, in the little orchards, from tree to tree, our machine guns and *fusil mitrailleurs* were

they were and cut off from reinforcement or supplies, they were in a hopeless position. The tanks in the rear areas, attacking supply columns and reinforcements, made sure that their ammunition and food would soon be exhausted. Two days later the village fell silent. We knew that they were all dead or prisoners.

In the same manner, one after another, all centers of resistance were surrounded, isolated, broken—all in one or two days. We were told that on our left a counterattack of the motorized cavalry of the division, supported by a few tanks, had succeeded in retaking several centers.

For my part, as soon as I reached my battalion I participated with it in a fight between our artillery and the German tanks. Swarms of these tanks which at the very beginning of the attack had by-passed the infantry centers of resistance, were running as far as twenty kilometers inside our lines, destroying batteries, blocking roads, storming headquarters, wrecking long lines of supply trucks.

One example will give an idea of the swiftness of their penetration: At the same time that my major was receiving a message from me (while I was still with the infantry) that our infantry was repulsing the attack, he was receiving another message from our supply column ten kilometers in his rear saying that it was surrounded by tanks.

I shall reserve for a future article the details of this fighting between the German tanks and our artillery. It was desperate and bloody. The 155s could not be turned around quickly enough to face the tanks, which almost always attacked the rear. The 75 with its scanty, thin shield was too vulnerable and its crew was, as a rule, wiped out before it could fire more than a few shots. Several times during this war I have passed 75s in the fields, with their crews lying about them, killed by tanks. For the tanks it must have been great sport, circling around and killing at leisure. The outcome would have been different if our guns had been adequately protected and could have been turned through 360 degrees with great rapidity. Although we began the fight with the hope of holding the tanks with our guns, we were soon forced into a game of hide-and seek, with us doing the hiding; and we realized that ditches and traps couldn't be used in this war any more than such absurd things as bottles of gasoline, crowbars thrust between the tanks' tracks, and so forth.

After dark we removed our broken guns from their emplacements and tried to get them out on the road. We noticed that the materiel was luminous, glowing in the darkness. We wondered if the German tanks had not fired some shells filled with a special phosphorescent substance.

During the night we could see German rockets rising in the sky far within our lines; we presumed that the German tanks were signalling their positions to their supporting echelons.

The foregoing describes how our lines in the A ----- pocket were broken by the German machine. It is, I think, typical of the rupture of an organized front by the blitzkrieg. From my friends who were on the Aisne I heard the same story.

Once the line had been broken the panzers pushed ahead with their tanks and infantry transported in armored personnel carriers. My artillery battalion was caught by a column of panzers while on the road near Beauvais. The German column consisted of armored vehicles, numerous infantry who dismounted and fought on foot, supported by 105-mm. field pieces. On this occasion the other battalion

of our regiment was still 30 miles to the north and, what may seem odd for a battalion of horse-drawn 155s, joined us a few days later.

Ahead of the panzers the German Air Force bombed villages and machine-gunned columns on the road. At Breteuil we saw a most amazing thing. Sixty Stukas, one after another—like links in a chain—diving and dropping their bombs, four or five at a time. In fifteen minutes the center of the city was annihilated. Then the flock of Stukas went from village to village; within half an hour smoke and fires were rising from everywhere in the valley. But we were surprised to see that none of our men who were caught in Breteuil during the bombing had even been wounded. Later on we found that bombing does not do much harm to personnel if they take shelter in a little pit or a ditch alongside the road. Even after having crossed the Loire River under dive bombing, there are none of us who would not prefer to be a hundred times under bombs more or less dropped at random than to be caught once more under the accurate fire of a close tank.

After having experienced the power of the panzers on the Somme we again saw their technique, this time at its best, in Beauce and Poitou. In that sector the panzers were moving on the roads, which they seemed never to leave except to by-pass some obstacle or crush some resistance. They preferred the main highway, and disdained to use the side roads. This is one of the reasons why our column, horse-drawn, and still encumbered with much of its heavy equipment, could make six hundred kilometers from A ----- to the south, with German panzers ahead of it most of the time. The Germans did not seem to bother with their flanks. Several times while scouting I found myself very close to them. The panzers went along the road, storming, one after another, the villages which the French had occupied in the vain hope of stopping them. These attacks were led by tanks and infantrymen who had quickly jumped from their trucks. Here the tanks and infantry operated closely together, whereas on the Somme the tanks had wandered far inside the French lines without support. We thought that this difference was due to the fact that the Somme front was an organized one where infantry attempting to accompany tanks inside the lines would have had little chance against the strong French defense.

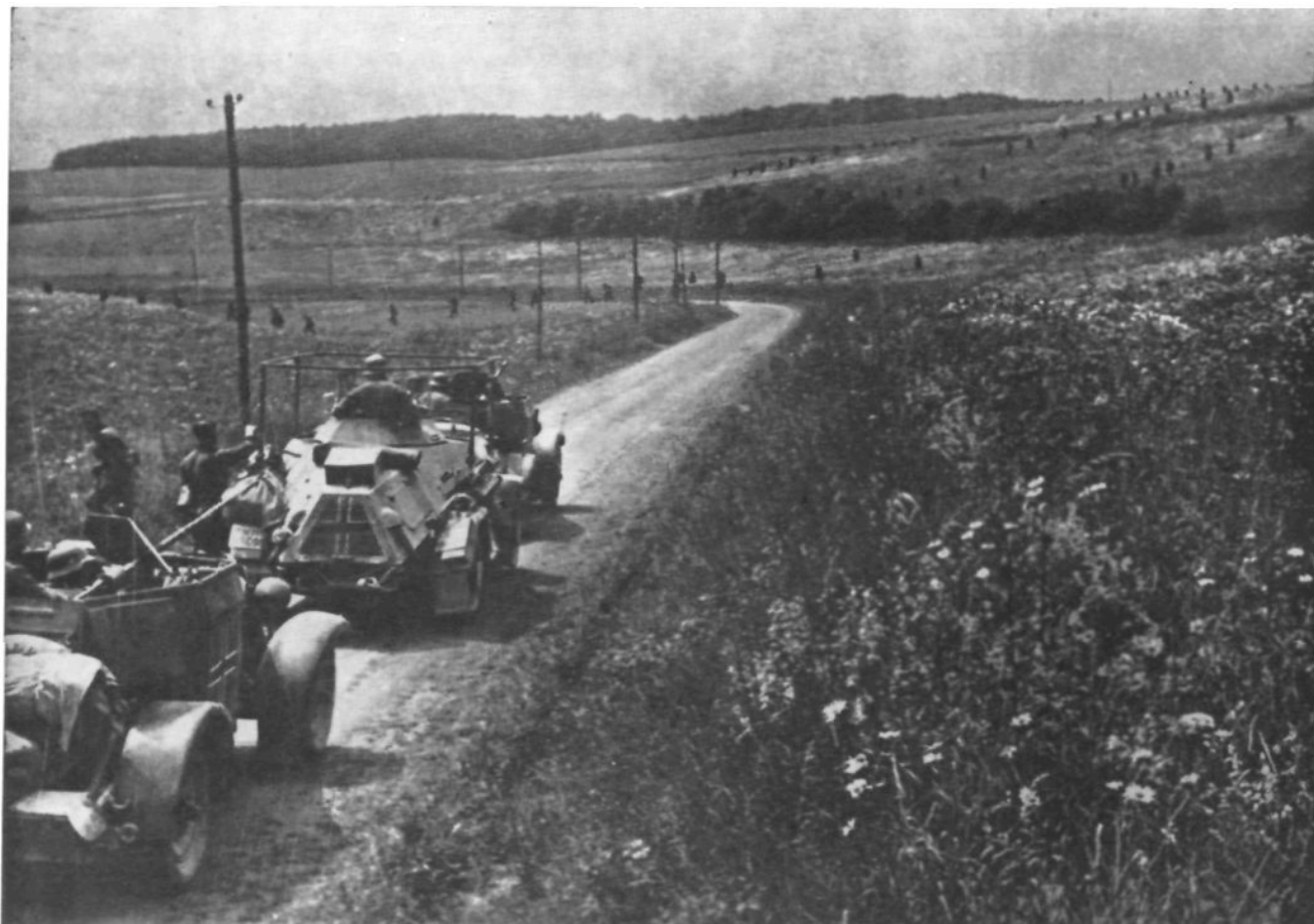
The head of each panzer column was composed of motorcyclists and armored cars. This element pushed ahead daringly, storming or going around all obstacles. In Beauce this vanguard was so far ahead of the main column that quite a gap existed. Several times our column took advantage of this gap to cross the highway on which the "blitz" was moving. We noticed several times small columns of German vehicles speeding to the rear. Possibly their purpose was to keep the route open. In the village of Poitou, where we were finally cornered, there was no gap between the leading motorcyclists and the rest of the armored division. There we saw for hours,

passing at fifty kilometers an hour, twenty yards apart, armored vehicles, guns, and many trucks pulling antitank cannon.

One point worthy of note is that, in spite of the amazing speed of the panzers and the complete German supremacy in the skies, we were always well aware of the presence and general direction of movement of German armored units in our neighborhood. If this had not been so, our colonel would have been unable to lead from the Somme to Poitou, between the 7th and 25th of June, a heavy column

automatic guns. More often than not we had to interrupt a meal or a good sleep to get out of their way, but we managed to keep going in good condition and in good order. We even received supplies and kept in touch with division headquarters, at a cost, of course, of several liaison agents.

Even at the end, the day of the Armistice, when we were cornered, we knew perfectly well what was going on. However, our communications had been cut, and, being horse-drawn, we could no more match the speed of the



Infantry of a panzer division making an attack, while armored vehicles wait in defiladed area.

of artillery which was completely defenseless, without losing more than half of it. When we were trapped once near Beauvais we had been forewarned for hours; but, knowing that the "front" was thirty miles to the north, we felt that we were not in danger. We even refused to believe it when 105-mm. shells commenced to crash around us,³ and only realized our peril when our column was caught under the fire of German tanks. After this experience we became quite cautious and quickly developed the ability to recognize at a distance the slow tuck-tuck of the tank

³We thought they were fired from an unusually long-range gun.

motorized Germans. Cavalry scouting, or motorized scouting, was successful because it was easy for an individual to flee from the panzers, especially if they were just moving along the roads. If so many men were captured, it was because the panzers cut through our columns and blocked the retreat by occupying bridges or other defiles.

Many times the panzers reached these bridges ahead of our troops, and many times the bridges were not blown up in time. The talk of widespread treason among the French is nonsense. Twice I have seen the tragic dilemma of the bridge-demolitions details: If they blew up the bridge they would cut off the retreat of the

remnant of the French Army. On the Oise River one of our batteries did not reach the river in time but was lucky in finding another bridge farther upstream. On the Loire, one of our battalions made twenty kilometers in two hours and at dawn galloped across the bridge before it was destroyed. Our men knew that the bridge would be blown at the first sight of a German helmet.

The speed of the panzers nullified any efforts to build barricades across the roads. The panzers, with their cross-country mobility, only sped around these obstacles, whereas our troops were often delayed by them.

When we summarized all that we had seen in this fateful month of June—and we discussed this over and over—we all came to the conclusion that the main cause of our failure to hold the Germans was the *lack of efficient and sufficiently numerous antitank weapons*. You can't have too many antitank guns, and they must be powerful enough to smash the tank. It ultimately boils down to this: There always comes a time for the attacker when all parts of the terrain must be occupied. This cannot be accomplished until the defending machine guns have all been silenced. If the guns are scattered and have a little ground protection—which they usually had—neither planes nor infantrymen can silence them—and did not in our case silence them. But the tanks *could and did!*

On the Somme, centers of resistance fell because they were isolated by tanks. Storm troops succeeded in penetrating because tanks had opened a breach. Our 155s and 75s did not help much because they were not themselves protected adequately, and thus were destroyed by tanks. (I will show in a later article that field guns which fight tanks must be armored.) When near Beauvais one of our batteries was captured; it was because its only machine gun had been silenced by a tank. If, in Poitou, villages fell one after another in a few hours, it was because their weapons—mostly machine guns—could do no harm to German tanks. If bridges had to be blown up instead of being defended, it was because suitable antitank weapons were not available. If whole armored divisions could plunge deep into our lines without being pinched off by counterattack, it was because there were no efficient guns to rout their tanks, nor *armored, motorized* guns to support the counterattack.

With their planes and tanks the Germans made this fight look more like a struggle between a blind man armed with a wooden sword, and a farsighted man equipped with a gun.

I am convinced that the whole panzer success was founded upon a *trick*. That trick was the invincibility of the tanks. Could the tanks have been stopped, the whole blitz would have crumbled.

Armored Attack South of A—

A Translation of a Recent German Article

***Editor's Note:* It is not often in today's war that one can discover accounts from both antagonists describing the same local action. The following story, somewhat disappointing in its lack of specific detail, is interesting nevertheless in that it describes from the German viewpoint the same fight south of A ----- in which Lt. Dupont was a French participant. It shows, moreover, that the French mine field and antitank fire was more effective than Dupont and his friends realized. We can only conclude that for a successful defense, the antitank guns must be far more numerous and must be emplaced in great depth.**

It is the early morning of June 5, 1940. We are at the south edge of A----- and with some suspense awaiting the coming day, the day upon which the Weygand Line south of the Somme is to be broken. It is about 4 AM. Everyone is crouched in the tanks, for the enemy artillery fire is so strong that the greatest prudence is necessary. Only the officers are gathered around the C.O. in discussion. At 5

AM comes the order to march. Once more I collect my platoon, and things then seem more cheerful. For the first time I have the good fortune to be with my platoon at the head of the battalion.

We move off to the left of the A----- P----- road. Shells are falling everywhere. After going about 2 kilometers we receive antitank fire from a copse to the front. The

weapon is invisible but we can see the flash. In unison the fire of the whole platoon focusses on the same point and silences the enemy; we do not have to halt once. I take a quick look around out of the turret; and then close the hatch, for the battle seems now to be beginning.

My tank rolls down a slope with the platoon behind me, in good order. We cross a level stretch, where enemy mines were expected. My driver goes carefully and all of the other vehicles creep along, always maintaining their distance in a narrow wedge formation behind me. We cross a road and halt in front of a slope. Up to the left a woods extends for some distance. Here the enemy must be waiting. However, a burst with the machine gun brings no answer. Quickly we mount the slope and charge up to the edge of the wood. A tank behind me shoots into the trees. I see the tracer and direct my weapons in the same direction. Suddenly enemy fire bursts from countless muzzles. We halt, fire, move forward, halt in a slight depression, and fire again. Who is fighting us from the woods we do not know. We can only hear the crack and roar of our weapons which drown the noise of the motors and the crash of the bursting artillery shells. When someone spots an enemy, his fire indicates the target to the others. So we help each other mutually and are like one tank and one weapon.

Everything seems to be going fine. I can hear that the fire of the tanks following me is becoming weaker. We have done about 6 kilometers; perhaps we have come out of this fire successfully. Forward—but didn't that sound like a hit in the engine? "What's the trouble?" I see my driver fall back covered with blood. It is light in the tank; somewhere up front there must be a hole. In an instant I empty the magazine through the gun. I shoot at the copse from which I am being taken under fire. Then I hear two more thuds, this time on the left. Sparks fly through the tank, which fills with powder smoke. The driver is dead. And while the tank rolls forward, my radio operator and I jump out of the turret and throw ourselves into the grass. A hail of bullets and shell fragments is whirling around us. We roll into a ditch close by. Here we can await the tanks which are following.

The first two are here already, moving quite slowly about a hundred meters from us. Then a man whom I recognize as being from my platoon crawls into the ditch and tells me that all of the tanks have been hit. Those which are moving have only just the momentum to roll down a slight incline without power.

How did all that happen? The Frenchmen had aimed first at the tanks in rear so that those further forward had not noticed anything wrong. In this way my whole platoon had been put out of action. A heavy tank passes us; it comes back but does not notice our signals. After going about a hundred meters a streak of flame flashes upwards from its rear portion.

Suddenly my radio operator lying beside me says, "Lieutenant, the French are attacking." And I actually see groups advancing toward us on a broad front. What shall we do? Each of us has a pistol, but can we carry on the fight with these? No; therefore let us make tracks—get going! Leaping up, we run 50 meters to the rear, and fall into the sand. Machine-guns chatter behind us, carbines fire—one of my men lies dead beside me, shot through the head. We crawl, slide, jump up again. I have to take off my cap because at the slightest movement the shots crack into the sand close to my head. When I can look around cautiously I see that my radio operator—why, I don't know—has taken another direction and is disappearing into the tall corn. I crawl over a rise, through a draw, wriggling like a weasel through a cornfield, and finally, after about a kilometer during which I have been shot at almost continuously by the enemy, I reach a protecting copse which promises me sufficient cover. Now I must be pretty close to my own men.

Now I hear the rattle of ammunition boxes. But imagine my surprise when I see the attacking French instead of German infantry passing me! I certainly regret that I have no machine gun with me, for I have a unique position from which I could make any further advance of the enemy impossible. But there is nothing else for me to do but to hide in the underbrush and wait.

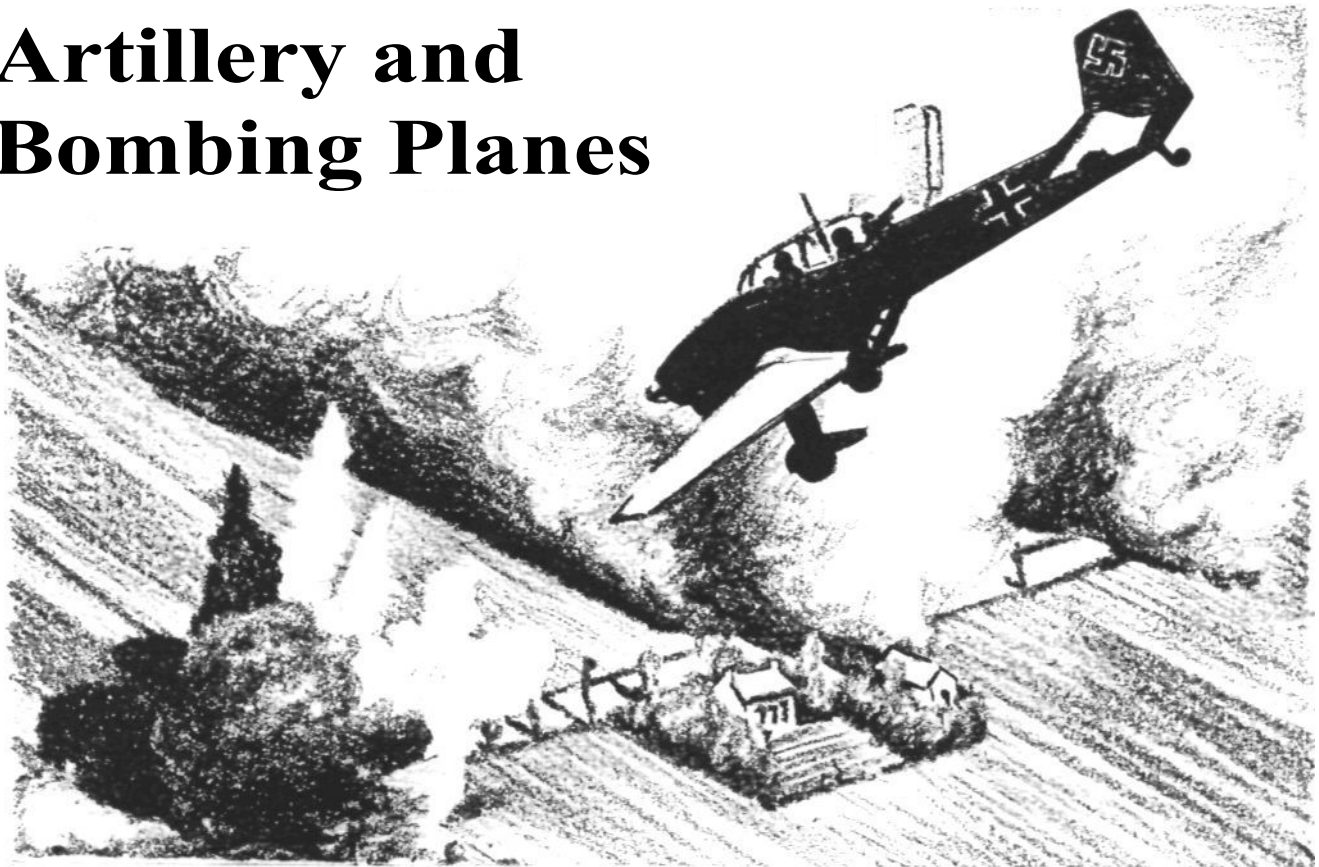
Something has gone wrong, but I am so sure of the success of my regiment that I feel not a moment's doubt or worry. So I lie from morning to late afternoon between the lines. The artillery fires incessantly; now that I was resting I could recognize it. Machine-guns were firing without pause. Stukas were attacking and the battle centered more and more about the wood which this morning had proved so fatal to me and my platoon. There was continuous hellish noise, and I could no longer distinguish the positions of friend and enemy.

Late in the afternoon, about 5 o'clock, I got quite a scare. I must have been sleeping a little. Quite close to me there was terrific shooting. I could hear clearly the chatter of our machine guns and the slow "tack-tack" of a French machine-gun. Bullets were whistling through the leaves, so I hugged the ground closely.

Then things quieted down, and I heard voices. Listening carefully, I said to myself, "Boy, that must be a Berliner." I came out of my hiding place and saw an infantry reconnaissance troop taking position close by. My joy at finding comrades, at last, can be imagined. They told me the best way to reach A---, and after about an hour I reached the rear echelon of my battalion, which was in that city.

What I learned there confirmed my suspicions. My regiment had not been able to break through the minefields and the stoutly built antitank positions, and had therefore attacked the position from the flank, winning complete success on the evening of this same day.

Artillery and Bombing Planes



A *German* statement as to the relative value of these two weapons

(From *Artilleristische Rundschau*, March, 1941)

The successes of our air force have caused the belief to be expressed here and there that the role of the heavy artillery could be taken over by the dive bombers, or that the artillery as a whole could be replaced by bombing planes.

Certainly no one will doubt or deny the powerful, smashing and unnerving effect of dive bombers. Above all, artillerymen are filled with enthusiasm over these successes and their hearts beat faster, without envy, toward the air force.

Above all, it is the long-range effect which distinguishes the bombing plane. The world stood still in 1918 when German long-range artillery took Paris under fire from a distance of 120 kilometers. The bombing airplane can easily bridge a distance many times as great. Because of its range, it has greater latitude in the selection of its starting field than the artillery has in the selection of its firing position. From a single flying field it commands a whole series of objectives and a much wider and deeper area than the very heaviest of artillery.

No less remarkable is the smashing effect of the bombing plane. Heretofore, long-range effect and smashing effect excluded each other to a high degree. The bombing plane reconciles and combines the contrasts in approximately the same manner that motor traction in the artillery overcame the barrier between mobility and projectile effect. The projectiles which the Paris gun fired

only weighed about 265 pounds. The largest aerial bombs, many times heavier, crush everything. As a rule only individual pieces of long-range artillery of the heaviest type are produced and employed, whereas the mass employment of heavy bombers is already the rule.

It was considered a feat and a gain if the projectiles of the Paris gun fell anywhere within the boundaries of the metropolis. The dispersion at 120 kilometers is so great that hits can only be expected if the surface of the target is very extensive. The dive bomber is independent of distances and attacks definite targets.

The aviator is usually in a position to observe the effect of his bombs, whereas in the case of the Paris gun it was necessary to wait hours and days for information to arrive via foreign countries regarding the approximate location of the impacts.

The bombing plane and the dive bomber are incontestably superior in achieving crushing effect and accuracy of aim at long distances. In all these cases it has to do, as a rule, however, with independent and special missions which appear to be only indirectly or casually connected with the land force, such as the smashing of supply industries, armament factories and transportation facilities, the destruction of harbors and shipyards, warehouses and barracks, the disruption of the supply service



Stukas over England

of the enemy forces, the holding-off and dispersion of reserves, the harassing of the retreat, and the pursuit and annihilation of a defeated enemy. To the aviator therefore belongs the entire rear area of the enemy territory and the enemy hinterland of the theater of operations. Briefly stated, the entire area beyond the range of effective, observed artillery fire belongs to the aviator.

However, when it has to do with direct support of the land force in its ground battle at a definite place and time, or the battlefield in the narrower sense, or the immediate rear of the enemy, that is, when artillery observation is effective and worth while, the situation is different.

It is true that in these cases likewise the dive bomber and low-flying plane helped pave the way to victory for the infantry and tanks. However, aircraft will never be able to handle all cases. Warfare presents innumerable such cases, quite often very suddenly and unexpectedly and in great variety.

On the battlefield in the narrower sense the action of the air force will be restricted to the single bomb of the dive bomber or the low-flying plane, or a limited number of bombs dropped in a series. Mass fire or constant fire would not be easy for aircraft to

render, and particularly not for dive bombers. Aircraft will always have to return to the airfield for a fresh supply of bombs. The artillery remains in position and is able from there to maintain constant fire. There is no doubt that the tube of a modern, rapid-fire cannon can hurl a greater weight of projectiles against an objective within a given period of time than can a number of combat planes. From August to the end of 1940, the German Air Force dropped a total of 44,600,000 kilograms of bombs over England, making a monthly average of 9,000,000 kilograms. In comparison thereto, the German land force from January to October, 1918, used up 2,000 trainloads of heavy field howitzer ammunition (each train loaded with 6,000 15-cm, shells weighing 40-kg. each). That was a monthly average of 200 times 6,000 times 40 plus 120 times 2,000 times 120—48,000,000 plus 28,800,000 or 76,800,000 kilograms of iron and explosives, and during months of greater battles

it amounted to much more. If aircraft alone were to hurl such quantities at the enemy, the number of bombing units would have to be many times greater. We will not discuss the question as to whether such a gigantic effort, which would have to be equipped with a corresponding ground organization



Martin 167-F bombers for Britain

and supply system, would be worth while. In the same manner the question arises as to what is cheaper, easier and quicker to organize and train—a correspondingly strong heavy artillery or a quantity of bombing planes and dive bombers of equal value. Many purposes will always be achieved more economically with artillery, and often more properly, than with bombing planes. The dive bomber appears to be such a valuable weapon that only special missions (by no means mass missions) warrant its employment, and in addition the aviators during each dive should not be disregarded.

Mass fire and constant fire are characteristics of position warfare. Here is where the artillery is of great and decisive importance. From last year's events it might appear that position warfare belongs to the past. However, it can reappear again at any time and under certain conditions it might prove necessary and purposeful.

On the other hand, in movement warfare, and even in "Blitzkrieg," that assistance and that weapon offers itself first of all to the infantry and to the tanks that is nearest to them; that follows directly upon their heels on the ground and that constantly keeps in close communication with them down to their smallest units: *The artillery!* It is true that the low-flying plane and the dive bomber were always quickly at hand, but only at critical points, and never everywhere and certainly not constantly. Regarded in general the bombing plane, which is not confronted by terrain obstacles, is more mobile than artillery. However, the airplane only enjoys this advantage while in the air. The delicate, extensive and complicated ground installations, to which it is bound and tied, are subject to terrain difficulties in their full extent. Which weapon is the most mobile and elastic when regarded from this angle can only be decided from case to case and by taking into consideration the military objective and the terrain. In an impassable theater of war, aircraft has an advantage in many respects. However, in the area of motor traction, numerically strong and heavy caliber artillery can be transported with greater freedom and more rapidly than formerly. The landing fields of the air force will always remain behind the progress being made on the battlefield. Their change of location requires more time and effort than the change of position of artillery. The farther the airfields remain behind, the greater is the danger of mistakes being made (despite the most careful radio communication), and the longer will the infantry and tanks have to wait for assistance from the air force.

With the aid of its means of observation, the artillery is furthermore in a position to observe constantly and minutely the battlefield in the narrowest sense and the immediate hinterland of the enemy, while at the same time remaining in close contact with the infantry and in

verbal communication with parts thereof. If aircraft were to achieve the same results, planes would have to hover day and night over the enemy positions. Naturally the infantry and artillery observers will communicate with the bombing planes and dive bombers at the proper moment and request their help. However, a certain amount of time will elapse while the aircraft takes off and searches for the objective. The artillery, on the other hand, can act immediately on its observations and open fire without a go-between or loss of time. Within a few minutes it is able to concentrate the fire of a large number of guns on a single objective regardless of how small the target is. In this respect its fire readiness, fire elasticity and fire rapidity has apparently reached the peak of perfection and can be excelled by nothing.

Bombs have only the effect of perpendicular fire. Yet there are many objectives which can only be destroyed by flat-trajectory fire of high velocity. In this case the artillery no doubt has the advantage.

The artillery also appears to be less affected by darkness, weather and fog. It can hit the objective although it is unable to see it. The combat pilot, and particularly the dive bomber pilot, must be able to see and aim if he is to hit small targets. He is fully subjected to enemy defense and attack and must be protected by pursuit planes. The artillery only can conceal itself in the terrain without impairing its fire effect. Its guns and positions can be camouflaged more easily than airplanes or airfields.

The artillery retains its fighting capacity when the enemy air force is superior in the air and prevents the mass of our aircraft from dropping bombs with any precision. In such cases the artillery is often the only support on which the infantry can depend.

No doubt each weapon has its advantage, but also its disadvantage and limitations. If we were to draw a line between the artillery and the air force we might state: "The artillery predominates in the immediate hinterland of the enemy; the air force in the remainder of the enemy hinterland to the rear." The air force with its reconnaissance and bombing planes has no doubt mastered problems which the artillery was unable to master or could only partially solve. However, it would be wrong to want to do away with the artillery for this reason. In many respects, because of its peculiarity, it cannot be surpassed by any other weapon. The same is true of aircraft. It would be wrong for the two weapons to regard each other as rivals. They complement each other in the most favorable and useful manner. We should be glad that we have both; and in such perfection.

The question: "Artillery *or* bombing airplanes?" can therefore not be put. The slogan must read: "Artillery *and* bombing planes."

Wartime Production

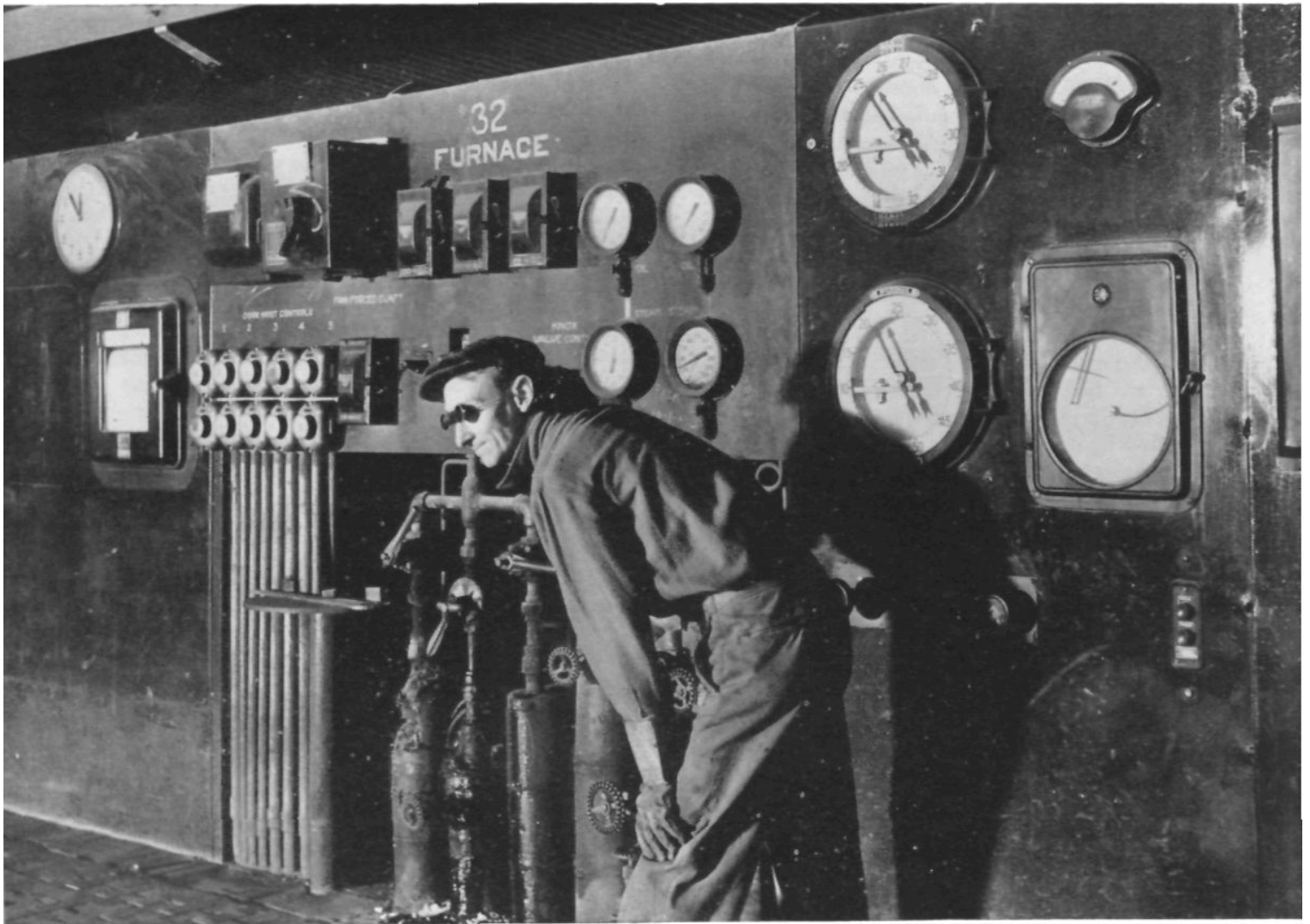
Steel and Guns

By Major General William J. Snow, USA-Ret.

STEEL SHORTAGES

It was always a pleasure to me when Mr. Stettinius, Assistant Secretary of War, sent for me. I liked his ritual. He had a drawer of his desk filled with wonderful cigars and cigarettes. Invariably when I entered his room he pulled open this drawer and said, "Have a smoke and take a seat." He never varied this delightful procedure. And then he plunged immediately into

business. On one of these occasions he had two piles of large sheets of paper on his desk. Placing his hand on one pile, he said, "I have here the total steel production of the Allied world." Then placing his hand on the other pile, he said, "And I have here the total steel demands of the Allied world, except Great Britain, which I'll have before night. The two don't balance; there is a shortage." And then he said he wanted to find out from me where, in my opinion, a saving in steel could be made in the



Control board of open hearth furnace. Plate courtesy Inland Steel Co.

field artillery program with the least jeopardy to our cause. He told me the number of tons of forgings we were furnishing the Allies per day and said he did not want to reduce that; and actually this amount of steel was never reduced even though our plants making supplies for the American Army had to be curtailed. Parenthetically, I may repeat the statement that the guns used by our army in France were those purchased mostly from that country; so it may be of interest to the reader to know that in the agreement made between the United States and France by which the latter was to supply the American Expeditionary Forces with guns and ammunition, we agreed on our side to furnish the equivalent in raw materials and semi-finished products. The French High Commission fixed these amounts as follows: the United States to deliver six tons of steel for each 75-millimeter gun, forty tons for each 155-millimeter howitzer, and sixty tons for each 155-millimeter gun, and proper proportional amounts of necessary materials used in manufacturing ammunition. This agreement the United States actually carried out more than twice over. In metals alone for artillery and artillery ammunition, we delivered over 700,000 tons of steel, 30,000 tons of pig iron, 5,000 tons of brass and spelter, and 50,000 tons of copper. The French used 12,000 tons of smokeless powder in our ammunition; we delivered more to them. They used 18,000 tons of picric acid in our shell filler; we delivered 18,500. From August, 1917, to November 11, 1918, an average of 2,000 tons a day of materials for French factories left American ports in army transports and was delivered to French factories.

This question of steel was a new one to me. I confess I had never given it a thought. In common with most Americans, I simply thought that as the greatest steel-producing country in the world, the American supply was practically unlimited. Neither had I known before of our agreement to supply the Allies with certain amounts. It therefore came as an unpleasant surprise to learn that my continued efforts to speed up production of guns might have to be modified. However, surprises are characteristic of war; and I repeat my previous statement that one of the abiding convictions I acquired in 1918 is that in war there is never enough of anything to fill all demands.

But the discovery of the completeness of the data Mr. Stettinius had, the realization of the coordination of effort of the Allies, and a comprehension of the magnitude of the Allied effort to win the war, were even more illuminating to me.

I think the conversation which took place during this attempt to discover ways and means of reducing steel demands gave me my first realization of the gigantic

struggle in which the whole civilized world was engaged. It was not a question of the American Army and Navy fighting the German Army and Navy, nor of the combined armies and navies of the Allied and Associated Powers fighting the armies and navies of the Central Powers of Europe. It was a case of whole nations fighting whole nations. This indeed is the age of steel. The world cannot go on without it. It enters into the everyday life of every individual. And here was a shortage! Men, women and children of nations, the whole commercial production of the mines and factories of nations, were in this titanic struggle of nations.

My help to Mr. Stettinius in solving his problem was necessarily slight. I could merely lay before him our critical condition as to guns and the consequent impracticability of reducing our program and figures as to actual consumption of ammunition by England and France. The talk about guns was, of course, of no help; the ammunition figures were a help, for my figures had recently been obtained from General Headlam (of the British mission) and were the latest on the subject. Mr. Stettinius had, of course, complete figures as to the amount of steel which was going into America's ammunition efforts and the

slow rate of production, at that time, of finished and loaded shell. By comparing the number of forged shell bodies with the number of loaded shell in our ammunition program, he knew there was a choke point somewhere along the line. And by comparing the number of shell body forgings with the rate of consumption of shells per gun in the English and French armies, and this in turn with the number of American guns, and introducing time factors along the line, my recollection is that he decided to make at least part of his desired steel savings by slowing down shell forging by some millions of rounds. This discussion was purely on quantities of the metal steel, and money did not enter into it; but, as it turned out, and with the Armistice coming when it did, his procedure saved *several hundred million dollars* to the American taxpayer. My admiration for the man who could thus effectively and practically handle the world's steel production figures went up to mountain heights!

GUNS FOR THE AMERICAN EXPEDITIONARY FORCES

In an earlier part of this book, I have stated that the French agreed to supply the A. E. F. with guns during 1918.

I had been Chief of Field Artillery only about two months when a cablegram was received from General Pershing, dated April 13, 1918, expressing his uneasiness about the supply from the French and asking about the American production, as follows:

Editor's Note: Next month we conclude this significant and important serial by publishing portions of General Snow's Memoirs dealing with training (and allied matters) which had been omitted from previous installments.

"What delivery in France of 75-mm. gun and 155-mm. howitzer before May 31st and June 30th can be made?"

This was exceedingly disquieting to me. I was just starting the various activities provided for in the General Scheme of Training approved by the Chief of Staff and discussed in the first part of this book. If the few guns we had in this country were to be shipped to France the whole Training Scheme would go up in smoke. Of course the small number of guns we had here would be of no battle value to Pershing, but if he wanted them for training purposes he would probably get them, for the attitude of the War Department was to give him everything he desired if same were humanly possible. He was informed by cable on April 25 of the total numbers of guns on hand and the estimated production, and then told that if these were sent to France "there will be nothing left for training in this country."

This was the first of many cablegrams expressing Pershing's uneasiness on this question. While, of course, the main worries in the matter of producing guns fell upon the Chief of Ordnance, it may readily be seen that I also was by no means free from care. I felt sure that Pershing would not want the 3-inch guns we had here because their ammunition was not interchangeable with the French. But he might call for the British 75-mm., the production of which was promising, and I was counting on this production to ultimately yield enough of this caliber for training purposes here. The production of any considerable number of the American 75 (Model 1916) was hopeless, and was dismissed from consideration.

A checkup made by cable in June, 1918, gave the following figures concerning these guns purchased by Pershing from the French:

	Orders placed abroad	Delivered to May 15	Promised from	Divisions which can be equipped	
			May 16 to June 30	with deliveries to June 30	when all orders are completed
75-mm. guns	1,305	670	247	16½	25
155-mm. howitzers	578	197	207	15	24

As by the end of June we had 17 divisions in France and the above table shows guns for only 16½ divisions on that date, the situation might well worry anyone. Accordingly, on the 20th of June, General Pershing was informed by cable that:

"It was decided to retain all British 1917 models (the British 75-mm.) in this country, but, if your needs demand, 5 complete battery equipments of these could be shipped abroad in August and 10 or 15 batteries per month thereafter."

This looked like the beginning of the end of my Training Scheme, but I of course concurred if General Pershing wanted the guns. My job was to assist, not obstruct. Fortunately, he managed to secure more guns from the French, so he did not call for the British 75's. However, the

prospect of sending overseas the total output of these guns, the only ones that were being produced effectively in this country, hung like the sword of Damocles over my head from then until the end of the war.

I was in hearty accord with the spirit of the War Department to give Pershing preference in everything, including these guns. But, at the same time, if he should call for them my whole Training Scheme would be wrecked. While I put no end of thought on the training problem under such conditions, I could never find a satisfactory solution. This state of affairs continued; there was no let up. Of course, I continually conferred with the Chief of Ordnance to see where we might get more guns and where production might be speeded up, but always with discouraging results. Increasing factory facilities would not help, as that would take time. We needed immediate delivery to be of any help, and the already existing factories were working up to their limit.

In the course of these investigations, I made an unpleasant discovery in October. I had understood, in the spring, that when it was learned the American 75 (Model of 1916) could not be produced in quantity, all contracts for its production except at Rock Island Arsenal had been cancelled. Apparently I had misunderstood and these contracts had merely been subordinated. The situation was so critical that the only course to take was to produce a gun that experience had shown would actually work, and this meant the British 75 (Model 1917).

To straighten out the misunderstanding, to kill off the diversion of manufacturing facilities to the American 75, and also to show General Pershing what help he might expect from the United States, I handed the Chief of Staff the memorandum quoted below. Colonel Francis L. Robbins, Jr., of the Ordnance Department, who had been of great assistance to me all during the war, drafted this memorandum for me after we had discussed the subject matter to be incorporated in it. I want to take this occasion to make of record my very deep appreciation of the services of Colonel Robbins, who labored hard and continuously, month after month, in the effort to provide the Field Artillery with guns. The memorandum is of special interest as being a record of the last effort I made during the war to secure guns, a very harassing subject:

October 25, 1918.

MEMORANDUM FOR THE CHIEF OF STAFF.

Subject: Equipment of A.E.F. with 75-mm. Guns.

1. There have been indications from time to time that the subject of the equipment of our army in respect to 75-mm. guns has not been entirely clear to all of those concerned in this country and overseas. It is, therefore, deemed an opportune moment to review the situation, reaffirm the policy which is to be pursued and apprise those who are concerned with the policy which is to be followed.

75-MM. GUN. MODEL 1897, FRENCH:

It is believed to be entirely clear to everyone concerned that the standard light field piece which has been adopted for use

of our army in this war is the 75-mm. gun, Model 1897, French, and that nothing is to be done to prevent its manufacture in quantities sufficient to meet the needs of our army. It is believed that this is well understood in this country and that any suggestions for the adoption of an improved model are made with the understanding that such model will have to be developed and tested without interfering with the existing program for the 1897 model. It is also believed to be well understood that quantity production of any new model will not be undertaken until such new model has passed such tests as may be prescribed by the Ordnance Department and the Chief of Field Artillery.

Reports indicate that the French Govt. has furnished our troops with 1,750 Model 1897 guns, up to October 1st, and, based on expected deliveries set forth in Mr. Stettinius' cablegram No. 38, will make cumulative deliveries as follows:

November 1st	2,050
December 1st	2,350
January 1st	2,650
February 1st	3,000
March 1st	3,350
April 1st	3,700

The progress chart of the Production Division, Ordnance Dept., estimates that recuperators for the 75-mm. gun, 1897, which appears to be the limiting factor in that materiel, will be completed in this country, viz:—

October	10
November	60
December	125
<hr/>	
Total to Jan. 1st, 1919	195

It is understood that the Ordnance Department estimates two months as the necessary period of time from the factory delivery of components through the stage of assembling, proof firing, disassembling, crating, marking and shipping to port, and an additional month before the materiel is floated, transported overseas and delivered to troops. It is, therefore, concluded that the maximum number of 75-mm. guns, Model 1897, of American manufacture to be delivered in France by April 1st, is 195. This does not make any allowance for proving ground or training requirements in this country. It appears, therefore, that the grand total of available guns of this type in France by April 1st will not be more than 3,895.

75-MM. GUN. MODEL 1917:

The 75-mm. gun, Model 1917 (British) which is sometimes referred to as the "18 pdr. converted," is made in this country by the Bethlehem Steel Company only. It is understood that 545 of those have been completed up to October 12th and that they are being now produced at the rate of 40 or more per week. With the exception of the small number which has been used at the proving grounds and 124 which were shipped overseas for training purposes, all these guns are being used at the camps in this country for training of field artillery. This gun has, during the past few months, been used at the training camps in such number and under such varying conditions and so favorably reported upon that it is deemed to be safe to conclude that it is a satisfactory field piece. It is understood that, since my recent memorandum to the Chief of Ordnance, steps have been taken to increase the production of the Model 1917 gun and additional orders will be placed with the Bethlehem Company. It is believed that the Bethlehem Company will manufacture under its present contracts 175 of these guns next month and that this production can be increased to 250 or more per month by February 1st, 1939.

75-MM. GUN. MODEL 1916:

This type of field gun, sometimes referred to as the "Ordnance Design," was originally ordered in large quantities, the understanding of the Ordnance Dept. apparently being that it was to serve as the standard light field gun. The fact that this gun, more particularly the carriage, was in the experimental stage and had not met any satisfactory tests which would warrant its adoption as the standard light field gun, brought about a change in the plans last spring which resulted in the cancellation of contracts for the model 1916 gun and vigorous steps looking toward early procurement of the French model. Contracts for the 1916 gun carriage were then supposed to have been cut down to the minimum number which could be finished without loss of materiel already in course of manufacture. The three contractors making this carriage were: Rock Island Arsenal, New York Air Brake Co., and the Bethlehem Steel Co. Up to October 1st, Rock Island Arsenal had completed 113; New York Air Brake Company 23; Bethlehem Steel Company 6; making a total of 142 carriages of this type. The progress chart of the Production Division, Ordnance Department, estimates deliveries of this type of carriage as follows:

October	59
November	68
December	45
January	45, etc.

Thirty-four of this type have been sent overseas for experimental work and the balance have been sent to proving grounds and a few to the training camps. Reports which have been received to date from the training camps indicate that this carriage will require further development before it will satisfactorily meet hard service usage.

REQUIREMENTS:

Without looking beyond the date of April 1st, 1919, the estimated number of guns required for initial equipment is as follows: These figures are cumulative:

November 1st	1920
December 1st	2112
January 1st	2112
February 1st	2400
March 1st	2688
April 1st	2976

This does not take into consideration the replacements nor reserve. The estimates for replacement purposes and for reserve purposes vary considerably. It is believed that the necessary replacements by April 1st will be approximately fifty per cent of the initial equipment, and that in addition there should be an available reserve in France of 25% more. This would mean, roughly, that there should be in France on April 1st, 2,976 plus 1,488 (50%) replacement, plus 744 (25%) reserve, a total of 5,208. It is noted above that it is not safe to assume that there will be more than 3,895 of the French model to meet this requirement, and that the balance, consisting of 1,313 guns, should be shipped from this country not later than March 1st, and will have to be of a type other than the French.

CONCLUSIONS:

From the statement above, it will be seen that 1916 model carriages will not be manufactured in sufficient quantity to make any considerable impression on the deficit which is shown above, even though this model were considered satisfactory for use in France. On the other hand, the production of model 1917 is approaching the rate of 200 monthly, and it is informally understood that the Bethlehem Steel Company could increase production to upward of 250 per month. This schedule would meet the requirement of 1,313 guns to be shipped by April 1st, approximately as follows:

Already shipped	124
Last week of October	50
November	175
December	200
January	225
February	250
March	250
<hr/>	
Total	1,274

It is believed essential that the American Expeditionary Forces be provided the number of guns herein stated.

2. If the statement of the situation as herein expressed is correct and if the course of action which is herein suggested is approved, it is recommended that a cablegram be sent to General Pershing in the form hereto annexed. The Chief of Ordnance has been consulted and concurs.

WILLIAM J. SNOW,
Major General, U.S.A.,
Chief of Field Artillery.

"Proposed Cablegram to be sent to General Pershing:

"Reference my 1652, Paragraph 15, present indications are that there will be sufficient 75-mm. guns model 1897, French, available in France on April 1st, 1919, from French and American sources to meet requirements for initial equipment and provide in addition a substantial number for replacement purposes. In order, however, to assure you of sufficient guns for replacement and also establishment of necessary reserve, it is proposed to ship you model 1917 British which will be completed from now to March 31st estimated at about 1200. Production of this model has progressed so satisfactorily that it is believed that total requirements will be met in this way. Production of model 1916 guns has been disappointing. This small production and part of model 1917 will be kept in U. S. for training."

The retained copy of this memorandum of October 25, 1918, as quoted above, has the following pencil marginal notations in my handwriting:

"Saw General March in person (October 28), who said to delay action for a week or 10 days (Armistice talk), and, in meantime, distribute these guns.

"Later—50 already crated sent to port and held.

"Later—Ch/S referred this paper to Operations, who say no action necessary on account of signing of Armistice.

WJS"

From the record made by these pencil notations, it will be seen that we had begun to send to Pershing our production of British 75's. I both wanted and needed this production in the United States for use in training. It is difficult to overstate my desire. But Pershing's cables indicated that his need for guns was great. So in this, as in all other matters affecting the A.E.F., whenever its interests and those of the troops in this country clashed, we unhesitatingly gave the A.E.F. the preference.

SUMMARY OF MATTERS RELATING TO MATERIEL

I have given this brief statement of the materiel available in the United States for the reason that no understanding of the training problem here could be obtained without a knowledge of just what materiel we had and just what we did not have but badly needed.

There is nothing fascinating to people generally in reading about materiel. It is a dry subject. For this reason I have gone into it only lightly, but I hope not too lightly to show that the shortage was great, was continuous, and constituted a serious handicap. We could never train as many organizations simultaneously, nor could we train any individual organization as thoroughly as we wanted to in the field artillery.

In the early days of my incumbency as Chief of Field Artillery, it looked as though time would at least partially remedy the shortage of materiel available for training. This aspect soon disappeared. It was followed by the prospect of having to send to France a large part of the inadequate materiel we already had.

There are plenty of documents in existence showing that, in 1917 and early in 1918, the Allies did not regard a final decision of the war in 1918 as possible, that they planned a defensive year for 1918, that they regarded France as safe for that year, that they expected (or hoped) for the United States to send only two divisions a month to France, and that they recommended we lay out a training and production plan to deliver our full effect in 1919.*

Accordingly, all production plans of the Ordnance Department contemplated maximum capacity of delivery to begin with the winter of 1918-19, and they did. You cannot put up a plant involving millions of dollars and employing thousands of workers and have it turn out its product in a day or a week, as some ignorant critics seem to have thought when criticizing our shortage of training materiel. It takes time to build big plants and to get them producing. What we actually got in 1918 was only a dribble compared to what we would have gotten in 1919. All plants were just coming into production at the time of the Armistice.

But after the March and May drives of the Germans in 1918, when the British were driven to the position of their "backs to the wall," it was decided that the cause of the "Allied and Associated Powers" could not wait until 1919 for the United States to make its maximum effort on the Western Front. The shipment of troops overseas and the organization of new units in the United States had to move faster and faster. The demand for field artillery materiel with which to train consequently became greater and greater, but production of this materiel did not keep pace; it could not. The production machine was already geared up to its highest limit; it could go no higher. In many of the plants producing munitions, already half of the workers were women.

Some idea of the vast scale upon which the munitions plans were based, and how near we were to capacity production at the time of the Armistice, can be obtained by

*From the time General March came in as Chief of Staff until the Armistice was in sight, it was my custom to ask him on or about the first of each month to send me to France. He invariably replied "You can go for the spring campaign of 1919 and not before."

considering artillery ammunition. The reader will recall the statement (correctness questionable) that not a round of the American product was fired in France during hostilities, and that we suffered from a shortage in this country. As soon as practicable after the Armistice, production of artillery ammunition was stopped and contracts canceled. Yet when an inventory could be made, in February, 1919, it was found that there was on hand artillery ammunition, including machined shell bodies, to a value of seven hundred million dollars! And this is typical of other supplies also.

There is no arm of the service so dependent for its training upon an adequate supply of materiel as is the field artillery. There was no other arm so short of its materiel, both relatively and absolutely, in 1918 as was the field artillery. After the approval by the Chief of Staff of my General Training Scheme in April, and after I had gotten it started, I spent more time upon materiel from then to the close of the war than upon any other matter of concern to the field artillery. In discussing this shortage of materiel in these memoirs, I have frequently referred to it as "distressing." I use this word because I know of no other so accurately descriptive of the situation. But while the arm did thus suffer, and while this shortage was most acute in supplies furnished by the Ordnance Department, I have also tried to show, in a spirit of fairness, that the fault was not due to lack of vision in that Department, and that after General C. C. Williams became its Chief, the record was superb.

I cannot close this discussion of materiel without adding that I am rather ashamed of the criticisms I have made in previous chapters of the Ordnance Department when I

consider the magnitude of the operations it was carrying on. My criticisms seem small and to a great degree lacking in appreciation. I have not so intended. Perhaps some idea of the vast scope of its work can be gained if I state that the Ordnance cost of providing equipment and supplies for our army of over four million men was about one-half of all the money Congress had appropriated during the previous one hundred and forty years of existence of our American government. It should further be noted that during this one hundred and forty years we fought a number of wars besides making most appropriations for the pursuits of peace. The cost of our participation in the World War would have covered the cost of the Revolutionary War for a thousand years!

But I am not writing a history of the Ordnance Department. I am simply trying, briefly, to sketch the work of the Office of the Chief of Field Artillery. And this purpose cannot be served without bringing in the references to the Ordnance Department that I have made.

Our failure to produce in quantity in 1918 was due, as I see it, to three things:

First—The advice of the Allies to take until 1919 for this purpose.

Second—The advice of the French Mission to change our guns and ammunition to correspond with theirs.

Third—The lack of appreciation before the war of the necessity of any planning for an Industrial Mobilization.

I hope that the lessons I have tried to indicate from the World War will act as sign posts in pointing the way toward avoidance of serious mistakes in our present emergency.

10th Field Artillery Insignia

The 10th Field Artillery went out of existence in September, 1940. Its 1st Battalion is now the 10th Battalion, the 2d Battalion the 39th Battalion and the 3d Battalion the 41st Battalion and all still belong to the 3d Division, which is streamlined.

The regiment was organized at Douglas, Arizona, June, 1917, from the 6th Field Artillery and served very gallantly as one of the 75-mm. regiments of the 3d Division from the Marne to the end of the war and later with the 3d Division in Germany until August, 1919. This regiment and all the other regiments of the Division were cited by the French for their services at the Marne.

The insignia is about the simplest one of all the regiments. The shield is red. On the shield are crossed cannons. In the upper angle of the crossed cannons is a rock in honor of the 38th Infantry, which one of the Battalions supported at the Marne. The 38th Infantry is known as the Rock on the Marne. The Canton (upper left hand) is a flying horse in honor of the 6th Field Artillery. The regimental motto is "The Rock's Support."



—COL, A. S. FUGER.

Advanced Course (Special) Number Two

By Lieut. Col. Ross B. Warren, FA.*

Advanced Class (Special) 2 has just completed its tour at the Field Artillery School and out of the welter and swelter that went on during its three-months' stay some events and ideas stand out concerning matters of such vital interest to all field artillerymen that it appears worthwhile presenting them to the branch at large.

Before getting involved in shop it might be well to describe briefly the make-up of the class. So far as rank goes there was one brigadier general, there were five colonels, eighteen lieutenant colonels, fifteen majors, and four captains. There were twenty-five national guard officers, one reserve officer and sixteen regulars. Professionally the class consisted of western ranchers, southern planters, eastern businessmen, mid-western engineers and some Pennsylvania Dutchmen. Ranks and previous condition of servitude were quickly forgotten in committee exercises and solutions if one can judge fairly from the reverberations that issued from committee rooms and alcoves.

The Advanced Course (Special) is not the equivalent of the old advanced course nor is it a school for battalion commanders. It is designed for higher artillery studies, for the consolidation of field artillery doctrine in higher echelons, for the dissemination of new doctrine and technique, and the standardization of artillery methods. (An additional course for battalion commanders is now being organized.)

Commanders must be made to realize that it is wasted effort to send inexperienced officers to this course, for unless the student thoroughly understands the duties of an artillery battalion commander and has had considerable experience with combat orders and map problems, he is unable to grasp the instruction; he impedes the progress of others and is sure to leave the course with a permanent black mark on his record. Through it is not a prerequisite that the student be a graduate of the Command and General Staff School, he should have considerable knowledge of the extension course of that school or the troop school equivalent thereof.

Enumerated herewith are some of the principles of the Advanced Course, especially those which concern units larger than a battalion, and which are not generally reviewed throughout the service.

*The author wishes to acknowledge assistance of Maj. H. D. Kehm.

1. *Use of the Observation Battalion (Field Artillery).*

A comprehensive study of the observation battalion demonstrates its ability to observe and report targets, adjust artillery fire by high-burst ranging and center of impact, furnish meteorological data, and coordinate survey work.

The coordination of survey is especially essential when map substitutes such as wide-angle photographs are used. The observation battalion will establish points in the position area from which division and corps artillery battalions obtain coordinates and direction to carry forward into their own surveys. In this manner targets are given from the plotting charts of the fire-direction center by restitution. This method will also be carried into the division artillery surveys so that division fire direction can be simplified and division concentrations fired with speed and accuracy. Other nations have observation batteries in the division but unless the division is acting alone, on a wide front, the shorter base limited on a division front to 2,000 yards would not locate targets as accurately as the long base used by corps. The organization of the observation battalion is sufficiently flexible to allow the attachment of an observation battery from the corps to the division artillery, when needed for the support of a separate division.

2. *Coordination of Observation.*

Observation for artillery fire is secured and maintained wherever possible, and everyone will push out an observation post but the final effect will be like a barb-wire entanglement on each hill, with tripods, radio sets, telephone wires and "Red Legs."

In a situation where the reinforcement is relatively light we are confronted with a total of 43 observation posts on a front of 3,000 yards. With the so-called normal reinforcement for a large-scale offensive, there would be 27 batteries per 1,000 yards or an observation post for every 26 yards. Observation posts then should be apportioned like position areas; it may be necessary to allot one per battalion or even only one per groupment. Artillery is vitally interested in air observation; the slow plane operating near the position area should be made available immediately in large numbers. Artillery then will have its own air information service, an artillery-officer observer with non-commissioned officer pilot. When the hovering type of plane is employed, the portion of time in the air is short.

The plane goes up quickly, observes a center of impact, and is down and hidden away before pursuit planes can arrive. With an 8-mile per hour wind, a 100-yard run over open ground is sufficient to take off or land. While in the air, this plane might also be able to recognize oncoming tank attacks and give immediate reports in the artillery position area.

3. *Artillery Support of the Armored Force.*

Reinforcing artillery supports an armored force in a preparation and in the initial stages of attack, but the

situation changes quickly and artillery out of contact of necessity must cease firing early and not displace until serious resistance is again encountered. Organic artillery of the STRIKING FORCE remains mobile in order to go through or encircle with the tanks and be in close contact with the tanks when new problems are encountered. Artillery of the SUPPORT ECHELON might be used either way, depending upon the presence of reinforcing artillery.

The SUPPORT ECHELON acts as an infantry combat team when other arms are not present but remains a mobile combat team at all other times. Forward observers in tanks are constantly in touch with organic artillery by radio.

4. *Coordination of Artillery Fire and Air Bombardment.*

Studies of recent operations tend to show that an intense artillery bombardment will attend the initial breakthrough or other action. Organic artillery will then displace very

early while the reinforcing artillery continues to fire from initial positions. Bombardment aviation will be operating at the same time against AT guns, artillery positions, enemy reserves, and command posts. Subsequent objectives will become targets of the bombardment aviation in much the same manner as an artillery preparation. To achieve surprise it is well worth consideration to have bombardment aviation deliver the first preparation and have mobile reinforcing artillery come forward quickly and occupy position in order to keep the attacks going on subsequent objectives.

5. *Anti-tank and Anti-aircraft.*

A powerful radio net of SCR 245 sets is reserved for anti-aircraft and anti-tank warning.

This warning starts mobile units from position in readiness to previously reconnoitered firing positions thus allowing a concentration of anti-tank guns in the path of the tank attack rather than allowing a dispersion of weapons over a wide front where some would not be engaged



A class in gunnery at the Field Artillery School

in action. In anti-aircraft and anti-tank platoons, present tables do not allow sufficient gun crews to man both types of weapons; additional men must be obtained from other elements of the command. Positions for antitank and positions for anti-aircraft are mutually exclusive, the 37-mm. guns having overhead cover and a terrestrial field of fire over flat or rolling ground, while the .50 caliber machine guns would be on a prominence, with a clear overhead, allowing them to engage aircraft for a maximum of time. There have been lengthy discussions concerning the advisability of keeping the 37-mm. guns and automatic weapons hidden until after the passage of the medium tanks for the purpose of engaging light tanks and motorized elements which follow without prematurely disclosing positions to medium tanks, aviation and artillery fire. However, the newest foreign organization shows light tanks used only for reconnaissance and observation units while the number of medium tanks for combat is rapidly increasing. Thus it is evident that 37-mm. guns and automatic weapons soon will be impotent against anything but foot and motor troops.

The British viewpoint appears to be, "Stop medium tanks, wherever they appear, with every possible weapon and device, we don't like to have them behind us."

Training the anti-tank crews to have confidence in their weapons so that they will continue to serve them when tanks are close is a paramount objective. "One stout fellow took out forty tanks," said a British major who addressed the advanced course. Since there are so many AA and AT weapons throughout the corps and division it is essential that each echelon of the chain of command have a staff officer whose training has fitted him for the duties of anti-tank and anti-aircraft officer; thus absolute coordination is assured.

All field artillery weapons, including howitzers, must be used for anti-tank, and the organizations of positions with pits, barricades, mines, and traps as well as anti-tank fields of fire is vital. Batteries must be placed so as to be mutually supporting in case of tank attack; frequently having two or more positions for interior pieces in order to gain all-around defense.

When automatic weapons and rifles are used against tanks, they concentrate on observation slits. Smoke used by tanks in offense may well be augmented by defensive smoke in order to confuse drivers as to direction and objectives. Ricochet angles are minutely planned on tanks, and all troops should be carefully trained in selecting the most valuable points for directing their anti-tank fires.

6. *Staff of Artillery Officers of Division and Corps.*

Compared to the magnitude of their duties it would seem that the staffs of division and corps artillery officers are insufficient.

In the corps, unless the headquarters force is increased, it will be necessary for the artillery officer to be nothing more than an advisor and to turn over command, S-2

information service and organized fire against enemy batteries to the corps artillery brigade commander. Committee studies on this subject all agree that the corps artillery staff must be enlarged in order to permit the commander proper control over his organizations.

7. *S-2 Section of the Corps Artillery.*

In order to consolidate information on enemy batteries in a command where the big picture can be seen and proper action taken, the S-2 of the corps artillery should be trained in research work and compilation of such enemy information. The AIS work of the AEF was thorough and efficient: S-2 information must again be organized if our service is to be efficiently trained in this vital procedure.

Even though neutralization of enemy batteries is considered a routine target for battalion fire direction, an officer of sufficient rank in the corps artillery S-3 section should control this neutralization at times when our own troops are in most need of support.

8. *Planning for a Major Offensive.*

At present our service lacks officers trained to plan for the employment of large amounts of reinforcing artillery. Many hours of the Advanced Course were used in committee studies, committee reports, terrain exercises and committee map exercises on this subject.

One colonel who is at present a corps artillery officer and many other members of the class have expressed the opinion that the main lesson they learned in this course is the magnitude of the problem of bringing in and supplying ammunition for the tremendous numbers of vehicles and guns.

Reconnaissance for positions, routes and supply points; march tables, field artillery orders and traffic control; plans and orders for fire; alternate and dummy positions; and organizations for combat all are present in endless and vast numbers.

9. *Artillery Requirements.*

A thorough study of Bruchmüller, Roger and our own service texts is being made, in order to devise ways and means of deciding how much artillery is needed to insure the success of a major offensive. Bruchmüller is particularly thorough in his theses as to the planning, secrecy, organization of a corps of artillery specialists and other items for some of the major German attacks. The German principles which are brought out are quite in keeping with our own texts on this subject but go into much more detail and demonstrate results obtained.

10. *Organization for Combat.*

When large numbers of reinforcing artillery are brought in to effect a breaking of a strongly organized position, our present streamlined units are quite insufficient in command units. Groupments are necessary and

the following general plans for such formations have been favorably considered:

a. Division Artillery Reinforced.

For direct support of each infantry regiment in the front:

Retain the organic battalion of the combat team in order to sustain the confidence of the infantry, add battalions and regiments of light or medium artillery, and bring in a regimental headquarters from GHQ artillery in case there is none present for the command of the groupment.

b. Corps Artillery Reinforced.

For general support groupments reinforcing divisions:

Retain some organic regiment in each and add reinforcing 155-mm. howitzers and or guns, preferably using organic regimental commanders as groupment commanders.

Sometimes a groupment may be organized to maintain neutralization of enemy batteries, though for initial neutralization and reinforced periods it will be necessary to use other battalions in order to get the fire of at least two batteries and preferably that of a battalion on each enemy battery.

The 240-mm. howitzers from GHQ artillery may be added by battalions to reinforcing groupments or held as a unit under control of the corps artillery.

All brigade and regimental headquarters must be employed in the command system.

Division artillery should be trained in selecting targets normally within short distances from our front lines, and target-range practice should be emphasized with such targets rather than with enemy batteries and long-range targets.

11. *Plans and Orders for Fire.*

A detailed plan for fire on enemy batteries to secure initial neutralization, reinforced fires and maintenance of neutralization must be worked out for all known batteries which will appear.

One battalion can maintain neutralization over six enemy batteries. Division and corps commanders are consulted as to other prearranged fires, and provisions are made for lifting fire by time schedule and signal, both prearranged. Similarly it is important that direct-support groupments carefully prearrange the bulk of their preparation and accompanying fires with the infantry regimental commander.

12. *Ammunition.*

All maneuvers, command post exercises, and map problems must emphasize the ammunition problem, permitting no firing that is not supported by proper ammunition hauling. A long preparation such as one lasting four hours, is preceded by the hauling of great quantities of necessary ammunition. According to experience tables given in artillery texts for a major

offensive the so-called normal of 27 batteries per 1,000 yards of front would call for 24,000 tons of ammunition on a corps front of 9,000 yards, using two unit days of fire in the preparation, two units for the accompanying fire the first day and one unit the second day. Using all ammunition platoons of service batteries and 5th-section vehicles it would require 750 vehicles per night for five nights to haul this ammunition from 24 thirty-car trains. Under such circumstances securing of other vehicles from quartermaster trains, prime movers, etc., would only serve to complicate the tremendous problem of railheads, supply points, and road net.

13. *Armored Observation Posts.*

Armored observation posts such as those now used by the artillery of the armored force and artillery with foreign armies, must have a high priority in procurement. Light tanks will become more and more available now as the medium tanks are built. These light tanks should become available to the Field Artillery for reconnaissance and observation purposes.

Developments in foreign armies have shown an amazing decrease in exposed personnel, and if our army is to lead rather than follow foreign developments, armor must be obtained for every possible field artillery element.

14. *Individual and Committee Studies.*

During the course each officer participated in one individual and two committee studies assigned by a directive such as this:

SUBJECT: The artillery problems incident to the preparation for a major offensive.

OBJECT: An analysis and exposition of so much of the subject as pertains to the items indicated in the scope.

SCOPE: Reconnaissance, survey, observation, selection, occupation, and organization of position, plans and orders for fires, plans and orders for change of position.

REQUIRED: *a.* A written report by April 19, 1941.

b. Presentation at time indicated on schedule.

Time was allowed for meetings and library study as part of the schedule. The chairman sub-allotted the scope into four parts and each officer began his research of Department texts, foreign documents, historical papers and military intelligence reports. Subsequent meetings were free for all, no holds barred, as each officer enlarged or contracted his material under hammer-locks applied by his colleagues. The particular committee report given above ended with 41 pages. Such studies were valuable in acquainting officers with library material, bringing out improvements in the thesis after staff conferences, putting reports into coherent readable form and most of all developing ability to stand up before a large group and properly instruct it.

The Field Artillery Journal's military analyst contributes another outstanding study of current European history



Barracks yard in Ostend after the fighting

THE FALL OF BELGIUM

By Col. Conrad H. Lanza, FA.



IN
THREE
INSTALLMENTS

Part III
(conclusion)
The Surrender

***Editor's note:* In the two preceding installments, Col. Lanza described, first, the cracking of the Belgian outer fortified lines, including the capture of Eben-Emael. Then he told how the Belgian divisions were forced back slowly, though in good order and greatly hampered by the throngs of refugees who choked the roads. Finally it was the rupture of the French lines south of Namur which caused the great retreat. In this issue are described the final acts in the tragedy.**

OPERATIONS ALONG THE SCHELDT

On 18 May the Belgians evacuated Antwerp, and retired to the west bank of the Scheldt River. They occupied this stream as far as Ghent, inclusive, where they retained a bridgehead. Because of the width of the river at Antwerp and for some miles south, it being navigable for ocean-going ships and having no bridges, this sector was lightly held. There was a shortage of ammunition and rations.

The Germans occupied Antwerp and closed in on the Scheldt River. In France they continued their remarkable advance, reaching St. Quentin.

M. Daladier complied with the British requirements as to change of military leadership. Marshal Pétain was appointed Vice-Premier, and General Weygand was sent for with a view to having him relieve Gamelin as C-in-C. It was hoped that the British would now release troops and planes for France; and that the French Army would feel that with new leadership they would now defeat the enemy.

On 19 May the Germans attacked the Scheldt River line with fierce assaults around Ghent and further south against the British and French. They made but slight progress. On the north flank, opposite Antwerp, as had been expected, calm prevailed during the first part of the day.

This sector was held by the Belgian cavalry corps. They posted small detachments along the river bank, established OPs on the high ground, and placed the artillery and the bulk of the troops well back. Visibility was excellent; no one could see any possibility of the enemy crossing that river.

About 2:00 PM the OPs noted unusual activity of the enemy along the Antwerp side. The presence of wharves, gas works, lumber yards, buildings, etc., made it impossible to make out what the enemy was doing. His activity lasted for two hours. Otherwise the sector was very quiet. A beautiful Sunday afternoon.

At 4:00 PM an oil tank on the Antwerp side caught fire. Of course the OPs saw and reported it. It was probably sabotage, they thought. Good business; this would reduce the enemy's limited supply of gasoline. A few minutes later all the oil tanks went up in flames. Now this could hardly be a coincidence, nor was it likely to be sabotage, since the Germans had been in and around those tanks for the past two hours, doing nobody knew what. This was most interesting; why would the Germans be destroying their

limited supplies of oil and gasoline? This problem was too much for the corps G-2 section. The corps did nothing about it.

The burning tanks made a tremendously oily smoke, which settled on the water, and gradually obscured the opposite bank from the view of the OPs. The Belgians watched, wondered what it was all about. After some time they heard a chug-chugging. Looking closely, they saw a line of motor boats come out of the smoke, headed at terrific speed* for their shore. They were going so fast that they arrived at the bank before the artillery had a chance to fire. At the same time, the German artillery opened a heavy fire on the OPs, and laid down a barrage on the small detachments defending the river. Thus there was next to no opposition to the German landing.

The Germans mounted motorcycles and dashed inland. The OPs were not prepared for defense. Being mechanized, they had transportation, and got away, having had barely time to warn the CPs that the enemy was over the river. The enemy had machine guns and sub-machine guns, and spread out in all directions. He likewise—an innovation in modern war—had a camera detail in his front line, which took movies of the attack. The artillery barrage preceded the attack and covered it.

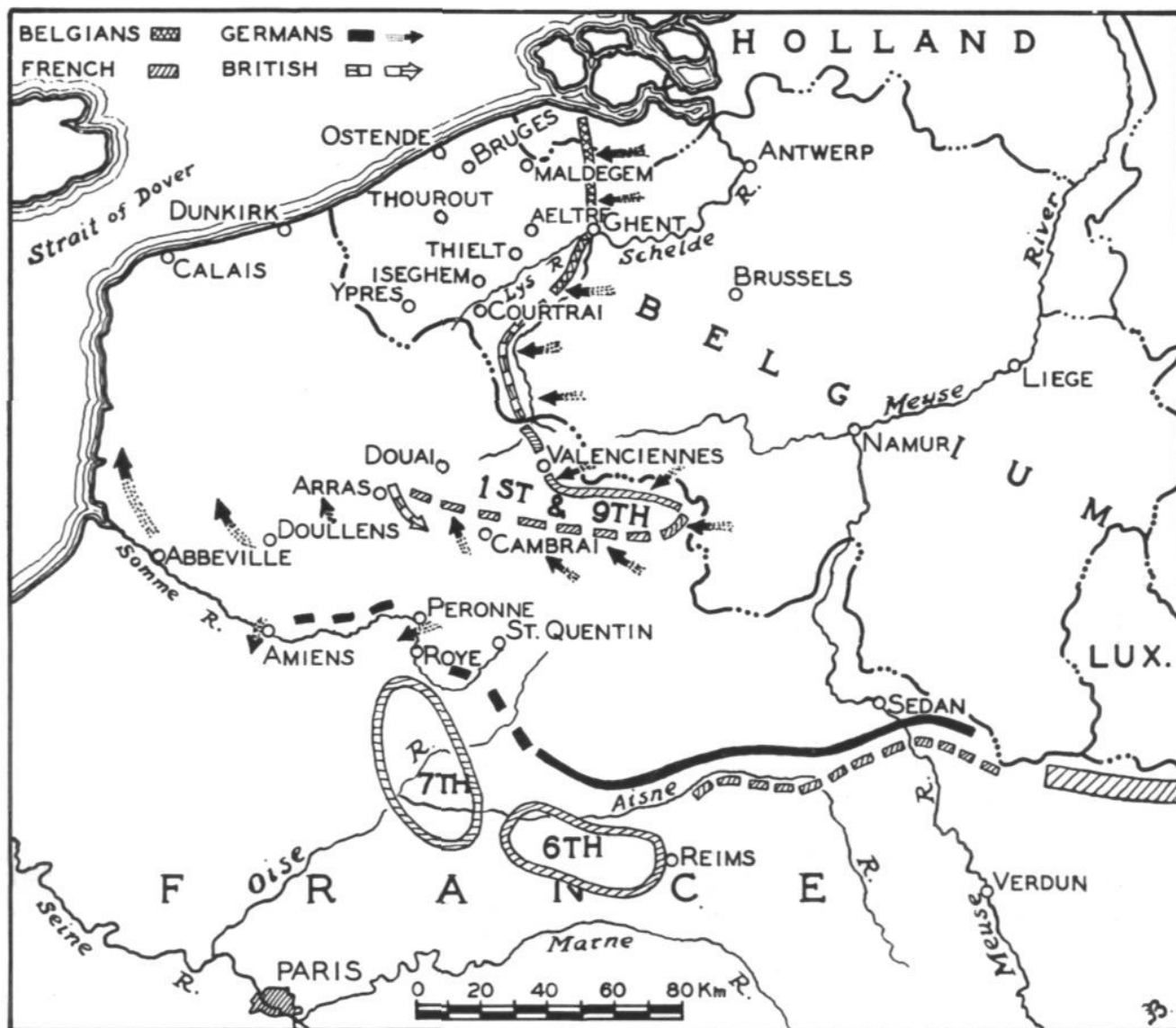
All the Belgian cavalry rushed to the front. There had been no time to prepare any orders, and each unit entered the fight wherever it met the enemy. A very confused action resulted. It ended only with darkness, about 8:15 PM. The Belgians lost their local commander, killed, and had many other casualties. The Germans had a bridgehead three miles wide and deep. They laid no bridges, but used barges, and all night ferried tanks and artillery across the Scheldt for the next day's battle.

The Seventh French Army had been unable to completely evacuate Holland. About 16,000 men surrendered this day in Holland; while the XVI French Corps, escaping via Zeeland Province, reached the Belgians, to whom they then became attached. It was a welcome reenforcement to the thin line of the Belgian Cavalry Corps, as it arrived in rear of their positions.

This evening at 8:00 PM, General Weygand having reported at Paris, was announced as the Allied C-in-C, vice Gamelin relieved and ordered to his home.

General Weygand took all of the next day, 20 May,

*German pioneers use assault boats powered with 4-cylinder outboard motors which propel the craft at 25 MPH or better.—Ed.



Situation on May 21

becoming acquainted with the situation. He issued no important orders.

The Belgians held their line along the Scheldt all this day. They stopped the Germans who had crossed near Antwerp, but were having great difficulty as to supplies. The depots were largely in enemy possession. There was little in the country now at their disposition. The railroads were of slight use, as they did not run in the direction the retreat was taking. The land was full of refugees, crying for food, care and shelter. The enemy bombed all roads and villages. Gasoline was scarce. Ammunition was approaching exhaustion of stocks. Morale was low. King Leopold advised London of his anxiety as to the future.

The British Expeditionary Force south of Ghent, and the First Army beyond, retired from the Scheldt line to the protection of the Lys River. The Belgian divisions at the

extreme south, originally from Namur, conformed to this movement.

The Chief of the British Imperial General Staff held a conference at London. The subject was what was the best movement to make. It was decided that the BEF, with the First French Army, should counterattack southwards against the Germans who had this day reached a line short of Peronne and Cambrai, only 100 kilometers from the English Channel. General Weygand appears to have known nothing about this, and there was no coordination with Allied GHQ. The British had no confidence in that headquarters. They made their own decisions. General Billote (commanding the First French Army), upon being advised of this decision through his liaison officer, agreed to participate in the proposed counterattack. Nobody consulted the Belgians, but they knew what was being prepared.

On 21 May the Belgians continued everywhere to hold their lines against continuous attacks. By pigeon post they learned that only one fort remained in Belgian hands at Namur, and that the inner ring of forts at Liège was in hostile possession. In the south the Germans reached Amiens, Abbeville, and Arras.

WEYGAND TRIES TO ARRANGE COUNTERATTACK

General Weygand, the new C-in-C, having familiarized himself with the situation, thought it best to confer with the commanders in Belgium. He arranged to meet them at Ypres that day. En route Weygand's plane was attacked, damaged and forced off its route. It made a forced landing near Calais. New arrangements for the conference had to be made.

Late that afternoon, the conference met at St. André, near Bruges, Belgium. King Leopold and General Billotte were present. General Gort, commanding the BEF, failed to arrive. King Leopold told Weygand that the situation appeared to be hopeless; the Belgians faced annihilation. Weygand appealed to all to do their utmost to rescue the nearly surrounded armies. He then explained how he thought this might be done.

His suggestion was that the First Army, reenforced by British units, should attack south from the line Douai-Valenciennes, to meet another attack coming north from the vicinity of Roye. The two attacks would seek to pinch off the German thrust moving west south of Belgium.

A general discussion followed. It was brought out that the troops were considerably mixed. They had lost much equipment, were fatigued, were short of ammunition. Particularly there was lack of air support. In view of these conditions, neither King Leopold nor General Billotte were willing to guarantee that the proposed attack was practicable. They were willing to try and take a chance that General Weygand's idea would succeed. Billotte only had 6 divisions. For the attack proposed this was not enough; he would require reinforcements from the British. The British representative being absent, this could not be decided. King Leopold invited attention to the fact that the French XVI Corps, with I division, was on his left, attached to his army. This division was motorized; it might be able to cross in rear of the front and join Billotte. The Belgians would take over the sector it now held. It was pointed out that if this were done, the march would cut across the British lines of communication to Dunkerque. It was not certain that the British would agree to this. Weygand thanked the King for the offer, but thought it best to decline it.

Nothing definite could be arrived at. It was agreed to leave everything to General Billotte. He was authorized to decide on the date and hour, make necessary arrangements, and handle everything by direct communication. General Weygand then left for France.

The King and Billotte remained to discuss further what could be done. About 9:00 PM General Gort came in. The

King and General Billotte explained to Gort Weygand's plan for the attack. Gort promptly stated he would assist. He believed he could send 2 divisions to help Billotte's attack. He had intended to employ these in the counterattack decided on the previous day at London, but would now abandon this plan.

The conference then broke up. General Billotte entered his car and drove away for his CP at Ypres. He had not gone far when, in the darkness of the night, with everything blacked out, a French army truck ran headlong into him. The General's car was completely smashed. When help arrived and the General was extricated from the wreck, it was found that he was fatally hurt. Shortly afterward he died. With him died also the plan for Weygand's attack.

Next morning, 22 May, General Weygand, back in Paris, conferred with M. Reynaud, the French Prime Minister, and with Mr. Winston Churchill. Then M. Reynaud announced to the press that the new C-in-C was full of confidence and felt that, provided everyone performed his duty with a ferocious energy, the country would be saved. He then appealed to civilians, and urgently requested that they stay at home, continue at their daily work, and pay no attention to hostile raiders in their communities. Such raiders were in a dangerous situation, exposed as they were to attacks from all sides.

General Weygand issued orders to the Seventh French Army—those units salvaged from Holland—to attack north from the vicinity of Roye, as had been agreed upon at the St. André conference. The Seventh Army was guarding a front of 90 kilometers and only had 6 divisions. They considered an attack completely impracticable and made no attempt to start one.

Because of the death of General Billotte, his staff at Ypres was not oriented as to the St. André conference. They did not feel competent to go ahead with a plan assigned personally to General Billotte and about which they knew little. Besides, the Germans were attacking venomously, so they had plenty of troubles of their own. When General Gort heard that the First Army was not doing anything about attacking southwards, he considered it useless to proceed farther with the weak attack which he had started with the few units the British had been able to assemble for this purpose.

Belgian GHQ was grievously disappointed when they learned that there was to be no determined attack to restore communication with France. They heard instead that the Germans had reached the sea.

On land the Belgians were now surrounded. Their line was a little under 100 kilometers in length. They held it under constant attacks. Every division was in line. Only local reserves were left. Communications were poor, as supplies had to move largely over or across roads filled with British and French troops trying to reach the coast. Other roads were filled with refugees, who slept in the ditches, congested the villages in efforts

to find food, interfered with all troop movements. Efforts were made to return refugees to their homes, but it was found that they were practically all from distant places beyond the front line. There was no place to which they could be sent.

German bombers rained incendiary flares on the lines of communications. They destroyed depots, fired on trains, damaged bridges and railroads. The rear areas presented scenes of the wildest disorder and confusion.

On 23 May the Belgians gave up the Ghent bridgehead. They attempted, by street fighting, to prevent the enemy from crossing the Scheldt at Ghent. This failed but delayed the enemy until evening. Supplies of all kinds were wanting. Every time a unit withdrew it abandoned something which could not be replaced. Ammunition was insufficient; rations were short.

French and British on the Belgian right also withdrew. The British were now definitely on the way to Dunkerque to escape by sea to England. The French, although cut off from France, had hopes they might break through what might yet be a weak enemy barrier.

The Belgians could see no escape for them. They received word that Liège and Namur were holding, but were daily losing key positions.

THE END APPROACHES

On 24 May the Germans attacked the whole line. They captured Courtrai on the right of the Allies, crossed the Lys at several places.

The Belgians maintained their positions, but it was evident that the end was approaching. In the evening King Leopold convened a conference of his GHQ staff and Civil Ministers. It met at Wynandaele Chateau near Thourout. The King, with tears in his eyes, explained the situation as it appeared to him and to his military advisers. The Belgian Army, bearing the brunt of the German attack, was suffering heavy losses in personnel and materiel. It was his opinion that their army should withdraw from the war.

There were four cabinet ministers present, M. Hubert Pierlot, the Prime Minister; M. Spaaks, the Foreign Minister, and den Poorten and Denis. They agreed as to the necessity for surrender, but disagreed as to whether the King should surrender with his army. The civilian ministers wished the King to flee with them to either France or England. The King said he would consider such action as desertion in face of the enemy, unthinkable for an officer. A conscientious man, he stood firm and would not give in on a matter of honor and principle. The conference lasted all night. Despatches arrived—not one encouraging. Nobody got any rest. As morning of the 25th came, they all were exhausted.

It was 5:00 AM. The civilian ministers had planned to escape to England via Dunkerque. It was time to go. If they waited longer they might not make it. M. Pierlot got up. He had hoped to have the King accompany himself and his

ministers in the flight to another land. If the King would consent to come, but wished to stay on a little longer, he too would stay until the last minute. But he thought it best not to delay. GHQ, after the King's departure, could negotiate a surrender.

The King replied that it was useless to argue. He would not desert the soldiers who had followed him into this war. He pleaded with Pierlot, begged him to stay with him, and govern as required by law. Pierlot did not believe that Hitler would permit him to do so. The King acknowledged that this might be so, but nevertheless he requested Pierlot and the other ministers to stay. If Hitler did interfere, Pierlot would become his privy councillor. Pierlot replied that in this case a rump Belgian government would be set up in France. The King stated that such a government would be unauthorized. If he and the ministers remained in Belgium, they would be the constitutional government. He wished to govern in this manner. "I am no Dictator," he said. He did not desire to try to govern without his ministers.

M. Pierlot closed the discussion, saying, "In that case we leave; we cannot remain with you." Pierlot and his ministers left. According to the report of the U. S. Embassy at Brussels, they reached Dunkerque in record time. One hour later they were all on a boat bound for England.

During the 25th, King Leopold took no steps to surrender. He and his army fought on, retiring slowly.

On 26 May, the Germans broke through the Belgian front at four places, and between the British and the Belgians. The British retired and liaison with them was lost. The G-3 section at Belgian GHQ outlined a plan to take 3 divisions out of line, to fill the gap caused by the British withdrawal, and the four gaps in their own front.

It was now found that the roads which would be needed for such a redistribution of troops were jammed with double lines of refugee cars which were barely moving. Ditches were full of wrecked cars. The refugees had no food, no shelter. Children were lost. The general idea seemed to be to reach the coast, and then leave on boats. But there were no boats. The road leading to the gap caused by the British withdrawal was blocked by 2,000 overturned army trucks—a British tank obstacle.

King Leopold consulted his chief of staff, General van Overstraeten. The latter reported that all was lost. Someone suggested that a flag of truce be sent to the Germans seeking terms. Perhaps they would not be too harsh.

Around 6:00 PM, General Blanchard of the French Army arrived at Belgian GHQ, at the Wynandaele Chateau. The King received him. General Blanchard introduced himself, stating that he had assumed command of the First French Army upon the death of General Billotte. He had heard that the Belgians were considering surrender, had reported that fact to Allied GHQ, and had received instructions to see what he

could do to have the Belgians hold on. He realized that the Belgians needed reinforcements. He would have liked to furnish French divisions, but due to the withdrawal of the British, they had left a gap on his side too. Through this a fresh German division had been identified advancing. He had only one nearly exhausted division, plus 15 tanks, to meet this situation, and had absolutely nothing to send to the Belgians. He had tried to consult the British C-in-C on his way to Wynandaele, but had been unable to find General Gort. However, he had made tentative

Orders were issued to continue the battle on the following day by minor movements locally made to close gaps.

Early on the 26th, General Weygand reported to the French Premier, M. Reynaud. Notwithstanding the confident orders of 22 May, accompanied by orders to pinch off the German thrust south of the Belgian boundary, it is very doubtful that Weygand really believed it possible to make these attacks. Now he knew. He appears to have frankly told M. Renaud on this day that the only possibility of



Acme

Heavy German howitzer (15-cm. or 21-cm.) going into position. The weapon is transported in two loads. Here we see the cannoneers dragging up the carriage transport wagon to slide the tube on to the cradle.

arrangements with General Gort's staff by which the British would furnish 2 divisions, provided the Belgians would continue to fight.

King Leopold explained the situation. His men were exhausted, but they could fight on. He particularly needed rations and ammunition. General Blanchard agreed to get these somehow. He then returned to his own army with the understanding that the Belgians would hold on.

At the end of this day the Belgian line ran through the vicinity of Maldegem, Aeltre, Thielt and Iseghem. The enemy was everywhere in close and most active contact.

reestablishing the situation was to receive very strong British support. Reynaud at once flew to London and consulted Mr. Churchill. Reynaud was frankly pessimistic. The French did not have the forces to stop the Germans, nor even to save their troops in Belgium. It was known that the Belgians were contemplating surrender. Unless the British would make a massive effort, France too would be forced to abandon the struggle. Just what passed between the two Premiers is not yet known. It was explained to Reynaud that the British were committed to evacuation of their forces from Belgium via Dunkerque. To save the personnel,

all materiel had to be abandoned. Consequently this British Army needed complete reequipment in addition to reorganization. It could not be ready for the field again for some time. The British would do everything they could to assist the French, but they were in no position to make a "massive effort." Reynaud flew back to Paris. His trip had secured him nothing.

On 27 May the Germans relentlessly renewed their attacks. By 11:00 AM they had penetrated the front of the II Belgian Corps near Maldegem. An hour later they broke through near Thielt, on a front of 6 to 7 kilometers. GHQ had no reserves to meet these attacks. A radio had been sent to General Gort early, for information as to the 2 divisions which General Blanchard had spoken about. No reply. Officers were sent to find the divisions; they reported that the British were marching on Dunkerque to sail for England. No British officer knew anything about "divisions for the Belgians."

Around 3:00 PM a plane bearing General Blanchard arrived. He had come in compliance with orders from General Weygand. The Belgian chief-of-staff and the British and French liaison officers, Admiral Sir Roger Keys and General Champion, were present at the interview. King Leopold explained that his lines had been broken through; he had no troops left to close the gaps. His 150-mm. howitzers had no more ammunition. They were now silent. His 75s had about 60 rounds left, hardly enough for the remainder of the day. No supplies, rations or ammunition promised had arrived, absolutely nothing. He did not reproach the Allies; he understood perfectly their difficulties. But the Belgians, lacking men, rations, and being nearly out of ammunition, simply could not fight any longer. The end had come. General Blanchard flew back, radioed to Allied GHQ.

It was now 4:00 PM. The Belgian GHQ staff were called in. The opinion was that the troops were exhausted, and could not be counted on to fight another day. A retreat to the Yser River, with a greatly shortened line of resistance, was proposed and discussed. After considering the blocked roads, the retreating British on the right flank, the lack of ammunition, and the fact that the front was already broken and that the enemy might arrive on the Yser first, the plan was rejected as impracticable.

At 4:30 PM the GHQ staff recommended surrender, The French liaison officer, General Champion, joined in the recommendation, requesting that the 1 division of French troops attached to the Belgian Army be included in the surrender.

King Leopold approved the recommendation. He gave directions to have a flag of truce detailed to leave as soon as he had officially informed General Gort and General Blanchard that he was about to surrender. Aides flew to the phones. General Blanchard could not be reached; the line was out due to the British having

destroyed the switchboard at Lille before abandoning that place. The British liaison officer stated that General Gort's CP was at Cassel. Cassel was reached, but reported that General Gort's CP wasn't there, never had been, and nobody there knew where it was. The responsibility for informing the Allies was left to their respective liaison officers. The message for General Blanchard was later transmitted.

At 5:00 PM the flag of truce left to go through the lines with a note to the German High Command asking on what terms a surrender would be accepted.

The French liaison officer telephoned the news of surrender to his lone division. Its commander did not want to surrender. His unit was motorized. If he could get gasoline and more transportation, and if he were authorized to abandon his materiel as the British were doing, he might be able to transport all his men to Dunkerque and escape to England. King Leopold at once agreed. He issued orders to give the French division whatever gasoline and transportation was available. Many Belgian truck chauffeurs were glad to go with the French. Enough were located to save this division, and during the night it fled to join the British.

At 9:00 PM the flag of truce returned with the German answer. No terms would be discussed. Unconditional surrender was demanded.

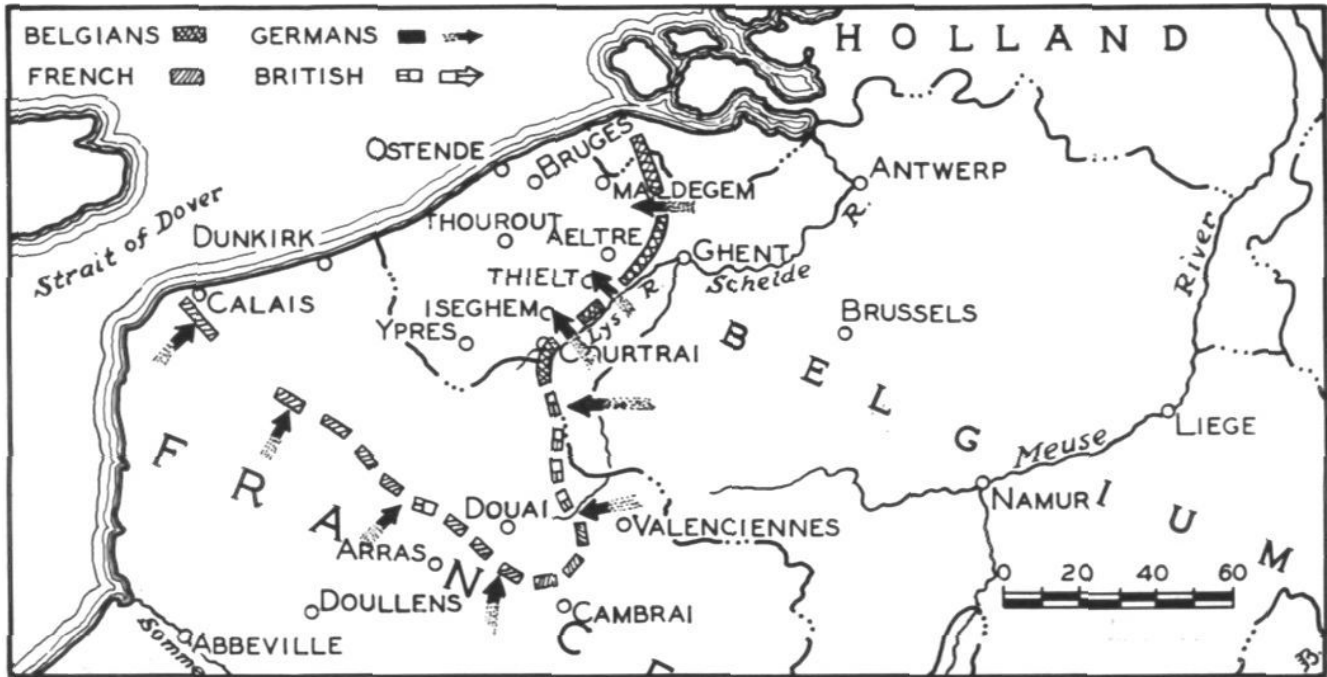
General Blanchard transmitted to Paris the news of the Belgian surrender. M. Pierlot was not in Paris, and the French Premier inquired of him as to the truth of this. Pierlot assured Reynaud that the news was unfortunately true. He made it clear that he, Pierlot, with his ministers, now constituted the real Belgian government. They were ready to carry on. They had met that afternoon at the Belgian embassy, and had passed a resolution affirming the determination of Belgium, no matter what happened, to continue on with the Allies, until final victory.

Reynaud then called a meeting of the French Cabinet. It met at 10:00 PM and sat until 12:00 midnight. They had instructions issued to the French armies to take no part in the Belgian surrender. Then went sorrowfully home; there was nothing else they could do. The British Government issued similar instructions to its army.

THE KING CAPITULATES

King Leopold held another conference to consider the German reply. It also lasted several hours. There was nothing that could be done. The demand for unconditional surrender was accepted. It was sent off about 1:00 AM. The German letter had stated that if their demand was accepted, firing would stop 2 hours after delivery of the note of acceptance. The bearer of the flag of truce and the German officer receiving it agreed that the hour of delivery and receipt was 2:00 AM. 28 May. Both sides issued orders to cease firing at 4:00 AM.

Some sections of the front did not receive this order,



Situation on May 27

and in places some firing continued until as late as 7:00 AM. Prior to surrender, the Belgian artillery disabled their pieces, and much other materiel was rendered unusable. The number surrendered is reported by German sources as over 400,000 troops; by French sources as about 350,000. There were also 800,000 refugees in *the Belgian zone*.

King Leopold, by his own choice a prisoner of war, surrendered to a German colonel assigned by the German High Command to that duty. He was asked where he wished to reside, but declined to make a choice. Chancellor Hitler directed that, as a brave enemy, he be given all consideration, and assigned him the castle of Laecken as a residence. With the German colonel he left immediately for this destination.

Early on 28 May, M. Reynaud broadcast an announcement of the surrender of the Belgian Army. He stated:

"It was this Belgian Army, which has just surrendered unconditionally . . . without warning their British and French comrades in combat, opening to the Germans the way to Dunkerque. Eighteen days ago this same King sent us a call for help. To this appeal we replied, following a plan adopted last December by the Allied General Staffs. . . . The Belgian Government has told me that the decision of the King was against the unanimous sentiment of his responsible ministers."

M. Pierlot wished to issue a proclamation to be published at 1:00 PM. Being in Paris, he had to submit it first to the French for approval. They insisted that before giving it, the proclamation be changed to include a reference to King Leopold's surrender as an act of treason. The Belgian cabinet declined. After considerable discussion approval was given, and at 4:00 PM the

proclamation came out, with nothing said about treason. The proclamation announced that M. Pierlot and his ministers now were the Belgian Government. They had not authorized the surrender of their Army. Since it had been made, the King was no longer in a position to govern; consequently all officers, men and civil officials who had taken an oath of allegiance to the King were now absolved from any obedience to him. The Prime Minister and the other ministers were now the Government; they would carry on the war, and would raise and organize a new army.

Thus ended Belgium's participation in the great campaign of May, 1940.

COMMENTS

TECHNICAL

Artillery: The German Army used very strong artillery forces. There is little reliable information as to how it was used, but the following items are known:

- No guns under 10.5-cm. caliber were used, other than antitank guns and infantry weapons.
- Antiaircraft batteries were available against any targets; were especially good to combat tanks and permanent fortifications.
- As far as means permitted, motorization was the rule. For west Europe, it was undoubtedly the best method.
- In battle, information from OPs to batteries was generally by radio in the clear. In moving warfare little use was made of telephones.

- e. German reports comment on the superiority of German motor vehicles as compared with French and British. Explanation seems to be that Germany had all late models. France and Great Britain requisitioned *used* vehicles able to run; many were far from new.
- f. When necessary, the Air Force dive bombers took over the artillery preparation, as at Sedan. Was very successful in one place; not so much so at another; and unsuccessful at a third place.
- g. Antitank batteries of 25-mm. and 37-mm. caliber were incapable of stopping the more heavily armored tanks. The smallest caliber accomplishing the mission with certainty was 47-mm.

The French, finding that their antitank batteries were largely of too small caliber, used their 75's. These did stop tanks, but were unnecessarily large. Many guns were lost by tanks circling around and attacking the guns from flanks or rear.

Bridges:

- a. Demolition of front-line bridges caused little delay. That they would be demolished was foreseen by the Germans. Temporary bridges replaced them rapidly. To be effective, demolition must be in depth beyond what the enemy can readily replace.
- b. There was no demolition ready to stop the Germans after they were over the Albert Canal and the

Meuse. The campaign might have turned out differently had the Allies foreseen the necessity for this.

- c. Demolition of bridges should ordinarily be accomplished before the enemy arrives at or near the bridges. If it has to be done when the enemy is close by, the local commander should have authority to order it. To depend on a distant headquarters is to run the risk that the bridge may be captured or the demolition detail killed before the orders arrive.

Refugees:

Civilians can not be expected to stay in homes or places of business if a battle rages around them. If they have no safe refuge at hand, they must be evacuated and fed and sheltered, in time to prevent their interfering with troop movements.

Depots: The enemy will destroy as many depots as possible. If they are few in number, and close to the front, the enemy's task is the easier. In future, depots will have to be multiplied and located long distances apart,

notwithstanding this may increase distribution difficulties.

Air Force:

- a. Concentrating planes on a few fields enables the enemy to destroy many on the ground by a surprise attack, as on 10 May. Air forces need numerous fields, each for a comparatively small number of planes.
- b. French and British reports comment on the absence of their own planes over their own lines, leaving



The end of the fighting

the air space overhead free to the enemy, who treated them savagely. Explanations that own planes were absent bombing deep in enemy territory were deeply resented by the soldiers. What good was this to them?

- c. The German C-in-C had *command* over land, air and sea forces. Cooperation between German land and air forces appeared to be under complete control and discipline. The British and French air forces were under separate control, and not under the orders of their respective armies. The various CPs were far apart. Cooperation was by request and agreement. Didn't work well.

STRATEGICAL

- a. The fast march of the motorized Seventh Army into Holland failed to find the enemy's right flank exposed as had been expected. It found itself in a pocket, with the enemy in front and on both flanks. It retreated, and lost a large part of its personnel.

The absence of the Seventh Army from the battle of the Meuse on 13 to 15 May was strategically similar to the absence of the Union cavalry from the battle of Chancellorsville. In both cases, mobile forces were absent from the main battle, engaged on duty which turned out to be unimportant.

- b. It is doubtful whether General Weygand's plan of 21 May to pinch off the German advance by simultaneous attacks from north and south was really believed by him to be practicable.

Weygand, after his study of 20 May of forces in France and after his conference in Belgium on 21 May, must have known that there were insufficient forces and materiel for such a large operation.

The explanation seems to be that this was an attempt to keep up the fighting a little while longer, in the hope that within that period the Germans would be forced to a standstill through exhaustion of their gasoline and other supplies. The Allies clung to this hope until the last. Weygand's plan succeeded only in delaying the surrender of the Belgians.

MISCELLANEOUS:

After the stormy meeting of the Supreme War Council on 15 May, the Allies lost confidence in each other. Day by day as the magnitude of the disaster became more apparent, there was a tendency for the Allies to act on separate lines. They became less and less friendly.

The Belgians and British blamed the French as responsible for the original strategical dispositions, and because they couldn't or wouldn't fight. The Belgians were charged with intending to surrender, as being quitters. In turn the British were charged with seeking first to save themselves in a war which they primarily brought about. In a growing atmosphere of suspicion and dislike Allied GHQ was unable to exert much influence.

The truth seems to be both the French and British believed that due to lack of supplies in Germany there would be no lengthy attack. They underestimated the enemy's reserves and resources. On 10 May, London and Paris were happy that the Germans had been finally forced out of their holes and had come out into the open where they could be killed off. The Allies were of the opinion that Hitler had made a grievous strategical error, sure to result in his undoing. Both partners agreed on this estimate of the situation. They made their dispositions in accord therewith. There is no sound basis for either blaming the other. Both were equally mistaken in their assumptions as to the enemy.

The claim that the Belgians caused the loss of the battle of Belgium by surrendering without giving any notice to their comrades in battle will not bear examination. Those in authority knew a week in advance that the Belgians were contemplating surrender. They knew also that the battle of Belgium couldn't be won; the British were so sure of this that they concentrated not on fighting but on escaping. They knew also that all the armies in Belgium were short of rations, ammunition and supplies, and that it was impossible to furnish them anything. The Belgians postponed their surrender, maintained a hopeless contest, gave the British and French as much time as possible, to either reestablish the situation or to save themselves. Most of the British and some of the French did save themselves. The Belgians did not. They deserve kinder treatment than contemporary history has accorded them thus far.

This concludes Col. Lanza's three-part serial dealing with the capture of Belgium.—Editor.





Preliminary training on thousand-inch range prior to firing on sunken track range.

Moving Targets on Sunken Track Ranges

By Captain Dale E. Means, 79th FA

To meet the problem of training gun crews in the technique of firing at moving targets, we have under construction at Fort Bragg four sunken track ranges. The first range has been completed and is in daily operation. The range was opened for firing on April 15, 1941, on the occasion of the visit of the Chief of Field Artillery to this station. It is believed that this type range offers the facilities essential to the proper elementary training of the gun crew. The range does not provide all the requirements essential in a moving target to round out the training of a finished gun crew. It is planned to round out this training by the use of the old type towed target.

The Sunken Track Range is fairly simple. It consists of a small motorized car which runs along a narrow-gauge (36") track. The motor car is protected from direct hits by lowering the track and car below the surface of the ground. The target itself is mounted on top of the motor car. The track is laid out so that the target moves on a continuous course. The course may be either a figure eight or an oval. Our plans provide for two figure-eight courses and two oval courses.

The track layout will depend to a large extent on the terrain available. The four ranges planned for this station have been laid out in two separate areas, each area having one figure eight course and one oval course. Ranges 3 and 4 will be practically duplicates of ranges 1 and 2. Consequently a description of ranges 3 and 4 will be omitted from this article.

The track layout for Range No. 1 is shown in Figure 1. This range has 3,680 feet of track. The range is laid out on

the forward slope of a hill. The maximum grade is 3.5 per cent. Without any other method of control, these slopes are sufficient to give a variation of six miles per hour in speed. If the nature of the terrain permits, the course should be laid out with a grade of not more than two per cent. The speed of the car can be varied by a method of ignition control to be discussed later. The track layout is designed to give frequent changes in direction and range. It is well adapted for training the gunner to follow the target as well as to train the chief of section to make frequent changes in the range. Two minutes and forty-six seconds are required to make the complete circuit at an average speed of 15 miles per hour. During half that period of time, the gun, at a range of 500 yards, is traversed through an arc of 500 mils. Because of the difference in elevation between the front and rear of the range, together with the depth of the range, range changes equal to 500 yards are required for each circuit.

The track layout for Range No. 2 is shown in Figure No. 1. This range has 5,807 feet of track. This layout is designed to afford training in firing at a target approaching the gunner at a high rate of speed and with two changes in direction. The maximum grade is less than one and one-half per cent. Variations in speed will be obtained mainly by ignition control. It is hoped to have the target on this range reach a maximum speed of thirty miles per hour. The maximum speed obtained to date on Range No. 1 is eighteen miles per hour. By improving the curves, higher speeds will be possible.

The total cost for materials for the track layout on

Range No. 1 was \$1,900.00, for Range No. 2 \$2,600.00. If creosoted commercial pine ties are used, the cost of Range No. 1 would be increased by \$4,000.00, Range No. 2 by \$6,000.00. We eliminated the cost of ties by sawing them at a government owned mill. As a preservative, the ties have been dipped in creosote.

In order to control and change the speed of the target, control ramps which actuate levers underneath the motor car have been developed. The ramp is placed on the track bed. The levers are connected to the ignition, throttle or brakes. Different type ramps are required for each of the control levers.

The possibility of controlling the motor car by remote control has been investigated. The investigation disclosed that the cost of a reliable system of remote control was too high and the equipment too complicated to warrant its use. Ramps are inexpensive, are not complicated, and will give the required control.

The ignition cut-off alone will meet most requirements for control of the car. When the ignition is cut off, the engine acts as a brake to retard the car. For example, when the ignition is cut off at a speed of 15 miles per hour, the car will come to a complete stop in 120 feet (level track).

The throttle control is useful on long "straightaways." The maximum speed can then be obtained without the danger of derailments on the curves.

Brake controls are not necessary. If concrete dugouts are provided for the man who marks the target, the use of brakes might save some time during the process of marking. Our experiences indicate that it would be desirable to remove the brake shoes completely. We were having occasional derailments. The brake shoes were removed. The number of derailments dropped considerably. Whether or not derailments were caused by the brakes "grabbing" has not been definitely determined.

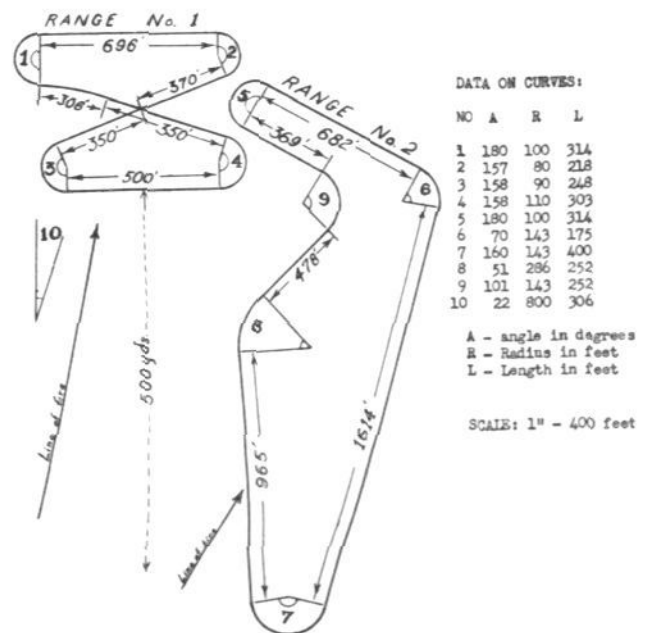
The railway motor car used as the target carrier is of standard commercial design for 36" gauge track. You have seen these type cars take section maintenance crews to work on the railroads. The cars were furnished by the Kalamazoo Railway Supply Company, Kalamazoo, Michigan. Upon request their standard model 27, 36" gauge, has been modified to meet the special requirements of a target carrier. The car is equipped with an air-cooled, four-cylinder, 16½-horsepower motor. The commercial model has been modified by moving the engine from the front end to the center of the car, thus giving greater stability. In addition, the car has been provided with levers, a star wheel ignition control, etc., for the control of the car as previously described. The above company also furnishes ramps for the actuation of the levers. The cost of the car delivered to Fort Bragg was \$520.00.

In order to provide two targets for each motor car, a trailer has been purchased with each motor car. These trailers are towed a few feet in rear of the motor car. The cost of the trailer delivered to Fort Bragg was \$115.00.

Any light-weight standard rail would be satisfactory. The Fort Bragg range is equipped with a 25-lb. per yard rail, having a 1½" tread. It is believed that a 35-lb. rail would be an improvement, although the 25-lb. rail has proven satisfactory. Rail braces, sometimes called angle bars, are not necessary. The spikes are sufficient to hold the rail in place under all conditions, due to the light weight of the motor car.

In order to provide more targets, and thus increase the capacity of the range, it is planned to use at least three separate motor cars and trailers on Range No. 2. The motor cars will be started at intervals of two or three hundred yards. After some experience the proper setting will be determined for each car so that all cars will travel at the same speed. By this method three or six gun crews can be trained simultaneously. It is the understanding of the writer that ranges have been operated in this manner in the training of the British Army. (Cars protected by spring bumpers.)

The trench to provide protection for the car should be six feet deep and seven feet wide at the bottom. Five-foot ties are required. A dragline or motorized shovel should be available for digging the trench. The dirt from the trench should not be used to form a parapet for the protection of the car. In rushing our first range to completion, in order to reduce the amount of excavation, a parapet was used. It was found that the elevation of the base of the target five feet above the normal ground level led to erroneous range change estimates. For example, the range setting for a round a few feet below the base of the target may be 200 to 300 yards short. In addition, the percentage of hits from ricochets will be materially reduced, if parapets are used.



TRACK LAYOUT FOR SUNKEN TRACK RANGES AT FORT BRAGG, NORTH CAROLINA

Figure 1



37-mm. antitank gun firing demonstration on new sunken track range, for Chief of Field Artillery.

From the standpoint of construction, the installation of the curves requires the most care. A combination track level and gauge should be available. The elevation of the curve, as well as the curve itself, must change gradually. All curves should have at least a six-inch elevation (at center of curvature) for the outer rail. Ties should be spaced at approximately 18 inches.

Even with the utmost care in laying the track, occasional derailments may be expected. These derailments are likely



Commercial motor car, unmodified, used as target carrier.

to damage the front and rear axles. Spare axles should be purchased in order to insure continuous operation. If derailments are experienced, the car should be provided with derailment skids. These skids, of heavy metal, installed crosswise on the front and rear of the car, should be two inches above the rails.

The range should be selected so that ranges of at least 600 yards, preferably 1,000 yards, can be obtained. Firing positions at intervals of approximately 100 yards should be provided. The ranges most frequently used will be between 300 and 600 yards.

The Sunken Track Range has proven to be a valuable training aid. The range does not provide all the characteristics of the movement of a tank. The range does not provide quick changes of direction or surprise targets. The purpose of the range is to afford training in the technique of firing at moving targets. The surprise targets and quick changes of direction will be obtained by providing paths for towed targets in the range area. These towed targets will be used in the more advanced phases of instruction. The targets will be placed in position prior to the time of firing on the Sunken Track target. At opportune moments the surprise targets will be placed in operation.

NOTE: Range officers who desire to know detailed specifications of the equipment described in the foregoing should write to Post Headquarters, Fort Bragg, N. C.

PYROTECHNICS

INTRODUCTION

For many years the trend in fire direction for field artillery has been toward super-accurate, but relatively slow, methods of bringing the fire of the guns on the desired targets.

Precision registrations, transfers, weather corrections, elaborate surveys and OP installations have been introduced and developed to a point where extremely accurate results are obtained. However, these methods require time, equipment, and information that it will be

possible to obtain only in relatively slow-moving situations. The rapidity of movement and the speed of maneuver of modern war has shown the need for the development and use of simpler and more rapid methods of fire direction without sacrificing the essential accuracy of artillery fires. This is particularly true of the field artillery with an armored division, and to a lesser degree the field artillery with a cavalry, motorized, triangular or square division. We do not mean that the old tried and proved methods should be neglected or abandoned. On the contrary, they should be used wherever time and conditions permit. But new or modified methods must be developed and made available to supplement existing methods under circumstances where it would be impossible to use the existing methods.

THE PROBLEM

Imagine a situation where an armored division is committed to action in exploiting a breakthrough or in making a wide envelopment or encirclement. The battle has gotten off the confines of a military reservation and there are no fire-control maps or other suitable maps available for adjusting fires. The air corps has promised to furnish air photos suitable for use in fire direction, but, for some unaccountable reason, they have not arrived. The



AS AN AID TO THE FORWARD- OBSERVER

By Captain George
I., Hart, Jr., 78th FA
Bn. (Arm'd)

leading elements of the division suddenly meet enemy resistance which it is necessary to overcome quickly, and artillery fire is needed to quickly overcome this resistance. There is an artillery observer in a tank with the leading elements, but as a result of the movement forward and the "fog of battle," the locations of the batteries of his battalion are unknown to him and his location is likewise unknown to his battalion. The forward observer has radio communication with his battalion and, through the battalion net, with the batteries thereof. The forward observer can see many choice and profitable targets, but no one else in the artillery battalion is in a position to see them. No air observer is available to adjust the fires. How is the fire of the batteries to be brought on the target?

If you deem the foregoing situation unlikely or improbable, then the remainder of this discussion will be of no interest to you and you had better skip it and go on to the next article. However, if the foregoing situation does seem probable to you, we will attempt to suggest "a solution" and ask you to suggest other and better solutions, as there doubtless are other and better solutions.

A SOLUTION

The forward observer has with him a rocket projector and a supply of rockets. He prepares to project a

rocket from his tank, or, preferably, from outside and to the flank of his tank, and radios the Fire Direction Center as follows: "A.T. Guns, rocket, will adjust." FDC designates the battery to fire and the concentration number. Thereafter the forward observer communicates directly with the battery to fire through the battalion net.

The forward observer, with a small compass, has measured the azimuth from his position to the A.T. guns and finds it to be 4600. He estimates the distance from the target to his position as 400 yards. The observer reports to the battery: "Rocket, vector (azimuth) 4600, 400 yards, A.T. Guns, will adjust."

The battery to fire does not know from just what direction the rocket will appear, so it stations a number of men in a semi-circle observing small sectors of the terrain to the front and covering an area from right flank to left flank. Battery then directs the forward observer to "fire rocket." The forward observer fires a rocket and one of the men detailed to watch sees the rocket rise within his sector. He immediately locates the position from which the rocket appeared with relation to some easily identifiable terrain feature. The battery directs its instruments toward the point where the rocket appeared and directs the observer to "repeat rocket." The observer projects a second rocket and the instruments measure the azimuth to the rocket and the site of the rocket at height of burst. It is known to the battery that the average height of the rocket used at time of burst is 156 yards. The measured site is 31 mils, therefore the battery computes the range to the rocket as 5,000 yards. The azimuth to the rocket was measured as 1200 mils. The battery quickly constructs a chart on which the rocket position is assumed. Using a back azimuth of 4400 mils and a range of 5,000 yards, the relative position of the guns is plotted. From the rocket position an azimuth of 4600 mils is drawn and 400 yards is measured along this azimuth and the target located. With a range-deflection fan the compass and range for the initial salvo is determined. From this point on the adjustment will be carried on by the usual forward-observer methods. A ladder, either air or ground, will be fired on the first salvo to give the observer the direction of fire. All batteries might have been adjusted simultaneously or successively using the usual methods.

DISCUSSION

The foregoing method, with variations, has actually been used with success by the 78th Field Artillery Battalion (Armored) and the 14th Field Artillery (Armored), both of the 2nd Armored Division.

The variations used relate to the method of designating the relative position of the target and rocket and the method of obtaining the range from the guns to the rocket. Where the observer knows the general location of the battery he can designate the rocket as so much right or left, short or over with relation to the target. Where the

general location of the battery is not known the observer can designate the rocket as so much north or south, east or west of the target instead of designating the target by its location along an azimuth from the rocket position. In obtaining the range to the rocket a variation used has been to measure the range with a range finder, laying on the rocket, instead of measuring site to the rocket at the time of burst and computing the range from the site. The results obtained with the range finder at distances up to 2,500 yards proved very satisfactory, but at distances in excess of 4,500 yards, the error in range finder ranges proved to be too great to consider its use practicable on existing type rockets.

Tests were also carried out in the 78th Field Artillery Battalion (Armored) to determine the following:

1. Whether signals, ground rocket, rise to a relatively constant height.
2. To determine the ability of instrument operators with varied length of experience with instruments to make observations on rockets and balloons.
3. To determine the accuracy of observations and readings on rockets and balloons by a comparison of readings made with actual compass directions and known distances.
4. To determine the suitability of present available type rockets and balloons for use by forward observers.

In these tests two types of rockets were used, the M-7 (Red Chain Parachute) and the M-6 (Red Star Cluster). No white rockets were available for the tests.

The balloons used in the tests were meteorological balloons in three colors, red, black and natural, inflated to a diameter of approximately 30 inches.

From instrument readings made at a measured 1,000 yards from the position where the rockets were projected, the average height to which the rockets ascended was determined.*

At a carefully surveyed position 4,680 yards from the position where the rockets were projected three aiming circles, three B.C. Scopes, and three range finders were set up to take readings on the rockets and balloons.

The average error of the azimuth readings on the M-7 rockets was found to be 4 mils and on the M-6 rockets 2 mils.

The average error in the range finder ranges to the rockets was found to be 691 yards over with the M-7 and 420 yards over with the M-6 rockets.

The average error in ranges computed from angle-of-site measurements to the height of burst of the rockets was found to be 250 yards over in the case of both the M-7 and the M-6 rockets (after adding site of minus 11 from instrument position to rocket position to the readings obtained).

The meteorological balloons were let up from the same position from which the rockets were projected. For each reading 200 yards of line was paid out on the

*These data will be furnished to responsible persons on request.—Ed.

balloons. The height obtained by the balloons, with 200 yards of line paid out, varied from 131 yards in a 15 MPH wind to 193 yards in a 5 MPH wind. The variations in the heights attained was such that angle-of-site measurements to the balloons were useless for computing range. The range-finder ranges to the balloons showed an average error of 721 yards over. The average error of the azimuth readings on the balloons was 11 mils.

CONCLUSIONS

1. The use of pyrotechnics is a suitable means of getting the first salvo out where it can be seen and identified by the forward observer, who can thereafter adjust the fire on the target.

2. The present available type rockets are not suitable for use by forward observers except in very flat and treeless or desert country. A rocket is needed that will rise to a much greater height; a height of 500 yards is suggested as desirable. Such a rocket would rise above the ordinary mask of hills or trees that might be expected to be in front of the instruments. Further, any reasonable angle of site between the instrument and the rocket position would be so

small in relation to the total angle of site to the height of a 500-yard rocket that it could be disregarded without materially affecting the resultant computed range.

3. The azimuth to a rocket can be measured with satisfactory accuracy with the aiming circle.

4. With a rocket that rises to a constant height of 500 yards, or better, range computed from angle of site to the rocket at the height of rise will usually be more accurate than range-finder ranges to the rocket. (With a larger, longer-burning flare and a larger, colored parachute, range-finder ranges might prove more accurate.)

5. Rockets are more practicable than balloons for use by forward observers. The height to which a balloon will rise on a given length of line varies too greatly with the force of the wind to make their use feasible in quickly computing range from angle of site. The bobbing of a balloon in the wind makes it difficult to read ranges to it correctly with a range finder.

6. The observer will be at some risk from enemy fires when firing two or more rockets in close proximity to the enemy, but the results obtained will justify the risk involved. In any event, war is not without its hazards.



"The Ghost"

First section of Battery A, 81st Field Artillery Battalion, Fort Richardson, Alaska. In sending in this photo of a new and unusual type of camouflage (so far as U. S. field artillery is concerned), Major John A. McFarland says that the above piece was the first American light artillery weapon to fire a shot in Alaska.

THE SWISS ARMY



By Henry W. Steiger

Switzerland's army of over 500,000 men has been keeping watch at the front since the beginning of September, 1939. About 250,000 soldiers were demobilized in June, 1940.



The Swiss Army is one of the few undefeated armies of Europe. That is a certain distinction these days, even if it is undefeated because it has not been attacked. Germany might have attacked France through Switzerland instead of the Low Countries, but as in 1914, so again in 1940, Germany chose the easier route to get at her enemy.

For a country of its size, Switzerland's military condition is strong. Her entire manhood is trained for defense, in peace time as well as in time of war. So uncomfortably situated in the midst of powerful neighbors rivalling each other, the Swiss were forced to work out a system that would have the country's maximum military strength always in readiness for self defense. They found this in a militia system based on a constitutional requirement of military service by every male as a condition of citizenship. At the age of 20 the Swiss boy becomes of age, gets the right to vote and the obligation to do military service. No man is exempt. If physically unfit or living outside Switzerland, he must pay a tax proportionate to his financial status in lieu of service and is liable in wartime for auxiliary service.

The Swiss find no contradiction between the democratic ideals of their country and this constant military preparedness. They began fighting in the 13th century and they have been good soldiers ever since. The period when Swiss mercenaries were the most sought-after soldiers in Europe has so completely passed that (except for the Vatican Guard) it is illegal for the Swiss to do military service for any other country. That would jeopardize Swiss neutrality and deprive the country of its full defensive strength.

But compulsory military service fortifies Swiss democracy in another way. It is a melting pot of class distinction, because every Swiss must begin his service as a simple recruit, no matter to what rank he aspires. The son of a distinguished family and a young peasant wear the same uniform and must share the same work. A spoiled youngster who has never learned to obey has to swallow his stubbornness and take orders. Those who have no interest in sports are built up physically by the rigorous training. In a country with four official languages (German, French, Italian and Romansch) and denominational differences,* the unifying effect of such a military system is most important. The Italian-speaking Tessin boy of Catholic faith may do his service in the German-speaking, Protestant city of Thun, the French-speaking Genevese somewhere in German-speaking Switzerland. Thus a

*Population speaking German, 71.9%; French, 20.4%; Italian, 6%; Romansch, 1.1%; other languages, 0.6%; Protestant population, 57%; Catholic population, 41%.

strong factor in the striking unity of the Swiss is the military service in which every citizen, regardless of his background, participates.

MILITARY SERVICE FOR PRIVATES

The Swiss militia system differs from the systems of other countries in that the soldier has not one year or more of successive military training, but is called in for courses of short duration, and in accordance with the new military organization of June 24, 1938, the total peace time service for an infantryman between the ages of 20 and 48 is 320 days. Before that date a shorter period of service was required, but the more complicated modern military machines made it necessary to extend the time. The plan of service of a Swiss private is as follows:

At the age of 19 he must pass an educational test, which includes reading, arithmetic, geography, Swiss history and politics, and composition, and a physical test consisting of performance of gymnastic exercises. After having passed a medical examination, also, and been pronounced fit for military service, the boy may name the branch in which he would prefer to do his service and if possible his wishes are followed.

At 20 he enters the Recruit School, for a course which lasts 116 days for all branches except cavalry, in which it takes 130 days. On reporting for service the recruit is supplied with full equipment, including a regulation rifle, all of which he takes home after finishing the course. But he is responsible for having his equipment always in readiness and in perfect order, and yearly inspections at the time of his annual 19 days' drill course are an effective check-up. When he leaves the army at 48 his equipment becomes his personal property.

This practice of having every soldier keep his equipment, including his rifle, at home has the great advantage that the army can be mobilized in a minimum of time. But for reasons of public safety it might not be feasible in many countries. An Irishman who had lived several years in Switzerland still found this practice astonishing. "Why," he said laughing, "think of the revolutions that might be set off! The Irish would think it was a great opportunity missed." But in Switzerland this is no danger. The Swiss considers himself a part of the sovereign, and is conscious of the responsibility which that puts on him. He is proud to have his arms at home as a symbol of his freedom.

The training of the recruits is necessarily rigorous, because it is so short. It means eight hours of strenuous daily work, including night work, such as patrolling, entrenching and maneuvers. From the completion of this course until the age of 32 the young soldier belongs to the Elite troops (First Line or *Auszug*). In the first six years he is called in each year for a 19 days' drill course and afterwards only every other year, so that at the age of 32 he has completed eight such drill courses. These drill courses of the Elite troops are arranged to provide an adequate balance of training in smaller tactical units and in larger units.

The second line or *Landwehr* is composed of the men between 33 and 40 years of age. They are obliged to follow two drill courses during those eight years and to have their equipment inspected each year.

The third part of the Swiss Army is the *Landsturm*, the territorial troops, and is formed by the men between 41 and 48 years of age. They are no more bound to follow drill courses, but are called in yearly for inspections.

Until recently a Swiss left the army at 48. But a new regulation provides that men up to the age of 60 can serve in the army in case of a general mobilization.

The total of 320 days of military service is composed, therefore, in the following way:

	Days
Recruit School at the age of 20.....	116
First Line (Elite or <i>Auszug</i>) between 20 and 32—8 drill courses at 19 days each	152
Second Line or <i>Landwehr</i> , between 33 and 40—2 drill courses at 19 days each	38
Annual inspections	6
Territorial troops or <i>Landsturm</i> , between 41 and 48—Annual inspections.....	8
Territorial troops between 49 and 60, subject to service only in case of general mobilization.....
Total	320

Specialists such as gunsmiths, farriers, etc., receive their necessary professional training in special courses. The ambulance corps takes a hospital training course in addition to the course in the Recruit School.

Besides service under the colors, soldiers and non-commissioned officers of the first and second line who are armed with a rifle or a carbine are required to do a certain amount of rifle practice. All over the country in each town

there is an officially-subsidized rifle club with its own shooting gallery. It is therefore quite a common picture in Switzerland to see men in civilian clothes with their rifles on their shoulders going off to a shooting gallery somewhere in the country. A certain number of hits a year are compulsory and if the man fails to make his points he must devote three days to unpaid target practice. Shooting is a very popular sport in Switzerland, and local, cantonal and federal shooting matches are great events in Swiss social life.

The new organization of the Swiss Army also comprises regulations about those exempted because of physical unfitness. They are used for passive air defense, for which they must train, though the period is shorter than for active service. Others are classified for many kinds of auxiliary services and during mobilization may be called in for any service their country needs. This, however, is a recent regulation taken under the pressure of present conditions.

A feminine aid service has also been organized, but this, too, is of recent date.

OFFICERS' TRAINING

We have already mentioned that there is no officer in the Swiss Army who has not begun his military service as a simple recruit. This is not only an ideal democratic measure, but it is a great help in forming a good spirit in the relations between officers and troops. It also opens to any soldier with abilities and interest for a military career the possibility of becoming an officer. Candidates for the School for Non-Commissioned Officers are selected from the ranks of the Recruit School. Their course takes only 18 days, or 25 days for artillery and air force. The graduate receives provisionally the



Photopress, Zurich

Swiss tanks pass in review

rank of corporal, which is confirmed only when he completes another Recruit School course in his new rank.

The corporal with capacities for further advancement has two possibilities: to be selected for the Officers' School, or to advance as a non-commissioned officer. The course of the Officers' School is 60 to 120 days long according to the instruction required for the different branches (infantry 88 days, artillery and air corps 102 days). The officer finishes with the rank of lieutenant, and this promotion becomes definite when he has served a sort of term of apprenticeship as an instructor of new recruits. After three or four drill courses, if qualified, he advances to the rank of first lieutenant. For advancement to the rank of captain he has to take another course of 30 days, the Central Military School No. 1, as well as other special courses. Officers above the rank of captain devote a considerable part of their time to special courses in tactics, information, etc.

For the great part, Swiss officers up to the rank of colonel have private professions, and their military duties which require much of their time are to a large extent an honorary service to their country. But no army can be without a corps of instructors who are professional officers. Commanders of divisions and army corps are professional officers.

One of the peculiarities of the Swiss Army is that in peace time it has no commander-in-chief and, according to the Constitution, the federal authorities cannot maintain a standing army. When the country is in danger the two Houses of the Swiss Parliament, sitting together as the National Assembly, elect a commander-in-chief, who alone has the rank of General, and who will execute his command under the direction of the Federal Council, the highest executive body of the country. This gives quite a special ring to this office and we find pictures of "the General" in public places and private homes, not because he is a leader, but because he is the highest representative of the army.

THE ARMY AND ITS COUNTRY

Through this system it is possible to a country of four million inhabitants to train and maintain an army of about half a million men on a financially workable basis. Indeed, it is the minimum of training a modern army needs, but the Swiss Army is purely defensive. Yet it has a difficult task. The country is very irregular in shape and has a border 1,170 miles long. Up to 1938 Switzerland had four neighbors. In the south about 40 per cent of the total confines touch Italy. Here a great part of the border just follows the highest crests of the Alps, including the Matterhorn and the Monte Rosa. About 30 per cent of the frontier touches France in the west, and here except for a small Alpine region and the Lake of Geneva it tops the heights of the Jura Mountains, in general not more than 3,000 to 4,000 feet above sea level. The remaining frontier, originally divided between Germany and Austria, is now all German, with 2/3 of its length following the course of



Hans Steiner Berne
Gen. Henri Guisan. C-in-C of the Swiss Army, is much admired and beloved throughout Switzerland.

the Rhine. Geographically Switzerland is divided into three parts: the Jura region, the central part, where the population is densest, and the Alps.

The foundation of the first Swiss Confederation took place 650 years ago in the mountain region near the St. Gotthard Pass, a country which in the Middle Ages was comparatively easy to defend and today, too, it would be in this alpine region that the Swiss defense would make its stand. The Swiss Army is divided now into four army corps of two divisions each, and three independent mountain brigades. Those mountain troops profit from the love of the Swiss for his mountains, where both country and city youths spend their holidays and weekends in mountain climbing and skiing, and their military service makes good use of their hobby. In mountain warfare Switzerland has profited from the experiences of the Finnish-Russian campaign, as well as from the Austrian-Italian mountain warfare in the last war. Nevertheless the Swiss Army authorities have gone much farther in the training of their mountain



Widmer Wallenstadt

Swiss infantry cannon

troops for any eventuality of the arctic climate of the Alps, as orientation in bad weather, protection against avalanches, and fitness for very low temperature.

But of course the greatest danger is not in the south, but in the north. There the Rhine is some protection, the Jura Mountains still more, and in the northeast where the central



K. Egli

While about half of neutral Switzerland's army of over 500,000 men was demobilized at end of June, 1940, the remainder still keeps watch along the frontier and in the mountains. At intervals men are permitted to return home, while others are recalled to duty. Constant training is responsible for Swiss fitness. During the winter the men are drilled by means of alpine ski courses; in summer there are mountain climbing courses. Switzerland's finest alpine guides, also officers and soldiers who are experienced mountaineers, supervise these drillings. Instructions include rock-climbing technique, climbing of ice precipices, crossing of glaciers and crevasses, etc. Courses last several days and include camping at altitudes of over 13,000 feet, also ascents during the night. This photograph shows two soldiers rescuing a comrade who dropped into a glacier crevasse.

plain is open towards Germany, the Lake of Constance is a barrier. Even before the fighting in this war began, the Swiss were aware that they could not totally prevent a German invasion, but they know that they can make it so hard and expensive for the invader that the gain would not recompense the effort. Switzerland has no oil nor precious minerals, and this has proved to be a good protection and one reason why Switzerland is still enjoying her freedom. Furthermore there are two alpine railway lines through Switzerland, which for Germany's communication with Italy are extremely important, the St. Gotthard and the Simplon line, both with double tracks. The Loetschberg line, connecting the Simplon with Bern and Basle, has only one track. In case of an invasion those lines could and would be destroyed without any possible interference from outside and reconstruction would take at least two years.

The total strength of the Swiss Army is about 500,000 men and half that number have constantly been under arms since the war began. There were two general mobilizations of the whole army, the first in September, 1939, and the second in May, 1940. In order that civil life can go on almost normally, those who are in the most important (from a military standpoint) positions are granted leaves for a few months and then return to the colors that others can be released. Older men were demobilized already in June, 1940. Thanks to the electrification of most of the railway lines in the twenties, the train schedules are almost normal, because there is no shortage of electricity. But the unavoidable increasing expenses caused by the mobilization which cannot be met even by the exceptional income taxes and taxes on capital is a great problem to the parsimonious Swiss who is not accustomed to live beyond his means.

Nevertheless soon after the beginning of the Nazi regime in Germany the Swiss realized the great danger this movement was for Switzerland, 71.9 per cent of the Swiss speaking the German language. Those who had come to think of the military service as an unnecessary nuisance were grateful that it had not been allowed to rust in peace time. When an army was needed it was ready, although a modernization was needed, and the mental resistance toward increased military service was nothing in comparison to that in countries where no general military service is required. When in 1936 a loan of \$53,500,000 for the reorganization of the army was floated, it was oversubscribed 42 per cent. The money was used for increased training and new fortifications. The Swiss metal industry changed from producing locomotives and Diesel motors to guns and an effective air force was also built up.

So in September, 1939, Switzerland was not taken by surprise. During the long period of mobilization the Swiss Army has continued to strengthen the country's defense. And behind the army there is a people determined to be governed by their own sense of right and not by orders from outside. The decisive work is still in the hands of the Swiss diplomats and not of the army.



GERMAN SIGNAL COMMUNICATIONS

The recent campaigns of the German army have demonstrated that in the midst of the apparent disorganization of most rapid advances, wherein many movements were undertaken on the initiative of junior commanders, there undoubtedly has prevailed a certain and efficient signal communication service. The need for improved communication was indelibly impressed upon the German General Staff as a result of bitter experience during the summer of 1914. As the German divisions advanced into French territory, it became increasingly impossible for the High Command to maintain communication; the consequence was a breakdown in the service of information, as well as an inability to transmit orders. The situation finally reached a point where the German supreme command lost contact with its marching armies; commanders at different localities made unrelated decisions; there was a loss of coordinated action; and the campaign was a failure. With such a disastrous lesson as a reminder, there was no doubt that Germany would enter the next war with a much improved system of communication.

As the outbreak of hostilities in Europe threatened in 1939, and during the subsequent campaigns, there has been a constant demand for information concerning the German signal communication systems. We have been particularly interested in their equipment and the technique of its installation and operation. Not that we believed that our own equipment was less advanced or efficient but that we might profit by the experience of a nation whose resources were concentrated upon the problem and obtain ideas for the improvement of our own. Such information has been scanty in the extreme. Only recently has anything of value been forthcoming and that through excerpts from the Spanish military journal *Ejercito*. The Spanish Civil War brought to light many pieces of German equipment. Spain was the proving ground, and the Condor Legion the testing agency.

The following paragraphs (largely paraphrased excerpts from *Ejercito* and German Army Service Regulations) set forth in general outline the systems, means and operation of communication as provided for by the German artillery during early 1939. They probably describe also those agencies, equipment, and principles successfully used in the campaigns of 1940. In reading, bear in mind that

improvements and developments undoubtedly have been made. The *principles* involved should be compared with our own.

In a division consisting of 14,000 men, 500 are assigned to the division communication group. These are in addition to whatever men are assigned to the infantry and artillery for their own internal communications, and are amply fitted out with equipment as can be noted by studying the communication nets of the artillery battalion and regiment, shown in Figure 1. The following principles are especially worthy of note. Close to the front, reliance is placed more upon the radio than upon the telephone. Preference for the radio is even more marked in the infantry than in the artillery. For rapid circulation of orders a second, an independent net of radio communication is superimposed upon the normal tactical nets. This second net is used exclusively for the transmission of combat orders, and provides nothing but receiving equipment for those who are to receive orders. Information and administrative instructions are circulated, by relays if necessary, over the regular tactical nets.

The following tabulation gives the *types* of communication equipment found in the sections of the signal units assigned to the artillery:

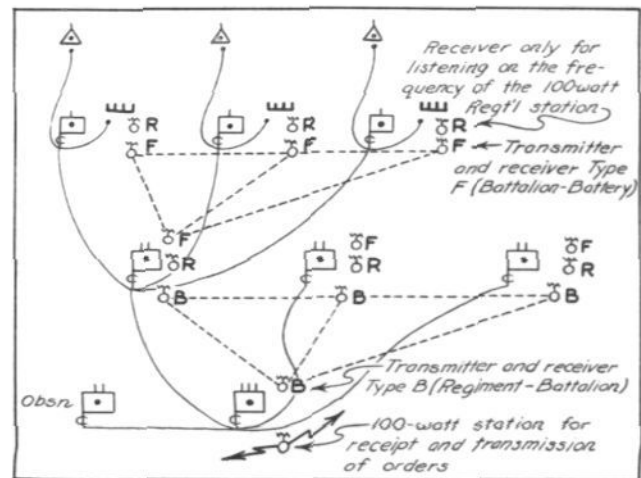


Figure 1

Telephone

Heavy long-distance cable (type "ffk")
 Light long-distance cable
 Cable for river crossings
 5- and 10-circuit switchboards
 Field telephones (type "33")

Radio

100-watt stations, long wave length (250/1500 meters)
 5-watt stations, intermediate wave-length (175/310 meters)
 Both of the above equipments are provided with receivers for all wave lengths from 170 to 1500 meters.
 0.6-watt stations (type F or type B) short wavelengths, pack radio sets (45/100 meters)
 High-frequency stations (radio-optical equipment)

The standardization of types and designs are carried through down to the last detail. For the field telephone the German Army invariably uses type 33, a portable, local-battery telephone, built into a bakelite case. Only at division headquarters will be found the desk telephone (type 38). The switchboards, likewise, are of one type. They are of identical design and vary in size only to provide for 5 and 10 circuits for infantry and artillery use.

The field service, heavy long-distance cable ("Feldfern-kabel") is of special interest. It is a thick cable strung on poles or laid on the ground depending upon the speed of and facilities for installation. Inside the cable are four conductors, electrically balanced, to provide facilities for two physical circuits, a "phantom" (simplex?) circuit that can be used for a third telephone, and a fourth circuit, the "super-phantom circuit" (phantom?) which permits simultaneous use of telegraph or teletype. Where circuits are long, amplifiers are used. This apparatus is designed to reinforce at convenient points the energy of the telephonic impulses that have been weakened by distance.

The special cable supplied for use in crossing rivers is an important item of the division communication equipment. In addition, an "optic telephone" is provided which will permit gaps in the wire to be bridged by modulated beams of light. This piece of equipment would appear to be particularly useful for bridging wide rivers, along heavily traveled roads, across areas covered by

harassing and interdicting artillery fires, and for temporary breaks in the cable. It has a line-of-sight range of about 5 kilometers and is "operated by means of modulated bands of light, with the aid of a vibrating mirror and a selenium cell." It can be spliced to wire or cables.

Use is made of several types of radio transmitters, depending upon the wave-length used and the requirements for power (i.e., range). Because of the large number of radio sets required for combat purposes, great care is taken in the assignment and frequent change of operating channels to prevent mutual interference, to combat hostile interference, and to limit hostile interception. Transmitting stations are limited in numbers and usually restricted to a very narrow wave band, although the receivers of these stations are the

same for all and even have a very wide wave band. For example, the two relay stations B and F of Figure 1. The first of these, used in relaying messages exchanged between the battalion and the regiment, have transmitting equipment permitting operation on any frequency channel between 3000 and 5000 kilocycles (60/100 meters). Type F stations, between the battalion and battery, have transmitting equipment for use between 4500 and 6600 kilocycles (45/63 meters). Yet both F and B have the same receivers and cover the band 3000 to 6600 kilocycles (45/100 meters). The Infantry has radio transmitters and receivers covering the wave band from 21 to 30 megacycles (7/10 meters). This equipment is light weight, portable, and suitable for use on reconnaissance patrols and during an attack.

The following paragraphs are extracted from a German pamphlet on Training

Instructions for Artillery Signal Units (Ausbildung Vorschrift für Die Artillerie, 1937). The tactical-communication doctrines and principles of installation and operation of the technical means of communication are of particular interest. They markedly parallel doctrines and principles set forth in our own training literature and emphasized at the Field Artillery School for many years.

INSTALLATION AND UTILIZATION OF SIGNAL COMMUNICATIONS

I. GENERAL PRINCIPLES FOR INSTALLATION OF THE SIGNAL SERVICE

60. *The task of the signal units* is the construction of the fire-control net within the artillery units and combinations. This net serves also as tactical signal net. On the rapid and



Laying the heavy cable

secure installation of this net there depends in great degree whether the artillery will be able to deliver prompt fire on the enemy forces most dangerous to our own infantry.

To accomplish this important task, the installation of the signal systems must in each case follow a well thought-out plan, free of all stiffness. Through great flexibility in the individual elements of the signal system, we must always make certain that the most urgent connections are set up in shortest time, free of interruption and ready for service.

61. For the correct installation of the signal system, the communications officer is responsible. He can fulfill his duty only when he has the closest association with his commander and keeps himself continually posted on the situation and future plans of the command. Only so will he avoid mistakes in installation which would lead to wasted personnel, equipment and time, and which would be difficult to make good again. He can (by thinking ahead) rightly recognize the problems of the signal communication in the further progress of the fight, and prepare for their solution. He will therefore not allow himself to be surprised by any change in situation and will at all times be prepared to make suitable suggestions and recommendations to his commander.

62. *Reserves of signal supplies* where possible are to be kept in rear or secured anew, so that if a sudden change of situation occurs they can at once be distributed for use. The effort to keep plentiful reserve supplies has, however, in this requirement its limitation. Hence in all situations, electrical means of communication should be supplemented by use of messengers, riders and cyclists. These men must be prepared, even under most difficult conditions, to find the way back to their units.

63. The higher command is responsible for the circuits to their subordinate commands or units. This higher command is concerned that sufficient personnel are assigned for trouble-service and that the maintenance of the wire connections are guaranteed.

64. Where the situation requires, lateral circuits complete the wire net.

Wire connections between adjacent command posts are laid to the right unless specially directed otherwise.

65. The general radio service is regulated by the above directions. In addition, such call signs, frequency assignments, and code methods are selected so that the activity of the enemy listening service is made more difficult. Mutual interferences are avoided by contacts on assigned radio channels.

Also the higher command will direct the radio silence and determine the interpretation of light signals [pyrotechnics] for each unit.

II. THE OPERATION OF COMMUNICATIONS UNITS

66. The regimental and battalion commanders order the operation of their communications units and their working together with signal units of higher or adjacent commands. They must be able to judge the working ability and peculiar characteristics of the available signal equipment in their commands.

Their orders include plans of the signal service, as to which locations are to be connected by the communications units, and the means to be employed.

67. The unit communications officers advise their commanders and make recommendations as far as needed for:

Advance of the communication detail.

The installation and dismantling of the communication nets.

They always give oral orders to their subordinate noncommissioned officers. They instruct them in terrain, and particularly concerning areas which are visible to the enemy. It must therefore be made certain that the sections in advancing and laying lines will make their work tactically correct (no construction over the crests of hills, etc.). The communications

officers must be absent from their staffs only for short periods. After the installation, they will generally be at the fire direction centers of their units.

They must also, as well as the senior noncommissioned officers of their details, be thoroughly instructed in the condition of their communication nets and in the operation and performance of their equipment and personnel.

68. The senior noncommissioned officer of the communication detail is the assistant of the communication officer in the technical installation of the signal systems.

When the signal system is installed, all signal equipment at the command post is placed under the signal noncommissioned officer's control. He is responsible for:

- (a) Arrangement of the central (switchboard), installation of command post circuits, installation of radio stations, particularly for good separation between such stations, and for their defense against ground and air observation.
- (b) Rapid and sure transmission of in- and out-going orders and messages.
- (c) Means of signal communication employed (i.e., equipment) except as ordered by the command of the communication officer.
- (d) Replacement on the failure of any signal equipment.

69. The signal section leaders, after orders are received, assign their sections so that rapid and certain execution of the task is guaranteed.

They are often placed on their own initiative, and must act independently and be able to find their way readily in the terrain.

70. Regimental signal systems are to be distinguished from battalion signal systems. Circuits are laid from the regiments to the battalions, and from the battalions to the batteries (generally to their observation posts).

71. The circuits from the higher command posts, particularly those required from the artillery commander to the regiments, are installed, operated and maintained by the Division Signal Detachment.

Parts of the Division Signal Detachment can be assigned to assist the signal details of the battalions, e.g., in construction of lateral circuits.

72. When the commander at the beginning of a fight is called off from his ordered task, by his superior commander, he appropriately takes his signal officer with him, so that the latter may be promptly conversant with the situation and the installation of the signal system.

73. The most important measure is for the communication officer always to secure the most rapid advance of the signal detail. For this purpose, message carriers or motorcyclists should be available.

How far the signal detail is to move forward depends on the terrain. On general principles it should move as far forward as considerations of cover against the enemy make possible. One should rightly be concerned—and this is of no small importance—that the necessary area head—particularly for motorized signal groups—remain free up to the new location.

74. The Senior Specialist Non-commissioned Officer or in his place a specially assigned grade, is vehicle director and as such must see that vehicles are assembled under cover and that the necessary protection against aircraft and tanks is taken.

75. How signal apparatus in individual cases is to be set up and which sections are to be assigned to the installation of circuits cannot be schematically set forth.

76. Radio equipment is to be set up to supplement wire connections whose permanence in battle is not always possible. Particularly are forward and flank observers of the battalion and the artillery liaison sections so to be connected. The installation

of the wireless signal equipment is further particularly adapted in displacements, as wire circuits require longer time.

77. The section lay-out as to vehicles is not to be too rigidly observed, but the individual sections are to be so disposed that a ready movement of reserves is possible. For the march and change of positions each man must remain with his own vehicle.

The division of the section into half sections and use of the same as much as possible at similar tasks eases up the distribution.

78. In rapidly changing situations and in the beginning of a battle in a still-undetermined situation, only the simplest signal systems will lead to results. It is therefore advisable not to set up a switchboard but rather to lay the most direct circuits or radio connections to the next lower command stations.

79. As the fight progresses, so is the net to be built. The direct circuits are laid to the switchboard and the message center placed in operation.

80. The construction of a signal net is essentially lightened if the signal officer is early notified of the location for the fire-direction center. It is particularly recommended for the regimental staff to obtain the advice of the communication officer before definitely locating the FDC; this from a technical signal standpoint. It is also important to inform the signal officer promptly of any change.

81. In general in the course of a battle, the following signal circuits will step-by-step come up for consideration.

(a) With the regimental staff:

Telephone circuits to all subordinate detachments.

Telephone circuits to the command post (generally 2 circuits).

Telephone circuit to the regimental observation post.

Radio connection to the most distant battalions

also as needed:

Telephone circuit to the infantry.

Telephone circuit to corresponding unit on the right (neighbor).

(b) With battalion staffs:

Telephone circuits to all batteries (generally to the observation posts).

Telephone circuits to command post (generally 2 circuits).

Radio connection to the most distant batteries.

also as needed:

Telephone circuit to the corresponding unit on the right.

Radio connection and if possible also telephone circuit to the artillery liaison section.

82. If in the course of an attack, only the observation posts and the battalion command posts are moved forward while the firing positions remain the same, then it is generally more advantageous for the battalion signal details to install completely new nets. An advance of the circuits with the battery circuits requires in general the same time, but the net is more vulnerable to breaks on account of the increased length of lines.

83. If, however, it is not possible to advance the lines beyond the observation posts on account of situation and terrain, then the sections of the signal detail are to remain at the observation posts. Under certain circumstances, help of the pack horses or the small telephone motor trucks must be given to move the cable forward.

84. In the defense, and in the attack of positions, it is advisable to build the net as a double circuit (that is to lay two wire circuits over different routes between the same switchboards or telephones).

In such cases it is particularly important that the tactical leader make timely preparation for a change of positions so that reserves of signal supplies will be promptly available for the further installations.

85. In delaying action, use is to be made in greatest measure of radio communication. Wire nets are to be so placed that they can be quickly removed. Withdrawal of the staffs and battery observation posts is generally along the wire lines so that these circuits can readily be used again.

86. Preliminary command personnel to organize rearward stations is taken from the detail reserves held ready for that purpose. In general, the preliminary personnel will be kept comparatively weak numerically so that the forward sections remain strong for construction work. The help of a radio section is recommended, to take up the communication from the rearward posts to the forward commander.

87. If, at night, command posts and observation posts are vacated, the existing circuits should be spliced through so that the requisite connections, e.g., between the battalion commanders and the battery commanders, remain available. If this causes the circuits to become unnecessarily long and difficult to maintain, then a new net is to be improvised for the night.

88. Lateral circuits complete the wire net. They are to be constructed only on the special orders of the tactical leader. In defense, and in attack of positions, they are particularly useful. Under such conditions, this cross installation comes at once under consideration as soon as sufficient personnel is available. Even here special care of the signal details is necessary, so that they do not give up their last reserves.

89. If the terrain and considerations of the enemy allow, the construction of front-line circuits is hastened by the use of pack animals or horsed signal wagons or signal motor trucks. Also similar action is taken on recovering a circuit. Detailed road reconnaissance, correct use of the terrain, and speed (traffic control) of the motor vehicles will greatly aid in the rapid installation of the circuits.

If for some stretches (e.g., on account of terrain difficulties) the work cannot be done from truck, then this stretch is laid on foot, while the vehicle detours around the obstruction and is then again brought into use.

If a section has installed all or a part of a circuit by vehicle, then this vehicle generally remains on the end of the circuit till the dismantling order comes, while the other vehicles remain in the vicinity of the switchboard, with sufficient supplies for further assignment.

90. The take-down of unnecessary circuits is to be regulated in time, so that sufficient sections are available to accomplish displacements. The dismantling follows if possible in the direction of the movement or toward the switchboard.

As a rule, the communication officer will go forward with his commander, in forward displacements. The senior NCO of the signal detail will therefore direct the dismantling and supervise the forward movement of the vehicles that have been left behind. In changing positions to the rear, the reverse course of action is taken.

III. COMMUNICATION WITH THE INFANTRY

91. Communication between artillery and infantry is particularly important for the successful conclusion of any fighting action.

If an artillery unit is placed under an infantry command (attached), the commanding officer of the infantry is responsible for the communication through his signal resources.

If, however, the artillery is assigned for mutual cooperation with the infantry (direct support), then the artillery is responsible for the signal communication to the infantry.

The infantry itself has also the duty to favor and assist in every way the substantial and sure communication with the artillery—and to help the artillery in case the latter's strength falls short.

92. In the front line, the communication to the infantry will be accomplished by the artillery liaison section. The following combination of signal equipment will be, in general, under consideration:

- (a) With horsed detachments:
 - 1 Pack radio section (mtd.)
- (b) With mtz, detachments:
 - 1 Pack radio section (mtz.)
 - 1 Telephone half-section of the medium telephone section (mtz.)

The horsed detachments must also strive as soon as possible to connect the artillery liaison section by wire with the battalion command post.

93. If failure of a telephone connection occurs, then the artillery liaison section will frequently make use of oral or written reports, through message riders, trucks, or motorcycles.

IV. SECRECY OF SIGNAL COMMUNICATIONS

94. Secrecy of signal communications must be maintained by carefully prepared announcements. Blunders may cause the most disastrous results.

95. For secure protection and, at the right time, certain destruction of all operation orders, responsibility rests on the commander concerned.

96. In radio service, decoy (code) names for troop designations are to be used; but in telephone service, only when so specially ordered. The necessary distribution causes the use of the first method. The latter method supplements the radio decoy list as needed in the special scope of command. In the danger zone, decoy names are always to be used, also with important messages and in case of alarm. Those radio and telephone men in the operation of signal service must without orders give to the tactical leaders the messages and the code-names list.

Designations which give exact clues to the tactical positions are to be avoided, e.g., regimental commanders; for this use "leader of (code name of regiment)."

97. Clock time can also be concealed, and set for a predetermined zero hour (x-time).

98. Where listening danger is involved, locations should not be given by map coordinates. In this case the coordinates are in keys, or localities and important terrain features are designated by the target coordinate square.

99. If action must be taken against the enemy listening service, e.g., in an attack on an opponent in defensive position, or in armistice, or in battle position, then the most effective protection is the drawing-in of the telephone service in the danger zone (3km. from the foremost line), completion of circuits as double lines, and severely penalized radio discipline.

Whispered speech does not lessen the possibility of the enemy's listening.

100. In battle a transmission of conversation out of and beyond the artillery commander's wire net to that of subordinate command posts and the reverse is to be prevented by technical measures. To this end, the artillery commander's circuit is not to be connected to the message centers of subordinate staffs, but the circuit is laid direct to their command post, and from there is relayed by field telephone. [This is a noteworthy difference from U. S. practice.]

101. Radio transmission is followed by the enemy listening service with the greatest concern. Particularly the knapsack (pack) radio equipments with their talking possibilities can give the enemy valuable information. Talking is therefore to be reduced to the minimum and allowed only in such cases as the following where the enemy can take no advantage from listened-in-on conversation:

- (a) Enemy messages of the most advanced observation posts when the information can be of no disadvantage to our troops.
- (b) Fire-command messages which are immediately effective in fire action; and fire commands.
- (c) Alarm signals (reports).

But even in the above cases, code names should be used.

102. Reciprocal conversation by tactical posts on the situation, is prohibited. An exception is allowed only when the tactical situation unquestionably demands it. The conversation is then carried out under personal responsibility of the particular tactical leader. Even then the talks are to be so abbreviated that they will give the enemy the least possible disclosure. *Intentional violations of radio discipline may be treason to the state.*

103. Radio conversations are basically to be keyed. Exceptions are those reports shown under paragraph 101 a to c. Otherwise a section leader should only in the greatest danger give the radio command in clear text. In this case he must place the preface: "For radio in clear text" on the radio dispatch form, and sign it with his full name.

104. Communication systems of troops not in combat with the fighting enemy maintain radio silence until sent in or installed. Tuning-in of the antennae is also to be avoided. Radio silence is also to be observed by all pack radio sections.

On the subject of radio silence, which a higher command directs to maintain secrecy in battle action, see paragraph 65. However, when there is danger in delay, every officer is justified on his own responsibility to use radio, if the prompt transmission of a message cannot be otherwise guaranteed.

105. At every telephone and radio set a sign "*Attention, the enemy listens in!*" will be conspicuously posted.

Editorial note: Reports from the fighting in Europe indicate that the Germans often relaxed the radio restrictions prescribed in the foregoing regulations. The situation was moving so rapidly that radio in the clear had to be used, and it gave the enemy little information on which he could act.

Night-Lighting Equipment in German Artillery

German artillery regulations for medium artillery disclose that battery aiming stakes are illuminated, for laying at night, with small lanterns equipped with dimmers and colored screens. Thus the light for the 1st Section may be green, the 2d red, the 3d blue, and the 4th yellow. This makes it easy for the gunner to lay on the correct stake. Members of the gun crew concerned with laying the piece wear small lights on their helmets, which are used to illuminate scales on gun and sight.



LESSON IN



Herewith a number of German photos of recent operations in Crete and Africa. In addition to their general interest, they should provide the amateur student of military events with a means of testing his powers of observation. In the following are examples of some of the intelligence items which may be gleaned from a study of the pictures. No doubt our readers will pick up many additional facts which we have missed.

No. 1. German troops embarking for Crete. Their uniforms (especially the caps) show that these air-borne troops are part of a German mountain division. Hence they are *picked* troops—especially conditioned physically, and supposed to be very tough babies. Note that they are carrying only light packs — no bedding rolls. Their arms are rifles and submachine guns. Some of them have bicycles. Each man has a gas mask, a canteen, a knapsack, a dagger, and a steel helmet. The ships are Junkers Model 52 transport planes.



No. 2 (a) and (b). Austrian mountain gun, 100-mm. in caliber. This is the new standard pack howitzer, undoubtedly employed by the mountain divisions who, in conjunction with parachutists, captured Crete. The Austrians also have a very fine 47-mm. antitank gun which can be broken down for pack transport. This was probably used in Crete. Photos in *Life* showed that the German mountain troops commandeered local horse and mule transport for drawing, in tandem, their mountain guns and antitank guns. Doubtless they were prepared for this improvisation. The 100-mm. mountain howitzer is a powerful, effective weapon, especially when opposed only by 75's.

MILITARY INTELLIGENCE

No. 3. The caption says "parachute troops on the way to Crete." But the uniform shows that they are mountain troops, hence airborne, not parachutists. Every man has a rifle and wears an inflatable life preserver, not a parachute.



No. 4. Parachutists landing in Crete. Not a very clear print, but we can see that the parachutists landed in open country. Note the distinctive helmets and coverall type uniforms, shown in this and the next picture. Each man carries a submachine gun, which the Germans call a machine pistol.

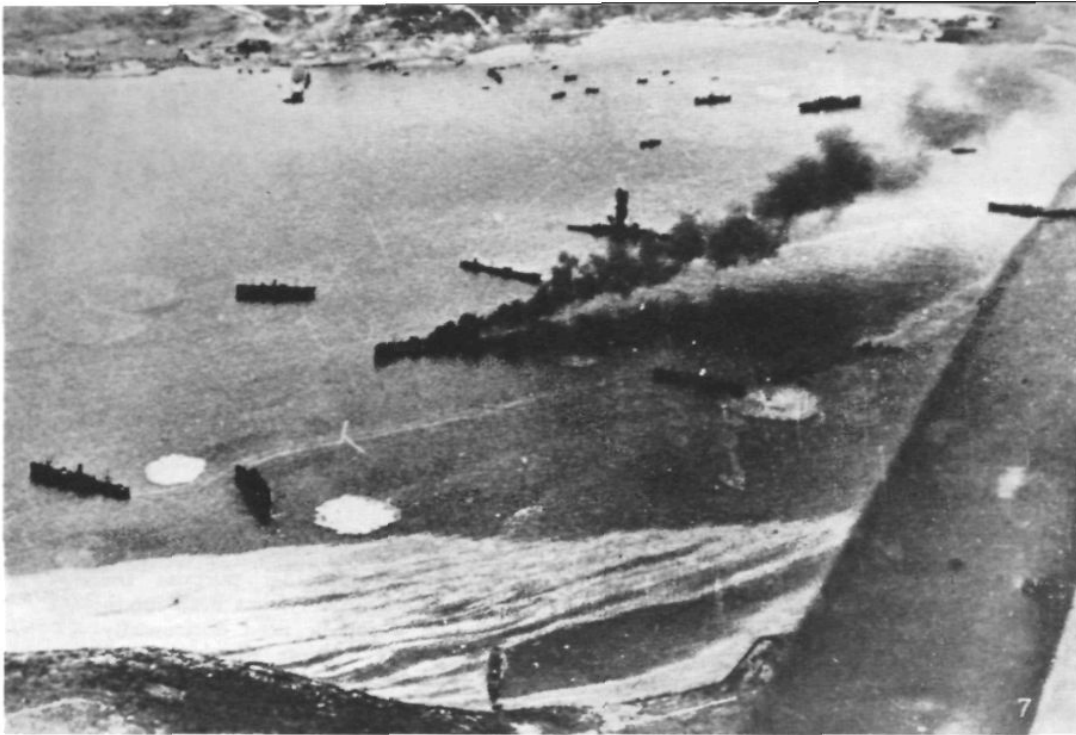


No. 5. Parachutists rounding up British prisoners. There seems to be a young woman among the prisoners. Note that the captives are mostly fine-looking young men, probably Australians. Familiarize yourself here with the special type of helmet, uniform and equipment of the parachutist.





No. 6. German planes on the Maleme airdrome. We count about 70 planes, sufficient to carry 700-1,000 men. Little if any evidence of earthworks or trenches are visible near the field. There appear to be some camouflaged hangars near the highway in the lower left.



No. 7. Stuka attack on shipping in Suda Bay. One or more ships appear to be on fire, and one, in the near foreground, is beached in the heavy surf. At least seven bombs have just struck the water. Heavy bombing is in progress on the shore in the background. A steamer with a tow of seven small craft has just left the beach and turned out to sea.

No. 8. The War in Africa. Here is an important picture which shows a new German antitank gun. Several interesting points may be extracted: The crew consists of a commander and five cannoneers, two of whom are ammunition servers. The gun has a very generous shield of double construction — two thicknesses, separated. Either this shield is mounted back of the wheels or the gun can be let down from the axle into firing position. At any rate it has a low silhouette. The carriage is a split trail, the near trail being

just visible under the brush camouflage. If we take the length of a man's forearm, from elbow to wrist, as being twelve inches, the tube of this gun is more than six feet in length, and the caliber of the bore, as measured across the shell, is about 50 millimeters. Note the length of the round of ammunition— apparently the gun packs a wallop! Ammunition is transported in small carriers like suitcases. A truck, probably prime mover, shows in far background.





No. 9. German supply column in Africa, carrying water in drums.

No. 10. German 88-mm. antiaircraft gun in action against British tanks in Africa. Apparently this weapon, obsolescent

for the original purpose for which designed (AAA), has been modified so that it can be fired horizontally from the trailer. Note the big, thick shield. A most potent antitank weapon!

Photographs from Acme and "Signal."





WITH THE ARMIES OF FOREIGN NATIONS



A Lesson from the Conduct of War in North Africa

(From *De Militaire Spectator*, Holland, Feb. 1941)

Wolfdieter Langer, Rome, wrote an article on the winter expedition in North Africa for the February 5 issue of the *Hamburger Tageblatt*. The following is an extract from the article:

After nearly two months of uninterrupted warfare in the Libyan desert, from Sidi el Barani (December 9) to Derna (January 30), a few facts can, with reservations, be set forth in connection with the offensive of the English Army of the Nile, and the defensive action fought by Graziani's army over an area of more than 400 km.

In this campaign the ancient rules of desert warfare have been thrown overboard. At the very basis of those rules we find such notions as "advances must be modest to make victualling possible," and "isolated detachments should be used on the outermost lines," and "the utilization of masses should be avoided in a desert terrain." In direct conflict with most of the lessons learned hitherto in Africa, the use of a single, strong, central column has proved itself successful—as demonstrated by Graziani in the September offensive against Sidi el Barani, by Wavell in the winter offensive against Tobruk. So far a total of ten divisions have been engaged; and the expediting such great masses through the desert was made possible by motorization.

The one really great lesson to be learned from this campaign was furnished by the tank, which proved itself possessed of great combat value in the desert as well as elsewhere. In Graziani's September offensive, Italian bombers wrought the defeat of the English 7th Tank Brigade, and at once voices went up to question the combat value of armored units in desert warfare. But these voices have been silenced since the English made their massed utilization of tanks—Light Tanks, Carrier Scouts, Morris; for, particularly from the actions in the Sidi el Barani-Bugbug-Sollum district, it now appears that the speed of tanks in the desert—amounting to at least sixty kilometers—was a tremendous advantage over non-motorized units with their marching speed of hardly six km.

And it is this that explains why, after Bardia, appreciably greater units were thrown into a state of embarrassment. The doctrine that had prevailed hitherto that for desert warfare only light tanks, specially constructed for this sort of terrain, could be used, has also been disproven. In this Libyan campaign, the Morris—an

extraordinarily heavy tank, both in point of armor and of armament—was used on the English side—an evident departure from the rule. And the explanation for the quick fall of Sidi el Barani and Solum must be sought in its use; for it would be impossible to explain otherwise how men with such rare experience of Africa as, for instance, General Maletti, could be made to abandon fortified positions in just twenty-four hours.

On the Italian side there was nothing that could be opposed, in this phase of the campaign, to the heavy English tanks: "For, against these tanks operating concentrically over an extensive area, the antitank weapons of our divisions could achieve only little effect" (Graziani). The proper implements to counter these seventy-ton English tanks—Stukas or tanks of equal size—were not there. Moreover, it seems that the use of dive bombers was made difficult by storms. Of the Italian tanks, the well-informed *Cronache della Guerra* (*Chronicle of the War*) writes in its February 1 issue: "The Italians were not prepared for the onset of English heavy tanks (tanks that were chiefly of American origin)." One reason that they were not prepared was this, that there were no means of transport to bring such tanks to their destination. This last may in fact be explained that the harbor works of Bardia and Tobruk had not been equipped to handle the unloading of tanks of that weight.

The opinion of this Roman organ, that the tank is for the moment stronger than the antitank defense, seems to us of importance. "We find ourselves in a moment of time when, in the eternal battle between armor and projectile, the armor plate of the tank seems to have the ascendancy over the penetrativeness of the projectile." In the light of these facts, it appears that the English command had it easy, relatively speaking; for they could take the tank detachments that dominated the terrain almost completely, and send them forward in a new advance; and while advancing, they could ignore, for the time being, Italian centers of resistance still in function.

The peculiarity of the North African battle terrain had this consequence, that the Italian centers of resistance, from Sidi el Barani to Bardia and Tobruk, could not, despite the spirit of self-sacrifice animating the defenders, arrest the English advance, at least not in the beginning. They could only bear up under it.

The English Army of the Nile, supported by the Royal Air Force, would even so have had plenty of trouble with the defenders, and the Australian storm battalions would probably still be in front of Bardia, if the English had not been so fortunate as to be able to use the very heaviest class of artillery. The transport of that artillery through the Egyptian desert had seemed an impossibility. In truth, the heavy caliber of the English Mediterranean Fleet's 15-inch guns eased Wavell of his greatest care. The bunkers and casemates constructed by Graziani's engineers proved themselves insufficient protection against that caliber. According to eyewitness reports, the walls of the bunkers, cement and one meter thick, fell apart when hit by a 15-inch shell. The heroism of the Italian shore batteries was of

no avail around Bardia, in position on the steep and craggy shore, in the artillery battle in which they engaged with the English warships; for the superior caliber of the warship fire caused entire cliff batteries to collapse, burying the defenders.

Since, in consequence of the numerical superiority of the English in point of ships of the line, and of the distance of the Italian fleet's bases, the utilization of the Italian fleet was out of the question; since further, the utilization of Italian submarines was strictly limited—if the heaviest sort of losses were to be avoided—by the peculiarity of the North African coast—shallows, currents, and especially the transparency of the water—a decisive factor in Wavell's offensive undoubtedly was the activity of the English fleet.

Lessons from the German Observation Battalion

A nontechnical study of some of the lesser-known aspects of an important artillery intelligence agency.

Twenty-three years ago sound- and flash-ranging was a recently adopted military specialty and was being performed in the A. E. F. by the Engineers under the guiding hand of Colonel Trowbridge, an eminent physicist from Princeton University. There was little in the way of tactical doctrine, and the technique had been borrowed largely from the British. It takes little imagination to visualize the difficulties impeding cooperation between these specialized engineer units and the artillery. Evidently recognizing this shortcoming, and probably thinking of long ranges and relatively stable warfare, the War Department transferred the functions of sound-and flash-ranging to the Coast Artillery, where its development received new impetus. In 1922 the Field Artillery was recognized as a more suitable sponsor. Since that time the strength of observation units has grown from a battery to a battalion, then to two battalions, and more recently, to six battalions.

Much progress has been made in the technical performance of these units. But the peace-time conditions of the past two decades did not favor the development of a tactical doctrine, since the combined maneuvers of a corps and its artillery was but a mirage which was merely contemplated. Lately, matters have considerably improved. It is therefore opportune that we can at this moment compare our ideas with the views and experience set forth by Lieutenant Zirpel in the March, 1941, issue of the *Artilleristische Rundschau* under the caption: "Cooperation of the Firing Artillery with the Observation Battalion."

Lieutenant Zirpel says that the cooperation of the firing artillery and observation battalion relates to

"1. Survey

2. Adjustment of fire
3. Supply of maps and control data
4. Metro messages
5. Exchange of intelligence data.

"These operations demand precise orders from the artillery commander and a spirit of mutual cooperation.

"1. *Survey*. Adjustment by use of the observation battalion is only possible if the firing battery is located in the common control net. If 1:25,000 or 1:100,000 maps and control data with sufficient number of identifiable points are available, these conditions are fulfilled provided that the firing batteries are tied in to such a point.

"If good survey data are not available, the survey battery of the observation battalion first establishes an arbitrary control system. In order to be adjusted, the batteries must also be located in this net. After conferring with the artillery battalion or regimental commander as to the proposed battery zones, the observation battalion gives the firing artillery a 1:100,000 or 1:25,000 map overlay showing control points at the rate of one for each battalion, together with their horizontal and vertical coordinates. The firing artillery battalion survey sections must base their work on these points. These can be requested of the survey battery or its platoons before the overlay is ready so that plans can be prepared for the determination of additional points or for possible change of position.

"If the batteries have already been coupled* it is the task of the firing artillery section to locate the base piece from these control points and then to recompute the

*FIELD ARTILLERY JOURNAL, July, 1941, page 517.

traverse by which the coupling is determined. The coordinates of the control points upon which this survey is based must be taken exclusively from the official list published by the survey battery after completion of its own survey work. If the survey section does not want to embark upon the somewhat complicated work with overlays or supplementary drafting on the grid, a new plotting of the points in a new grid cannot be avoided.

"If, later, it happens that the grid must be skewed as, for instance, after local maps or lists of coordinates become available, or perhaps in order to convert several local grids of different observation battalions to a common control system, the observation battalion publishes a list of coordinates computed in the rectified grid. In such a case the survey work of the firing artillery survey sections must be completely recomputed, using these new coordinates—right from the start—and these points must be plotted on a new chart. Any failure to do so leads to faulty adjustment of fire by the observation battalion and makes map firing impossible."

There is little conflict between these views and those of our own service which find expression, in part, at least, in TM 6-200, Field Artillery Survey, now being distributed. This publication stresses the importance of the Observation Battalion as the coordinating agency for survey work in the artillery with its corps and as the link between artillery and engineer survey operations.

2. *Adjustment.* On this subject the German author says, "By means of the closest team work between the cooperating batteries of the observation battalion and the firing artillery (preferably by personal contact of the commanders) that complete mutual understanding which is essential is reached. In addition to telephone communication, established by the observation battalion, a radio channel should also be used.

"By means of the connections above mentioned, the necessary data are exchanged, commands transmitted and the rounds announced by 'on the way.' The observation batteries need the following data:

- Coordinates of the base piece
- Coordinates of the base line
- Width of battery
- Distance from the base piece to the center of the battery
- Which piece is the base piece?
- Weight of projectile
- Powder temperature
- Altitude of the battery position

"Other data, such as minimum range, width of zone, etc., are needed at the CP of the observation battalion. It is a good idea for the firing battery to prepare a form for this information. During the adjustment itself, it is essential that all commands and instructions for the fire be given entirely by the observation battery. In order to cooperate, the firing battery must conform and by means of timely warning and prompt report of 'on the way' contribute to the recording of each shot or each salvo.

"Difficulties in the cooperation of observation battalions and firing artillery will really only concern arrangements for command. A battery or battalion of firing artillery is assigned to each sound-ranging battery and each flash-ranging battery, respectively, of the observation battalion. This implies that these firing batteries are always available, and with priority over all other missions, will execute all adjustments which the observation battalion or battery commander deems necessary—without reference to its own headquarters. The success of the shoot may be jeopardized if fire for effect is delayed. It must be executed immediately after the adjustment and with the ammunition allotments prescribed in regulations for destruction or neutralization as the case may be. Batteries which have but little ammunition do not fire counterbattery.

"By frequent changes of position, a skillfully commanded enemy artillery will avoid counterbattery fire which does not follow immediately after it has been located. It is therefore essential that the adjustment data of one piece be transmitted to the whole firing battalion in the shortest possible time."

The author adds that details of fire for effect are prescribed, not by the observation battalion, but by the firing artillery commander, who must therefore be informed as to the nature of the target.

"If an adjustment has been made by air-ground methods, the firing artillery can help the observation battalion by promptly reporting to it the final firing data upon the completion of its mission. By stripping the deflection and range weather effects, the observation battalion determines the location of the enemy battery. The result can then be compared with other data at hand so that the possibility of duplicating the counterbattery fire may be avoided." This is a phase of tactical employment of the observation battalion which has seen little practice in our own Service, but which would probably become more frequent in campaign.

3. *Distribution of maps and lists of coordinates.* This is a function which should interest all field artillerymen. In the German Army maps in campaign are produced, not by the Engineers, but by these observation battalions. "Obviously, it is not possible to equip every unit with every map and list of coordinates which it is likely to need in a campaign. For this reason the observation battalions are equipped with atlases (sheets suitable for reproduction by contact printing) of maps and lists of coordinates. In case of a complete change of battle area, by timely planning the appropriate atlases of the new area are delivered to the observation battalions. It is the duty of the observation battalion to supply the artillery and *also the infantry* with maps at the proper time. For the most part these are large scale maps 1:25,000, which are suitable for fire control." The italics are ours. Once more, note the scale and the accuracy of the maps with which the artillery and infantry of the German Army evidently expect to be supplied—at least

on occasion. In our own service it is the field artillery which presents the most exacting requirements in point of maps and photomaps. Satisfy the artillery and you satisfy everyone. Yet we have no hand in their actual preparation. It is an interesting speculation whether this whole function of map and photomap production in campaign should not be a responsibility of the Field Artillery itself. A canvass of the arguments for map and photomap production by any other agency fails to carry conviction that we have the happiest solution.

The author continues, "In unusual emergencies maps of small scale such as 1:100,000 can be produced, but too much must not be expected as to their value, particularly legibility. Should good survey data be lacking, the reproduction section first reproduces available maps showing the proposed control points. Later on, control sheets can be printed which are suitable as firing charts.

"The observation battalion can likewise be employed to reproduce situation maps and general maps of any kind. The copy should consist, if possible, of black-line tracings, or maps printed on one side of thin paper.

"The many different types of work of which an observation battalion is capable should be exploited by the proper commanders. Excessive demands should be avoided, lest the delicate equipment be damaged to the detriment of later tasks. It is a continually recurring mistake that in map requisitions all kinds of demands are made which cannot possibly be met."

4. *Metro Messages.*

"The weather platoon of the headquarters battery of an observation battalion publishes artillery metro messages (called Barbara reports) usually at two-hour intervals; these reports are applicable within a radius of 30 kilometers. If there are no variations or only slight variations in the weather, the interval can be stretched to four hours, thereby economizing in balloons.

"To the artillery it is important to know how timely metro messages can be obtained. In the artillery commander's order—often in the division order—the following can be prescribed:

"a. The metro messages will be transmitted from the observation battalion to the artillery commander by motorcycle messenger. An operator of the signal battalion placed at the artillery commander's headquarters broadcasts the messages on prearranged frequencies at scheduled hours to all artillery units.

"b. If no operator is available, a portable radio of the observation battalion can take over this task. The range is reduced under such conditions, of course, and battalions and batteries often cannot pick up the reports.

"c. If for any reason radio is prohibited, the weather platoon reproduces the metro messages and delivers them by motorcycle to the artillery commander for dissemination, or sends them to the different battalions.

"In any case, the observation battalion is ready to reply to telephone requests and, if necessary, to make its entire

weather report by telephone in case a battery does not receive its metro message at the proper time.

"To a large extent the weather effects determined by the weather platoon are only considered in map firing; however, it is advisable to use these data also in observed firing with a view to faster effect on the target and economy of ammunition."

At the present time our own divisions are responsible for their own metro messages, but when equipment is issued to the observation battalions we can expect a measure of coordination with results which will parallel the procedure laid down above.

5. *Exchange of intelligence data.*

"The observation battalion, which is the chief intelligence agency of the artillery, has not only the mission of keeping itself busy with the enemy's artillery, but the flash-ranging OP's and the sound-ranging (outpost) observation posts also must report upon the progress of the battle, and upon infantry and other targets which may appear. This information as well as purely artillery information is transmitted by the fastest means through the CP of the observation battalion to the artillery commander. It is he who allots the individual targets to the batteries to take under fire. Of course, all kinds of battle intelligence obtained by the observation battalion are available on request to the artillery battalions. Communication between the OP's and the survey stations obviously contributes to the prompt exchange of information obtained by observation. The means for promptly transmitting intelligence from the observation battalion to the artillery is provided by the message centers of the former. Reciprocally, the artillery must support the observation battalion by furnishing artillery intelligence. In addition to reports as to all observations concerning the enemy artillery, the observation posts can operate like flash-ranging OP's and report angles to enemy observed batteries. This presumes that:

"1. The OP's (location of BC telescopes) are surveyed. A survey with an aiming circle is adequate.

"2. The zero point by which the instrument is oriented must appear on the map, and for night work, must be referred to a point visible in the darkness.

"3. The BC telescope, equipped with night lighting, is laid on the base point with the index at 3200 or 6400 mils.

"4. As far as practicable there should be telephone communication with the artillery battalion.

"At each flash, if possible, the interval between it and the sound of the report should be noted."

In this case also there is no basic difference in principle or procedure with respect to our own artillery S-2 system.

It is plain from Lieutenant Zirpel's article that technical and tactical doctrine for the employment of observation battalions in the German Army has been thought out. It has been subjected to the test of war. It would be imprudent to disregard it.

—T. N.



WITH THE OTHER ARMS AND SERVICES

Once upon a time, about 3,000 years ago, cavalry, the then only efficient combatant arm, was characterized solely by the mounted charge—hurling man and horse at the enemy as a projectile-weapon—in effect, *artillery*. With the advent of "firepower" (archers and projectile throwers) the cumbersome vehicles bearing the projectile throwers decreased cavalry mobility. It was soon realized by cavalry leaders, therefore, that a supporting arm had been created and that it could render more effective aid when placed on commanding terrain to support the attack.

The word *cavalry*, derived from the Latin *caballus*, meaning horse, came into military use about the middle of the Sixteenth Century and was applied to mounted men of all kinds employed for combatant purposes. Prior to that time previous types of soldiers were classed as foot soldiers and horse soldiers which included mounted archers and horse-drawn projectile throwers.

After the advent of gun powder, however, Gustavus Adolphus introduced portable leathern artillery and, like the previous use of projectile throwers, distributed his "artillery" upon the best positions along the line to sustain the infantry

Editor's note: Here is the third of a new series, each of which will describe one of the other arms and services. The complete series, together with articles on the War Department, General Headquarters, etc., will constitute a valuable hand book on the Army as a whole; so we suggest that readers preserve each issue of the Journal containing this series.

and cavalry. Artillery had arrived as a separate arm.

Frederick the Great, appreciating the need for a type of artillery that could maneuver with his cavalry without decreasing its mobility and later be available to support the cavalry attack, invented and organized horse artillery consisting of light guns, with mounted cannoneers, attached to cavalry.

CAVALRY MISSIONS

Cavalry is that combatant arm of the army organized primarily to perform those missions of ground warfare that require great strategical or tactical mobility combined with fire power and shock. The *cavalry mission* is the paramount consideration for

cavalrymen; whatever the mode of travel or fighting weapon the specific situation might require, it will be utilized by our modern American cavalry in the execution of cavalry missions. It is this characteristic which makes our cavalry force an indispensable element of any well balanced army combat team. Appropriate cavalry missions include reconnaissance and counter-reconnaissance; security for other forces on the march, at the halt, and in battle; pursuit and exploitation of a break-through; delaying action; seizing or holding important terrain until the arrival of



III—CAVALRY

By Lt. Colonel F. S. Jacobs, Cavalry*

*Col. Jacobs is Editor of *The Cavalry Journal*.



Horse Artillery, Cavalry Division

less mobile forces; covering the withdrawal of other forces; providing liaison between large units; raids; escorts for convoys; constituting a mobile reserve for other forces and offensive and defensive combat. Cavalry is admirably suited for operations against parachute troops.

When one emphasizes the capabilities of horse cavalry, it should not in any sense be construed as discrediting the effectiveness of our newly created Armored Force. On the contrary, we are definitely in favor of the Armored Force. Mechanized cavalry is an extension of horse cavalry. Neither can replace the other. Each complements the other. At present, 150 cavalry officers are assigned to our Armored Force in prominent command positions. We obviously speak the same language. It is not a question now of horse *vs.* motor, but horse *plus* motor—plus mule—plus wheels and tracks—*plus everything which will help us accomplish cavalry missions.*

CAVALRY DURING WORLD WAR

During the present period of army expansion and transition, we should not lose sight of the important consideration that over 100 foreign horse cavalry divisions were on occasion effectively employed in World War I. Each division averaged approximately 7,000 men. The following identifications were made of cavalry divisions: Austrian, 10; Belgian, 2; British, 7; Bulgarian, 2; French, 10; German, 11; Italian, 4; Rumanian, 2; Russian, 54; and Serbian, 1; a total of *103 cavalry divisions.*

In addition, there were numerous independent brigades and regiments, not forming parts of divisions but which were employed as division and corps cavalry. France and Germany alone had more than 600 squadrons; the French squadron or *escadron* is the equivalent in numerical strength to our cavalry troop. Besides these, there were numerous irregular cavalry and other mounted troops of the various nations.

After the United States entered the World War, except for a regiment of United States infantry in Italy and a small force in Russia, all of our great army was employed in France on the then stabilized Western Front, which obviously afforded little opportunity for cavalry combat *en masse*. The cry then was for aviators, ammunition and machine gun and artillery units. Only four of our cavalry regiments, consequently, were sent abroad, in the order named: the 3d, 2d, 6th, and 15th Regiments. All were without their horses. The 3d Cavalry helped establish the Remount Service of the A.E.F. Detachments of the 2d Cavalry, hastily supplied with foreign mounts, participated in the following battles in France: Toul Sector; Aisne-Marne Offensive; St. Mihiel Offensive; and the Meuse-Argonne Offensive. Their work consisted largely of patrolling, military police, reconnaissance, liaison, remount work, and miscellaneous duties. The 6th and 15th Cavalry Regiments were engaged in remount work or in military police duty. The regiments remaining at home were distributed principally along our southern frontier. The 1st to the 17th Regiments,

inclusive, were horse cavalry. The 18th to the 25th Regiments, inclusive, were organized in 1917 as horse cavalry and later recognized as Field Artillery regiments.

The Armistice, November 11, 1918, found both French and British horse cavalry on the Western Front from ten to twenty miles in advance of their main forces, in pursuit of the retiring disorganized Germans.

For us in America, the World War conveyed but a single picture—that of the bitter trench-to-trench struggle along that line which stretched without a gap from the British Channel to the Swiss Alps; great battles of brute force and attrition; a struggle marked by destructive artillery duels, by the horrors of gas and the bitterest discomfort. The inevitable result was that no branch of the Army of the United States of America came out

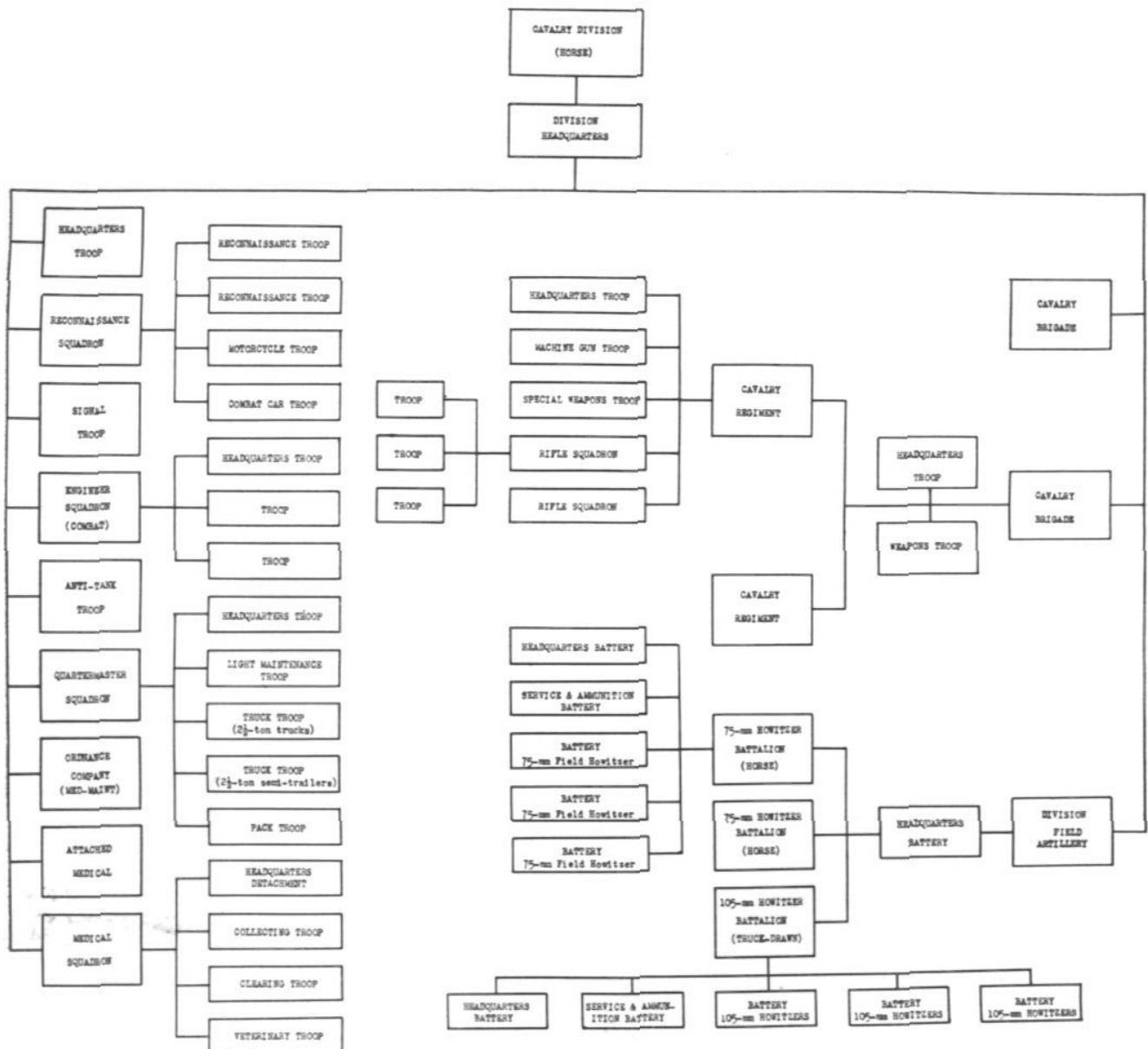
of the World War so unjustly undervalued as was our cavalry.

MODERN CAVALRY

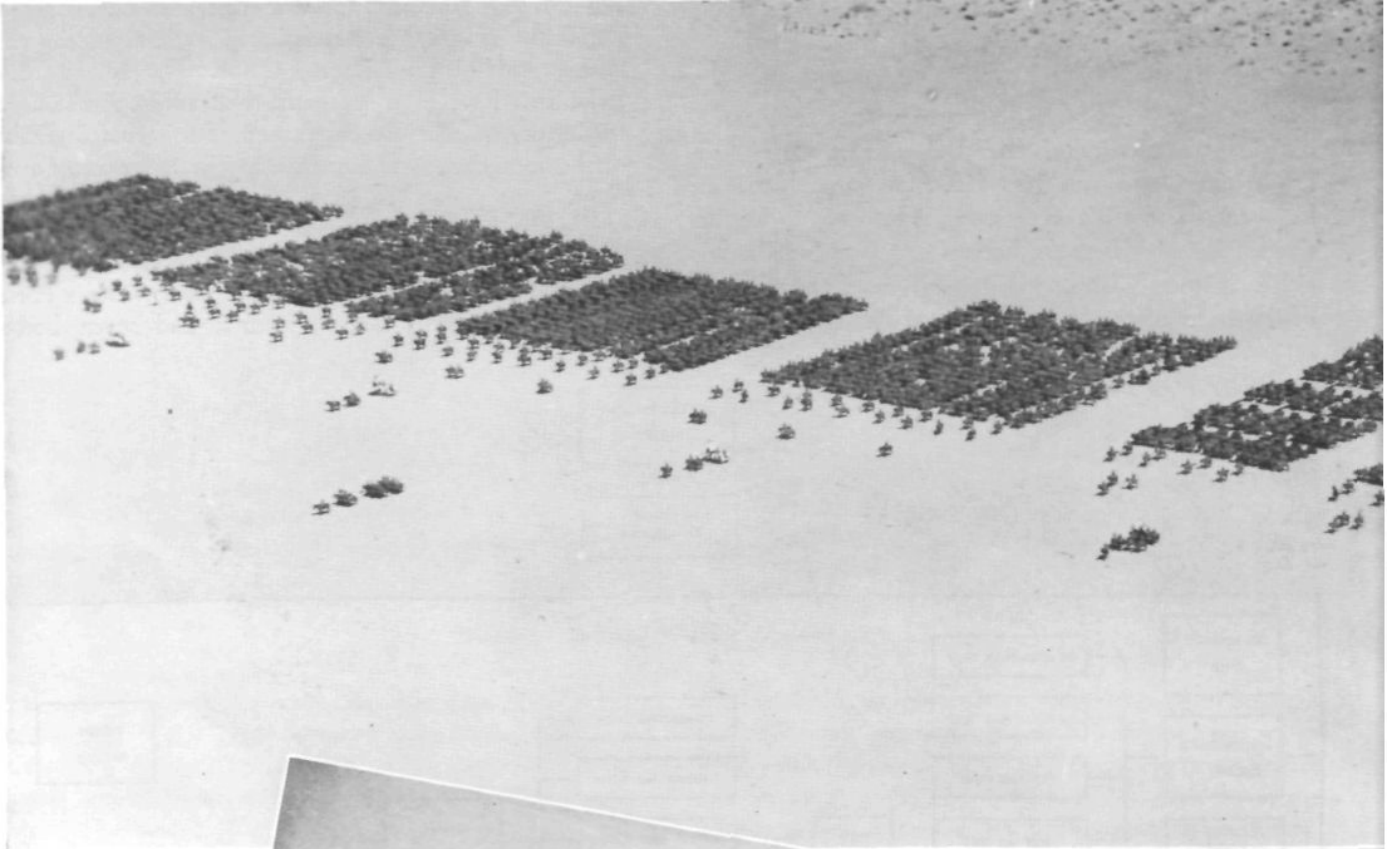
Today, of the fourteen active cavalry regiments in our Regular Army and the 26th Cavalry (Philippine Scouts), the 1st and 13th Regiments—called Armored Regiments (Light)—are completely mechanized and are elements of the 1st Armored Corps. The 4th and 6th Regiments have been reorganized as Horse-mechanized Regiments (Corps Reconnaissance Regiments). Eight of the horse cavalry regiments comprise two cavalry divisions.

We also have ten Reconnaissance Troops; and several school detachments.

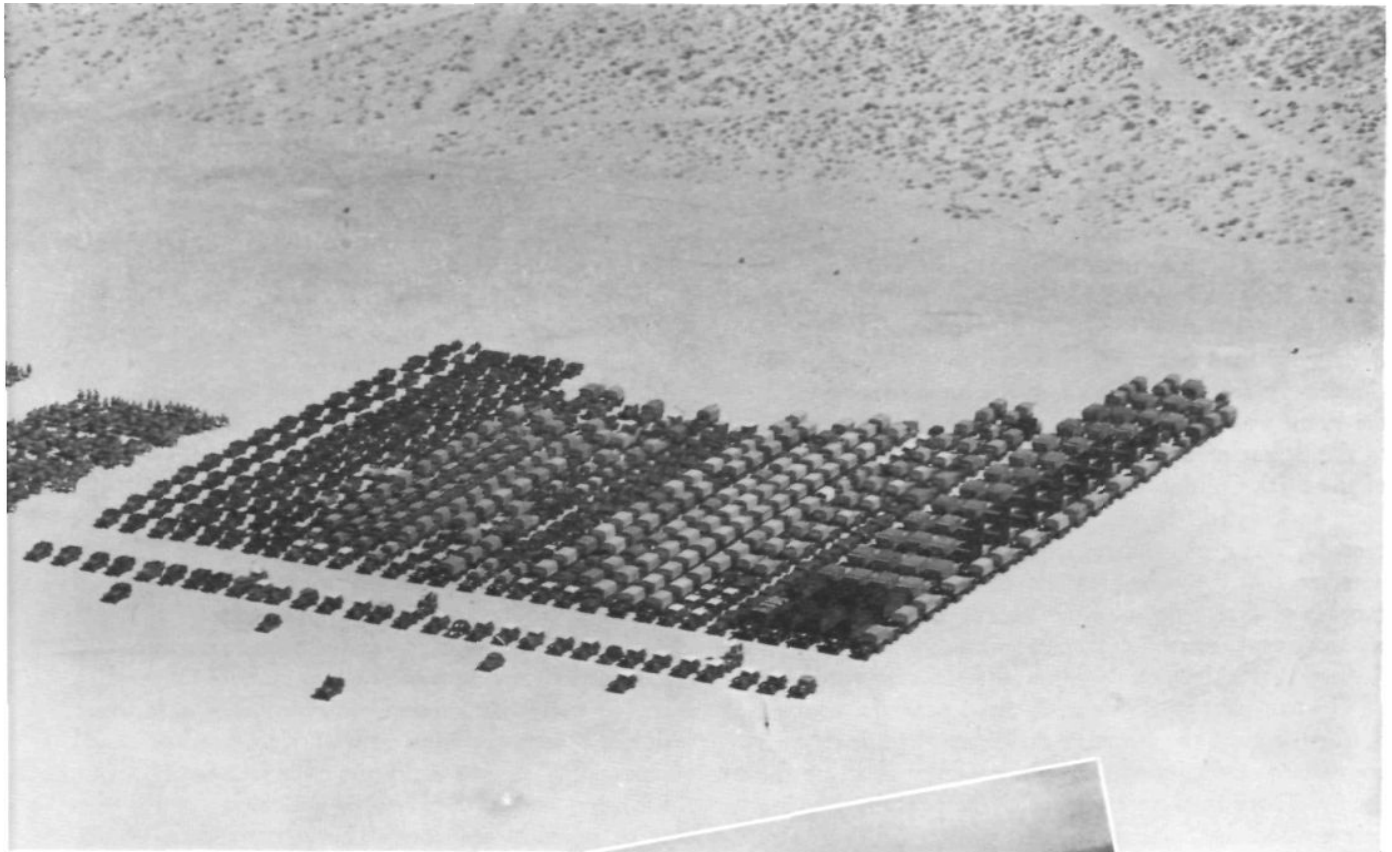
The National Guard, in Federal Service, has a horse cavalry brigade of two regiments; and seven horse-mechanized



The 1st Cavalry Division



Passes in Review



regiments.

Cavalry equipment now is a far cry from that of ancient cavalry. American cavalry has utilized to its advantage modern development in motors, armor, and armament, resulting in the development of three types of cavalry troops; i.e., horse troop, horse portée troop, and the mechanized reconnaissance troop—each designed to perform specific cavalry missions.

We wish that both men and dumb beasts could be eliminated from the prosecution of war, in favor of mechanical automatons; or better still, that war could be entirely banished from civilization. Since this, as yet, does not seem to be possible, from a purely military viewpoint we must consider it materialistically. Highway and rail arterial lines of communication, now, are tactical as well as strategical objectives. In France, during May, 1940, those highways in the theater of operations which had not been destroyed were so completely clogged by refugees that all motor movement towards the Front was brought to an absolute halt, contributing to the defeat of the French armies. With the presence of the Fifth Column activity, this condition should have been anticipated. It was anticipated by Germany and probably was a planned consequence. The fact remains, however, that it did happen and combat horse elements, capable of detouring the congested areas by cross country maneuver, were not then immediately available.

At the same time, on the Western Front, use was made of German cavalry divisions, at first, near the extreme northern end of the front, at the point where it reached the eastern extremity of the Zuider Zee, to clean up the enemy. Later they were employed for pursuit. Having first crossed the Seine River west of Paris, the cavalry reached and conquered Saumur, the seat of the French Cavalry School. In doing so it gave the German Army possession of two important river crossings (at Port Boulet across the Loire, and at Chinon across the Vienne). From there the cavalry troops pushed on to Parthenay, at the rate of 70 km. (44 miles) daily. This advance was carried out in a southern direction, without stopping to rest, but not without fighting. At several points enemy resistance was met and broken down in quick, lively encounters. French armored contingents appearing every now and then were beaten back by the horse-drawn batteries and the motorized antitank groups included with the division.

It is of striking significance to note that the new German horse cavalry is being fashioned along the lines of our modern American cavalry which is different from any other cavalry in the world. Until World War I, European cavalry, failing to profit by our experience in the American Civil War, fought almost entirely with the lance and saber. Today it is armed chiefly with carbines and pistols.

By contrast, our horse cavalry is armed with machine guns, of several calibers; anti-aircraft and antitank guns; numerous reconnaissance and fighting vehicles; mortars; pistols and semiautomatic rifle—a fighting force that is

unique in history. Our cavalry is the most adaptable of all arms where roads are few or poor, or quickly become poor in battle areas. It is *an all-purpose arm for ground reconnaissance and exploitation of success or protection of defeated units.*

Modern war has proved the essentiality of the horse. The press mediums of the country are beginning to realize this fact. The full-page articles which recently have appeared voluntarily throughout the United States refuting the layman's prejudiced opinion that the horse is obsolete are *not an apology* for horse cavalry, but a sincere effort to keep our public properly informed.

The United States has a greater potential horse-weapon than any other country in the world. We should take full advantage of this valuable asset. There are 11,000,000 horses in the United States today, the majority of which could be used in war.

In this age of mechanization and motorization we should remember that the Germans are reliably reported to have utilized 791,000 horses (not including supply columns) in their invasion of the Low Countries and France, where the road and highway nets were declared as superior to anything which we have in the Western Hemisphere except in our coastal regions and isolated inland metropolitan areas.

Today, Germany maintains seventeen regiments of horse cavalry, plus various other mounted combat units. Italy has twelve horse cavalry regiments. The Japanese maintain twenty-five horse regiments. Russia has a total of approximately 140 regiments of horse cavalry.

Utilizing horses, therefore, is not solely for the purpose of practical economy. They serve a definite military purpose. Fortunately for us, our War Department is fully aware that horse cavalry, by actual demonstration, still possesses battlefield maneuverability, over rugged terrain, yet unequaled by any other service. This coupled with the tremendous fire power which we have in our American cavalry today produces a composite weapon essential in modern military operations, particularly in probable geographic areas such as are found in the Western Hemisphere.

THE CAVALRY DIVISION

Here are the highlights of the new American Cavalry Division:

Four horse regiments, each with a headquarters troop; one .30 caliber machine-gun troop; one special heavy weapons troop armed with .50 caliber machine guns and long-range mortars; two rifle squadrons of three troops each, equipped with Garand semi-automatic rifles; one division reconnaissance squadron composed of two scout car troops; one motorcycle troop and one (light tank) armored troop; an antitank troop; two battalions of horse artillery, especially organized for cavalry action, with twenty-four 75-mm. howitzers and an added motor-drawn battalion of twelve 105-mm. howitzers.

Here is a summary of the armaments: 327 light machine guns, .30 caliber; 356 heavy machine guns, .30 caliber; 265 machine guns, .50 caliber; 490 Thompson sub-machine guns, .45 caliber; 54 antitank guns, 37-mm.; 28 mortars, 81-mm.; 10,342 pistols and 4,592 semi-automatic rifles, plus the artillery above mentioned. An air observation squadron is attached to each division. Air fighting and bombing units are attached as needed. Of armored vehicles there are 145 scout cars, 13 light tanks, 12 mortar carriers, and 374 motorcycles.

The prerequisite of air superiority applies equally to all ground units, without air combat superiority all ground forces are handicapped in massing their means and in maneuvering for position. Horse cavalry, however, has the advantage of being able to leave the roads and maneuver cross-country, mounted, at relatively high speed to launch dismounted attacks from directions unfavorable to an enemy.



Horse Cavalry Portée

It is emphasized that horses and motors complement each other. They are not in competition. Neither can replace the other in warfare. Both are necessary!

We recently have developed a system of portéeing horse cavalry great distances at high speed. This has opened a new field of effectiveness in the utilization of horses. Similarly for the foot soldier, it eliminates the long fatiguing marches and enables combat units to arrive fresh on the field of battle ready for extended cross-country maneuver; the importance of which in future warfare is now incalculable. Thus we find in modern warfare that the horse still is a dominating factor in strategic and cross-country tactical maneuverability.

In American cavalry, we obviously have an array of tremendous mobile fire power for attack or resistance. And the ability to shift this fire power adds to its value. The new cavalry division, developed under the able guidance of our Chief of Cavalry. Major General John K. Herr, represents the most formidable unit of its kind ever designed within an army.

HORSE-MECHANIZED REGIMENTS

As previously indicated, we have two regular and seven National Guard cavalry regiments organized as Horse-Mechanized regiments for the purpose of corps reconnaissance. Each regiment at present has an authorized strength of 61 officers, and 1,088 enlisted men. The major sub-divisions of the regiment are:

(1) Headquarters and Headquarters Troop; 11 officers, 115 enlisted men. This troop includes the normal subdivisions of the horse regiment, and includes a Pioneer and Demolition platoon, and an Antitank platoon. In the troop are 16 scout cars, 5 in the P and D Platoon, 7 in the AT platoon, and 4 in the Commander's Group.

(2) Service Troop; 4 officers, 155 enlisted men. This troop combines all supply and transportation facilities not organic in the other troops of the regiment. It provides semi-trailer transportation for the 1st Squadron.

(3) 1st Squadron, horse, portée: 18 officers, 396 enlisted men. This squadron is organized as the present horse squadron, consisting of three troops, "A," "B," and "C." Portée equipment is in the Service Troop. The horse troops are specifically charged with the proper condition of trailers, the prime movers remain with the Service Troop.

(4) 2nd Squadron, mechanized; 21 officers, 413 enlisted men. The mechanized squadron consists of two reconnaissance troops, referred to as scout car troops, and one motorcycle troop.

In the regiment there are a total of 88 scout cars and 171 motorcycles.

ARTILLERY MAY BE ATTACHED AS REQUIREMENTS DICTATE

The purpose of these new type cavalry regiments is inferred in their official designation as *Corps Reconnaissance Regiments*, now called Horse-Mechanized Regiments. A recent statement to the effect that the successful

operation of a field force was a question of the "maneuver of large units," and that the successful decision was obtained by such maneuver, and not by the operation of small units relying upon small arms fire is questionable. The operation of "small

reconnaissance units to permit INTELLIGENT decisions as a basis for maneuver of the large forces referred to, is of far more importance than ever before. The handling of these reconnaissance units so as to *insure pertinent information upon which to base intelligent maneuver of the major units of the Corps* is the primary mission of the new regiment. This mission then resolves itself into making the best use of the favorable characteristics of the new regiment, and avoiding, or neutralizing through training, and judicious use of its various elements, its unfavorable characteristics to meet the particular tactical situation, or particular terrain condition.

As to the mechanical details as to how this may be done, no specific formula will ever exist. In general, picture initially a *fast moving mechanized advance* in a broad front, from 50 to possibly 100 miles ahead of the major units of the Corps, and on the front dictated by the terrain features of the particular locality and the tactical dispositions, both of the friendly troops and the enemy. The mechanized advance will be by scout car platoons of the regiment, and will be as rapid as road conditions permit. It will continue to be rapid until contact is made — and there



A scout car platoon

are going to be some casualties in the scout cars. However the element of time is so extremely critical that the advance, initially, must *not* be slow and cautious until *after* contact. The width of front will dictate initial dispositions. Twenty miles is the maximum

that a troop should expect to cover. If greater than this, two troops are needed, and if beyond 40 miles, additional units of suitable type must assist the regiment. Following up the mechanized advance, even as close as 7 to 10 miles, horse cavalry, *portée*, should push along the main routes of advance, ready to immediately detruck and assist the mechanized units when the need occurs. Of course any enemy will expect this mechanized advance, and have his front blocked. Scout cars *alone* may have serious trouble punching through to get at his main forces. Nothing is a better panacea for forcing a road block than horse soldiers. If they are seven miles back, this may mean that they are ready to get around the flanks and open the way in 25 minutes. But the scout cars should not look for a fight, unless there is no other way open. They should seek to

sideslip, go around, in order to keep on going. If they do get by, and notify the nearest horse unit where the defended road block is, it would not be long until said road block is neutralized.

Variations of this general picture are to be expected. The mechanized squadron may be sent out alone in an advance, followed up by the horse squadron, but this will require some mechanized security detachments for the horse



squadron. Again, the mechanized squadron may be on the exposed flank, or the most vulnerable flank, during the reconnaissance phase. Again some mechanized security elements will be necessary for attachment to the horse squadron.

In any event, however, remember that the horse-mechanized regiment's most important mission, initially, is furnishing information to the Corps Commander in ample time for him to INTELLIGENTLY DIRECT THE MANEUVER OF HIS LARGE MASSES.

RECONNAISSANCE TROOPS

We have ten Reconnaissance Troops (mechanized). One is stationed in the Canal Zone, and there is one for each of the nine Triangular Infantry Divisions. The Troop has 20 scout cars, 12 solo motorcycles, and 2 motorcycles with side car. Experimental tests with the Bantam car may in the near future cause a change in the organization of these divisional reconnaissance troops.

The tactical operation of the reconnaissance troop is similar to that of the corps reconnaissance regiment's mechanized elements.

* * * *

The war abroad has been one of movement, the type of warfare and the doctrine that has been traditional in our army and which has brought success in every war that we have fought. Especially is this true of the Cavalry, a fast moving concentrated means of fire which can be placed in the shortest possible time on any objective. Despite all the descriptions of new ways of making war, that side which can put down the greatest amount of fire on the objective, has the best chance of victory. Horse cavalry must be judged today by its perfected organization, by the power of its arms and by its battlefield mobility. If there is one lesson that the actual battle experiences of the present war has clearly shown, it is *the rebirth of Cavalry as a powerful combat force.*

Proposed Amendments to the Constitution, U.S.F.A. Association:

TO THE SECRETARY, UNITED STATES FIELD ARTILLERY ASSOCIATION, WASHINGTON, D. C.

1. *Amendment to the Constitution.* The committee appointed by the President at the annual meeting December 16, 1940, proposes that the Constitution of the United States Field Artillery Association be amended as follows: (suggested changes are italicized)

ARTICLE V. Combine sections 3 and 4 to read: *Active and* associate members shall be entitled to receive the JOURNAL without payment other than the annual dues.

ARTICLE VI, Section 1—The Executive Council shall be composed of nine active members, five of whom shall be officers of the regular army, two officers of the *National Guard* and two officers of the Field Artillery Section of the Officers' Reserve Corps, to be elected biennially for a term of two years by a majority vote; *such majority vote to consist of a majority of active officers present overrepresented by written proxies at a meeting of the Association.* The Council shall hold its meetings at the headquarters of the Association, which shall be in the city of Washington.

ARTICLE VII, Section 1—The regular meetings of the Association shall be held annually at Washington, D. C., or at such other place as may be designated by the Executive Council, who shall also prescribe the time of meeting and *give at least thirty days' notice of same, by publication in The FIELD ARTILLERY JOURNAL or by such other means as the Council may prescribe.*

ARTICLE VII, section 3—Special meetings may be called by the Executive Council, upon written request therefor signed by twenty members. At least thirty days' notice thereof shall be given in THE FIELD ARTILLERY JOURNAL, or by mail, to active members. The object of the meeting shall be stated in the request and in the notice.

ARTICLE VII, Section 4—*The number of active members present at a meeting or represented thereat by written proxies,* shall constitute a quorum, except as provided in Article IX.

2. *Reasons for the amendments.*

a. Sections 3 and 4 of Article V should be combined as indicated to permit the Association to augment its income by publishing books or pamphlets (if so desired) for profit.

b. The reasons for the other changes are as follows:

(1) It has now become practically impossible to obtain a quorum, which, according to the Constitution as now written, must consist of fifty per cent (by proxy) of all active members in the United States. This failure to secure a quorum arises because erroneous mailing addresses or frequent changes in address prevent proxy cards from reaching many members; and also because many members fail to return signed proxies.

(2) The proposed changes will obviate the necessity for sending out proxy cards. This will save the Association \$100 (or more) annually. No member who desires to vote will be deprived of his vote; he still will receive due and timely notice in the JOURNAL, and will still have the privilege of sending in his proxy if he so desires.

(3) In effect, and in brief, the changes will merely mean that all members and proxies on hand at a meeting will be counted, and a majority of this count will constitute a majority vote.

(4) There is no change in the authority of the Council, which will still continue to administer the affairs of the Association as in the past.

3. In accordance with Article IX of the Constitution, we (members whose signatures are appended below) accept the report of the committee, and propose that the foregoing amendments be made to the Constitution.

R. M. Danford; W. C. Potter; I. T. Wyche; Thomas North; J. V. Phelps; M. McClure; Rex Chandler; J. A. Stewart; J. F. Uncles; Rex W. Beasley; Stuart L. Cowles; John B. Anderson; David S. Rumbough; J. A. Lester; L. M. Riley; H. E. Maguire; Townsend Heard; B. M. Sawbridge; C. G. Helmick; I. Spalding; B. M. Bryan; A. W. Waldron; J. W. Mackelvie; A. F. Kibler; I. L. Foster; A. C. McAuliffe; F. A. Henning; John H. Hinds; L. Whitlock.



Life

FIRE POWER

By Lt. E. A. Raymond, F. A.

God no longer fights on the side of the big battalions. Fire power, not man power, wins modern battles. This being so, one might suppose that every course in tactics would begin with a definition of fire power. Yet the chances are very strong that the reader can not quote a definition if, indeed, he has ever heard one. Some well-known officers maintain that such a complex quantity can not be defined.

If they are attempting to define fire power in *absolute terms* their contention is undoubtedly right. If they will appraise fire power in *relative terms*, however, it

will be possible to gauge the enemy's hitting strength in actual figures. Even though his ability to use this strength remains unknown—even though a formula for fire power indicates potential fire power, and fails to reflect degree of training, mobility, and the supply of ammunition—it is nevertheless

of capital importance, and well worth calculating. Commanders and staffs invariably do evaluate an opponent's fire power by study of his weapons and organization, but this is done more or less disjointedly, and the conclusions reached are commonly left in officers' subconscious minds. These

conclusions are vitally important, and if they can be clarified by mathematical treatment, this ought to be done.

Here is a proposed definition: The fire power of each type of weapon is the product of the *caliber* times the *number* of pieces times the *rate of fire* in rounds per gun per minute times *range* times *maximum ordinate*. The fire power of a given unit is the weighted, combined fire power of all its weapons.

Compute the fire power of the United States Army (latest triangular division) and use the reciprocal of this figure on the foreign army studied, so making the value for our Army one.

Weight the figures for all weapons according to their importance in producing casualties, as shown by experience tables.

Now let us examine the various factors.

1. CALIBER

What happens at the business end of the trajectory is principally determined by the caliber of the weapon used. Caliber is the index of the diameter of a burst; of the shock effect produced; and, to some extent at least, of the penetration secured. To illustrate the importance of caliber, French divisions fought for two years during the World War under serious handicap because their principal divisional artillery piece—the "soixante-quinze"—was no match for the 105-mm. and 155-mm. howitzers with which the Germans supplemented their 77-mm. guns.

2. NUMBER OF PIECES

The number of pieces of each caliber is, of course, an important point in any consideration of fire power. The successful German campaign in Poland furnishes an excellent reminder of the value of having many weapons. By bold use of infantry-artillery (light and medium artillery attached to the infantry, and sometimes emplaced within one hundred yards of the point of actual hand-to-hand fighting), a tremendous value of fire was brought down simultaneously on the enemy and his fires were extinguished.

3. RATE OF FIRE

A division armed with bolt-action rifles would not have the rifle power of a division firing semi-automatic weapons. Battle is not static but dynamic. Rounds per gun per minute is the standard expression of rate of fire, rather than rounds per gun per hour or other prolonged period, since if there is enough fire power, its use may not need to be prolonged.

4. RANGE

Range of weapons in thousands of yards is given important weight in determining fire power since it not only defines the size of normal zones assigned to batteries but also governs the size of contingent zones, or the amount of artillery support which can be given a tactical unit by neighboring units.

Range for dive bombers is expressed in sustained hours of flight, which is a function of the gasoline carried with a full bombing load.

Range for antiaircraft artillery is expressed in feet.

5. MUZZLE VELOCITY

Muzzle velocity is the speed of the projectile as it leaves the bore, and is expressed in feet per second. This factor determines the striking power of flat-trajectory weapons.

For support artillery, muzzle velocity is a less important consideration, tactically, than maximum ordinate, as will be explained. The maximum ordinate, however, is seldom available in ordnance reports of military attaches abroad. It can be approximated with the aid of the muzzle velocity figure. If the latter is *inverted*, that is, if the reciprocal of the figure be used, a close indication of the trajectory will be obtained. There is a concomitant variation between maximum ordinate and muzzle velocity. Howitzers, with higher maximum ordinate, have lower muzzle velocity than guns. Maximum ordinate is the greatest height reached by the projectile in its flight. This factor is introduced to reflect the shape of the trajectory. If the trajectory is too flat, dead space behind hills will seriously impair the usefulness of low-angled weapons. Furthermore, optimum fragmentation of a shell occurs when the projectile falls vertically.

High-angle fire is more effective, then, against personnel. It is also deemed more desirable for destructive fires. Range probable error is less for howitzers than for guns of equal range and caliber. The force of impact is applied to the target more nearly vertically, so minimizing tangential resistance.

And now a few words on the weighting of weapons. The basis of weighting is the percentage of total casualties a given weapon may be expected to produce. World War figures are very complete; they have, however, been used as a guide, and not as a pattern. Figures from the present war are sketchy in the extreme. The weights are necessarily approximate values, but they do prevent superiority in a minor weapon from offsetting inferiority in another of major importance.

Five per cent of casualties, caused by close attack weapons—bayonet, pistol, grenades and flame throwers—has been assigned arbitrarily to rifle strength.

The machine gun and infantry heavy weapons figures require no special comment. It will be noted that artillery receives not much more than half the weight which World War experience alone would give it. Gas may be used at any time—it is one of the big question marks of the present European conflict—but at present is out of the picture. Gas shell thrown by American field pieces in 1917-18 produced as many casualties as shrapnel and high-explosive shell combined, and the casualty-producing effect of artillery when it fires no gas must be reduced proportionally.

Dive bombers assigned to German divisions must be counted as part of the fire power of the division, whereas

the "light bombardment" aviation of our own and other armies is under the control of higher authority; it may or may not support the mission of an infantry division, so should not be considered in estimating divisional fire power.

Now that we have our formula, what does it tell us about the divisions of foreign armies?

Our first glance at the bar graphs, Figure 2, throws back the startling fact that the Germans fought the French in 1940 with FOUR TIMES THE FIRE POWER in their infantry divisions. The French did not have anything like the armament the Germans had, and a lot they did have was held in corps reserve. Reserves could not be sent everywhere at once, and often there was no time available to send them at all. Tanks and dive-bombers make good newspaper copy, and certainly were of enormous value under the specific conditions in Western Europe. We should not slight the perhaps more important effect of vastly superior fire power.

Part of the credit due the British for making a superior resistance to that of the French can be chalked up to their fire power; it was nearly twice as strong as the French and just over half the German.

Panzer divisions hit a more telling blow than infantry divisions, although they are smaller and so carry fewer

infantry weapons. Fire power, it should be emphasized again, is not the whole story. It does not reflect the offensive power of armored vehicles, for one thing. The relatively lower fire power in an armored division would be important, however, if that division were stopped and forced to hold ground.

Russia's fire power is of interest—being greater than that of our "old" triangular division, and no doubt representing fire power in being, not on order.

Japanese divisional fire power, if computed on the basis of numbers of weapons only, would be much greater. The alleged inferior performance of her equipment, much of which is old, reduces the fire power estimate to the figure given.

A parallel can be drawn between mathematical estimates of enemy fire power and weather charts. The endless number of variables involved in our problem, and the ceaselessness with which they change, can accurately be compared to the winds and weather. After laborious calculation, all that remains is a guess, and that temporary. Yet it was by hammering at uncertainty with statistics, by observing, and then CORRELATING what had been observed, that meteorology acquired its great importance. We should have "weather bureaus" studying relative fire power all the time, ready to predict the time for haying and to foretell impending storms.

Figure 1 UNITED STATES (NEW TRIANGULAR DIVISION)

Weapon	Caliber	Number	Maximum Range	Maximum R.G.M.	Muzzle Velocity	Product	Weight %	Fire Power	
Rifle	.30	6,942	5,200	68	2,850	2,098	15	471	
Rifle, Automatic	.30	375	5,500	600	2,680	995			
Machine Gun, Sub	.45	35	5,500	700	802	49	15	180	
Machine Gun, Light	.30	179	5,500	1,250	2,660	982			
Machine Gun, Heavy	.50	36	7,500	650	2,500	219	10	66	
Mortar, Light	60	81	1,935	35	---	329			
Mortar, Heavy	81	36	3,280	35	---	335	40	66	
Howitzer	105	36	---	---	---	---			
Howitzer	155	12	12,400	3	1,476	47	5	48	
Antitank	37	60	---	20	2,600	855			
Antitank	75	8	13,600	6	1,950	96	5	23	
Antiaircraft	.50	77	7,000	650	2,500	468			
Dive Bomber	0	0	0	0	0	---	10	-85	
									769

Figure 2 DIVISIONAL FIRE POWER (ACCORDING TO THE AUTHOR'S FORMULA)

	Fire Power	
United States		
New Δ	769	
Old Δ	534	
Great Britain	507	
France	303	
Germany—		
Infantry	1,200*	
Panzer	950*	
Italy	500*	
Russia	617	
Japan	300*	

*Estimated from published sources.

Vacation in Mexico

By Captain T. L. Crystal, Jr., FA.
Part II (Conclusion)

The Cathedral at Taxco
(Plates by courtesy of Mexican Railways)



Wednesday, July 5, 1939

Mexico, D. F.

After a late lunch at the Hotel Reformer, we rested while Patti went over to a "Salon de Belleza" (beauty parlor) and had them do their darndest to her hair. She found out that Mexican beauticians have very strong fingers, but their work is satisfactory.

Bud and I went down to Humberto's "Artes de Mexico" shop early, to get some data on our contemplated lake district trip. Humberto was thoroughly familiar with the area, as he had worked through it both on buying trips for his store and as a teacher for the government. He gave us some grand tips, and finally thought that he might be able to go with us next week.

After dinner, Humberto took us to a most unusual night club—El Patio. Bud and I caused the girls great amusement, as we had to be given ties for our polo shirts before they let us in. The Patio is completely tiled in with multicolored designs and has several balconies hanging over the main room, which is about 2½ stories high. The music was fine, but the hit of the evening was a pair of 18-year-old Mexicans who danced exquisitely. They were called "Los Chevaliallos Sevillanos," and did some Spanish and Mexican dances with a grace that would have done justice to a Royal Court. A Mexican Beatrice Lillie really put some oomph into her singing, and brought down the house with her version of an amusing drunk's rambling—"La Borrachita."

Thursday, July 6, 1939

Taxco, Guerrero

We left Mexico City at 1:30 p.m., after a morning spent getting ready to leave the city for our first excursion with the Mabbitts.

We had a very pleasant drive over a good, but very winding road, up out of the valley of Mexico and then drove down to Cuernavaca, where we looked around. In the Mercado we made an improvised harness for Bud's and Helen's new companion, a Daschund which they christened "Benito Juarez."

Taxco is quite a different sort of a town, and has been ordered preserved as a national monument in its status of about 1800. All the streets are cobblestoned with small (1 to 2 inch) stones, and are winding and quite hilly. The average width permits one pedestrian and one car to pass—a rather unusual version of two-way traffic. Bud and Helen had discovered the Melendez, and so we went there. It is very Mexican with a charming open patio and outside dining room and perched quite a bit up on the hill that is Taxco. The dominant structure in Taxco is the church, built by José de la Borda, reputedly at the spot where his mules' hooves scraped the earth off the vein of silver that made him a millionaire. All the buildings have a reddish tile type roof that is very charming in this setting.

For supper, Bud went out and got some cheese and crackers, and these combined very well with the bottle of red wine that we had purchased in Cuernavaca, and which our icebox in the car now had nicely chilled.

Friday, July 7, 1939

Taxco, Guerrero

We slept late in our most unusual corner room on the first floor of the Hotel Melendez, with far below us the native market and its triangular and rectangular

white cloth sun shades looking up at us. The ground dropped away from the bottom of the Hotel, and it seemed as if we were flying. From one window the valley stretched away from us, while from the other the Cathedral was quaintly framed by the sill and sides. The noises outside possessed a far-away touch that was quite conducive to sleep. We both liked it!

About nine, Bud and Helen came for us, and we walked about three-fourths of a mile up and down and through and around the quaint winding and precipitous streets to a knoll a little bit out of the town. On it perches the Hotel de la Borda.

We went over to the Castillos shop for our silver browsing and found there a choice collection of silver, with original designs beautifully executed. The owners are an unusual couple. Margot is an American girl with a very artistic nature who spends days in museums sketching designs from old manuscripts or sculptures. She then adapts them to silver pieces and has succeeded remarkably well. Antonio is an engaging youngster who looks about 18 but really is 26 or so. He is an outstanding craftsman, and has a happy, enjoyable, and friendly nature. We liked him immediately and he showed us all over the place. We didn't buy nuthin' . . . then. We later went over to Spratling's, a very famous silver shop, and met the owner. He was most pleasant.

Lunch was omitted due to the lateness of our breakfast, but on our return, we found the local Rotary or Kiwanis, or what have you, in full swing just outside our front door. Blocking our door was an eight-piece band going to town with great force. We loved the first hour of it, but by seven PM when the dinner was just beginning to turn into a dance, we had had enough. It was gone when we got back from our dinner about 10:00 PM, but I can't say at exactly what hour the luncheon broke up.

Saturday, July 8, 1939

Taxco, Guerrero

Pursuant to an invitation of yesterday, I got up at 7:30 AM and went up to the home of William Spratling, where I was immediately invited to join the host and three of his assistants in his private pool. It was located in one corner of his garden and was about 15 feet wide and 20 feet long. It had a depth, however, of at least 14 feet, and made a grand place to dive into from any height of the wall of the building that was along one end of the pool. The water was clear and cool and the swim most refreshing. We then had breakfast in his dining room, and it was a honey. We had stacks of real pancakes and bacon, maple syrup and butter, coffee and jam.

Spratling was quite a remarkable fellow. He fiddled around a bit with Mexican art as a sideline, discovered a rather minute silver business in Taxco, and stepped in and organized a bunch of kids as apprentice silversmiths. Today Spratling silver is almost synonymous with Mexican silver, and he owns a 35-foot auxiliary sloop and a home in Acapulco. He has an establishment of at

least 50 workers, and at his shop makes rugs and sarapes from the wool and cotton as it comes off the animal or plant, spins it by hand and weaves it on queer wooden looms.

After breakfast he showed me some interesting books on Mexican history. Some were three feet high and two feet wide, with huge etchings beautifully executed and hand painted. He had huge tomes full of five-color prints of Aztec picture writing. His walls were hung with Rivera and Covarrubias originals, and his home was unique in its many queer levels and corners. It was not at all pretentious but extremely livable.

After another breakfast at a surprisingly nice tourist hotel in the center of town—Hotel Los Arcos—we went over the rough street to the Castillos silver shop and admired the splendid job they do there. Antonio tried to give me the pair of cuff links his brother had made to my design, and the small buckles for Patti's *huiraches*, but being quite a foolish individual, and knowing their financial condition, I paid the amazing price of \$2.20 U. S. for the whole lot. Each had taken one smith a half day to do.

We packed about noon and, after filling the icebox, ate our picnic lunch at 4:30 PM, about half way back to Mexico City. As always, it was most enjoyable. We arrived at the Montejo about 5:30 PM, and in the next three hours succeeded in getting back our laundry and clothes that the tailor had had during our trip. Their system of keeping track of things is quite unique and I guess satisfactory to Mexican tastes, but a bit incomprehensible to Americans.

About nine o'clock that night, having bathed and dressed, we got a cab to take us to Humberto's house. Before ever taking a cab, or in fact contracting for any service in Mexico, it is most important that you inquire firmly for the price. The tourist rate is one peso, while anyone who can jabber fast enough at a cab driver can get it for anything from .50 to .75 centavos. A very valuable phrase to shout at them is "Tostone, la dejada!" which every now and then works. A *tostone* is a fifty centavo piece and is slang or corresponds to our "Half" or "Four bits."

Humberto showed us into his nicely decorated living room, and after some excellent Mexican cocktails, served us a noteworthy buffet dinner of chicken soup, *Ravioli Mexicana*, ham, cheese, tomatoes, and wine. We did justice to the meal. He had planned to take us slumming, but his *victrola* records got the best of us. He played Rachmaninoff's Second Concerto with the composer at the piano and Stokowski and the Philadelphia Orchestra, and some other beautiful pieces. He topped off the evening by playing on the piano Beethoven's *Moonlight Sonata* and a few other pieces, including some works of Chopin, and finally the *Malaguena*. We called it an evening right there.

Humberto was thoroughly familiar with the country,

and had a most intimate knowledge of the Indians and the people who still live in the hinterland of Mexico. He once was sent by the government to investigate some tribes that the government wished to modernize. He lived among them for quite a while, learned their language, and against his desires but in the knowledge that it was the only course for them to take, started the work of teaching them things of this day and age. His stories of the personalities and living habits and their reaction to the present age were fascinating. He conducted one unusual experiment among them. On his phonograph he played, first, a typically Mexican program of what they call *Ranchero* songs. They loved it. Jazz left them cold. He then played Beethoven's Ninth Symphony. They just sat there and felt—in silence. Their explanations of what they felt were moving, and surpassed anything he could have told them. They made him play it over and over during his stay there.

Sunday, July 9, 1939

Mexico, D. F.

At 8:30 PM we met Humberto at Prendes' Restaurant for an excellent meal of onion soup, steaks, and ice cream. You go to a refrigerator and select the steak you want before it is cooked, and if you order it rare, it is served rare. The meal became a rather animated discussion of the pros and cons of the Mexican religious question. We walked home (about a mile or so) and felt much better for it.

One of the reasons for walking was the Mexican taxi. The car itself is American, but the driver is definitely a Latin. They have only had a traffic question in Mexico for the past four or five years, as the Highway has only been open about that long. They have a lot to learn. Every street possesses several ground rules for circulation, and at least five different names for any one mile of length. About 18 cars try to get into the same spot at the same time, and each is afraid the other will get there first. They need only red mantles or capes to become distinguished toreadors. They whiz through a line of cross traffic with great disdain, blow the horn at all times (1 blast before a blind intersection means look out, 2 mean if you slow up, he may stop for you, and 3 mean a fight) and weave in and out of congested lanes at great speeds. If you are walking and so much as looking at a passing "Libre," the smell of rubber and screech of tires skidding mean that there is a cab at your service. We walked whenever possible.

Monday, July 10, 1939

Morelia, Michoacan

Up early at the Montejo to jack for our trip to the lake district. We cleared out of the hotel and went over to the Embassy where we were delighted to find mail from home. I met Col. McCoy, the new Military Attache, and as usual, he and the whole staff were cordial as could be. From there we went to the Artes de Mexico, Humberto's shop, and parked the car. Patti and I went to Wells Fargo, and as

usual they were very little help. We had a package waiting for us at the Express Station (the costumes we got in Tehuacan), and Wells didn't know much about how to get it, nor could they do so for us.

Bud went over to the market and got a small wicker chair for the back of the car so we could all ride in the one car. He had Humberto saw off the legs, and it made the back quite comfortable. Humberto had a rush of business while we were there, and we felt it would be a big imposition to ask him to come with us, and so about noon we left—regretfully—without him. He had given us quite a bit of dope on the trip, however, and we left confident of having a very interesting trip.

Shortly after we cleared the City we started to climb, and just as soon it became time to eat. We picnicked in a National Park at a picnic site high in the mountains on the road to Toluca, and it was so cold we had to move out from under a tree into the sun. Imagine being cold in July in Mexico!

After leaving Toluca behind, we started up again over an excellent road, and then ran into the clouds, and later a severe rain. There was a total absence of towns on the route, and we coasted into Morelia about 6 o'clock with a gas tank that had read empty for the last 15 miles. It was a plenty close call.

Morelia turned out to be an old town with plenty of new streets—all being built together. When we spotted the name of a hotel that had been recommended to us, we all jumped at it and went in. It was the Hotel Casino, and was quite nice. While Bud was parking the car in a secure place for the night (you never leave the car parked out on the street in Mexico), he spotted a perfectly beautiful hotel, the Hotel "Virrey de Mendoza," and we had dinner there. The dinner was fine for Mexico, but had to be complemented with a steak and a bottle of excellent Rioja Claret (Louis Marmiesse) to prove sufficient for an American appetite. My menu ability was increased by finding out that Frijoles de la Olla are Boston Baked Beans, frites or *al gusto* are dry baked, and *refrites* come out as a brownish paste. We had learned to eat most anything and like it!

Tuesday, July 11, 1939

Uruapan, Mich.

Patti and I got up and had an excellent breakfast at the Hotel Casino in a dining room patio that had around the walls 12 and 24 section panels of Cervantes tile. The one immediately above our breakfast nook was especially beautiful—Don Quixote and his imaginings. About eight we walked to the cathedral and found a choir of some sort chanting a litany. The Cathedral was one of the nicest we have been in, and magnificent in its size and simplicity. It looked quite new and polished up, although it had been started in 1660 and finished in 1705. It wouldn't have had to apologize in the slightest for its beauty or newness if placed alongside of St. John the Divine's in New York.

In Morelia the Hotel "Virrey de Mendoza" continued to impress us. In the doorway was a tablet marking the spot in which the great Mexican patriot Morelos had been shot. The doors were all paneled in leather, with hand scrolling and tooling all over them. The furniture was heavy leather and massive construction, and all the baths, service installations, etc., were modern in every respect. The slight matter that the building was erected in 1744 only added to its charm. Were we to do it again, we would stay there. Interior rooms were 8 pesos for two persons, and the exterior ones, beautifully equipped and massively and newly furnished with the ubiquitous Simmons mattresses, were 10 or 12 pesos.

About 10:00 AM we left in the station wagon and arrived in Patzcuaro about 11:30. There had been some rather rough stretches of heavy crushed rock road where they were still working on the Guadalajara highway, but we got through without anything more serious than bending up the oil pan. Patzcuaro intrigued us with its beauty and the scenery of the lake district is gorgeous. Everything, even including the food offered for sale at the station, looked clean and fresh, including some trout and white fish taken from the lake. We didn't have time to investigate, as our train for Uruapan left at 11:54 AM. We parked the car at a little hotel run by the same management as the "Virrey de Mendoza," the "Posada de don Vasco," and marched to the station with stripped field equipment (a toilet article case for Patti and me, and a small bag for Bud and Helen, plus Benito and his basket, a bag of canned foods and crackers, a camera and the typewriter) just in time to meet the train as it came in. It was standard gauge and quite clean and nice.

The train journey was only 2½ hours over a fertile countryside. Uruapan had a garden at the station. We went first to the Hotel Progreso, but changed to the Mirador after investigating both. I lasted through two lacquer factories, and then retired for a nap. The others kept on, but Patti joined me late and we awoke ready for a meal that we suspected would be in keeping with Mexico. Our surprise at getting a luscious soup, hot, light and crumbly biscuits, and tender beef filets with southern mashed potatoes and no beans or rice was nearly too much. Helen and I went out in the kitchen to thank the cook, a full-blooded Tlascan Indian matron, who had been taught her art by the wife of the Hotel owner, a Mrs. Slade. Viva La Señora Slade!

We walked around a bit after dinner, and as Patti and I were passing a lawyer's office we saw a comic map of Mexico on the wall we had tried to purchase without success. Patti urged me to go in and find out where I could buy a similar one. The lawyer—Lic. Ignacio Martinez Uribe—wouldn't let me out of the office 'till I had accepted it as a gift, had met his wife and sister and in turn introduced Patti, accepted an invitation to see his wife's rather well-known collection of small dwarf cactus, and in turn in self defense invited them to lunch with us

the next day. He called in the proprietor of the hotel, Sr. Alfredo Alvarez, to assist my inadequate Spanish. I know I never will know enough or ample ways to express my gratitude in Spanish for the many kindnesses and little courteous deeds of the many Mexican people who have so freely opened up the doors of their homes and hearts to this pair of incomprehensible, though always smiling, Americanos!

Another example of the ready willingness of everyone to help occurred. It was midnight, and I had forgotten Uribe's name, so I went out into the Patio and asked the night watchman if he knew. He didn't, so I thanked him and then found it on the desk of the hotel register. While I was writing it the watchman walked out to the Lawyer's office with a pencil and paper and wrote it down for me, and then came in and gave it to me. We have much to learn in courtesy from Mexico!

Pats and I bought a National Lottery slip for five pesos, and saw in the paper tonight that we are still lucky in love. That didn't deter us from getting another one from the Hotel guide—Rubin Diaz—who beat us in dominos before convincing us to take another chance to win the slight sum of 25,000 pesos for 5. We offered to give him 1,000 of our winnings on that drawing if he would do the same. The Loteria Nacional did *not* pay for our Mexican trip.

Wednesday, July 12, 1939

Patzcuaro, Mich.

Up at 7:30 AM to bathe and breakfast in time to take a drive to El Salto de Latzararacua, a small, though beautiful waterfall about six miles out of Uruapan. We took Rubin Diaz, the hotel guide, with us. Uruapan stands at the end of the hill country, and from it to the south the land just slopes off into the sea. It goes from an altitude of 5,500 feet above sea level to a hundred or so in the next 35 miles, and then stays tropical from then on. The Indians are industrious and clean, and lacquer seems to be the most promoted industry. Food is abundant in the wilds, and there are nearly no beggars.

At the top of the waterfall we changed to burros and horses and descended into a deep canyon. Patti observed that the accustomed lope of the burro here had the balance seat beat hollow for comfort and ease, and we both think it has its good points over the normal walk or trot. On our return we went into a most beautiful tropical garden that is a national park, and had to use great strength of character not to dive into a beautiful clear stream that traversed it.

The state of Michoacan is considered to be the most fertile area in the world. With irrigation they get three crops a year, and it is a fact that most of the fence posts do have green sprouts all over them. It is a standing joke there that if you stand in one place too long, you are in danger of growing roots. The marble statue of Morelos that stood in front of our hotel is reputed to need pruning once a month.

We got back to the hotel in time to meet the Lic.

Martinez Uribe at his office and be escorted by him to his home. There we were greeted by his wife who proudly showed us her collection of nearly a hundred dwarf cactus and flower plants. She plants them in pots about thimble size, and gets a miniature plant about two inches high, an exact replica of the larger ones growing in her patio. They fed us on avocados and French dressing, wine, cheese and Guacamole. We tried unsuccessfully to get them to accompany us to lunch at our hotel. Sra. Martinez played for us on her American piano, and we listened to some of his operatic victrola records. They brought in a niece of President Cardenas who played the Liebestraum and Claire de Lune for us. It was then time for us to catch the train, and with a bag of avocados they pressed on us, we ran through the rain to the Hotel, grabbed our few packages, and made the 2:00 PM train with 10 minutes to spare.

In all, Uruapan was very pleasant.

The ride on the train was quite clean and enjoyable, and also uneventful. We got off at Patzcuaro and walked about



Borda Gardens, Cuernavaca

a half mile to the place we had left the car, the new hotel by the name of the "Posada de Don Vasco." On our way up we had liked the looks of the place so much that we had decided to stay in it. We both found grand rooms, beautifully appointed, opening on a pleasant patio with brand new flower beds that Benito immediately found were great fun to dig in. We tried to discourage him, but it had a fatal attraction for him. The beautifully carved Spanish beds (with Simmons mattresses) were an equal attraction for me, and I had a nap before dinner.

Dinner meant some delicious fresh whitefish from the lake and Bud and I finished Patti's and Helen's with great delight. The next course was entrail stew, which, I must say, none of us could stomach. The management appeared not in the least nonplussed by our inability, and cheerfully substituted half of a baked chicken for each of us. This was the first time I've had to haul down my flag, and I hated so to do, but. . . .



Pyramid of the Sun, San Juan Teotihuacan

After dinner we walked around a bit, and it was plenty spooky. The hotel has its own lighting system, and at times it faltered from its ordained path or else just got tired of keeping all the lights bright. Shortly after I turned in, Patti had decided to sit up a bit and write letters in the quaint, old fashioned living room decorated in the 1890 style. It was a funny contrast to the rest of the building. She found the whole combination quite ghostly, and when the night watchman—a grizzled, wrinkled gnome, completely shrouded in a tremendous mantle of black serape, with an eerie gasoline lantern and a long shepherd's crook in his hand—passed by in the deep darkness outside the window, and the only noise was the scratching of her own pen . . . well, she really didn't want to write letters anyhow.

Thursday, July 13, 1939

Mexico City, D. F.

We left the Posada quite early and went to the Lake where for seven pesos we hired a long thin metal motor launch to take us to the island of Janitzio, about a half hour's trip away. It was fun to be out on the water again. Janitzio turned out to be a sugar loaf of an



Palace of Fine Arts, Mexico City

island rising abruptly out of the lake and crowned with a very modernistic, huge, hollow statue of Morelos. The town itself was quite without benefit of modern improvements, and the climb to the top was a honey. Inside the figure was a series of levels, each about 15 feet high, and the walls of each level were covered with muralled scenes from the life of Morelos. The muralist was still at work—he was inside the chest. The view from the statue of the lake and the many surrounding mountains was very beautiful, and in two directions storms were breaking. The ride back was splattered with rain drops.

Patzcuaro was the next port of call, and in a blinding rain storm we asked our way to the home and shop of Cucca Cerda, a former nun who now sells the handicraft of the people she used to visit. She had some beautiful wood carvings and bronze works, and a little lacquer, but our resources were so low that we came away empty-handed. We went to a federal museum there, and it was well worth the trip. Per usual, the entrance fee of 30 centavos was duly collected. The government took over a private home and made it into a model, artistic one filled with the best work of the people of that region, and arranged typically in the various rooms. Some wax figures from the time of Maximilian were very amusing.

We picked up our bags about one PM at the Posada and set out for Mexico City. After a wet, long journey, we reached the Montejo Hotel about 10:30 PM. It, along with nearly every other hotel or home or camp in the city, was full. After phoning around for about 45 minutes we were able to locate rooms at the Imperial Hotel, and wearily wended our way there. It was a marked contrast to the day we arrived in Mexico City, when we could have had any room we wanted in any hotel in the city.

The next day Bud located a fine place for us to stay—the Humboldt Mansion, the former residence of President Porfirio Diaz—at 45 Humboldt, with a private yard, flower bed, car parking space and 3 rooms and bath to ourselves. We took our guests to see our find, and then collapsed into bed. It was a long day.

Saturday, July 15, 1939

Mexico City, D. F.

This being our last day to shop in Mexico City, we got out and about quite early—shops open at nine or nine-thirty—and I left Patti to take a cab to the San Lazaro Railroad Station to try to retrieve our Tehuacan package. After great discussion and nearly as much red tape as the American system, I got my precious bundles, picked up a few more at Humberto's on the way back, dropped by the Montejo to pick up the bags, etc., we had left there, and finally deposited all the above at the Humboldt Mansion. This was the first time we had had all our stuff together since we had been in Mexico, and I was a little aghast at the amount of junk we had brought with us, and that which we had acquired here. It looked like a mean job of packing

to get it all in the car, and still be able to get in it myself. I hardly knew what to do with Patti—might have to ship her by express!

Sunday, July 16, 1939

Mexico, D. F.

After a good night's sleep in our suite at the Humboldt Mansion, we got up early and I took the car over to a garage and personally supervised a complete lubrication, checked the tires and switched one that looked a bit worn to the spare rack, changed the oil with the extra supply we brought with us, and generally got ready to pull out tomorrow. About noon I got back and found Patti nearly completely packed to leave, and we both set to get our loot classified and ready to move. We had planned to go to Xochimilco and have a picnic lunch in a boat, but a slight rain made us decide to have it in the apartment. With the assistance of the manager of the Mansion, Mr. Gonzalez, and his wife, we got a pot of tea and some bread, and with them as guests, sat down to another enjoyable commissary meal. The Sra. spoke no English at all, and as her husband was called away on business, I had a fine time trying to interpret for the crowd. She was charming and presented each of the girls with some carnations, and I learned more Spanish than I had in the past week.

Patti and I left the picnic to arrive late at the Bull Fight. We had the advantage of a cloudy day that was quite cool, and so got in on the "Sol" side for the immense sum of two pesos apiece. We looked in disdain at the very obvious blotch of Americanos in the "Sombra" side and recalled the Mexican saying that at 4:15 the Sombra was full, but at 5:15 you could play soccer in it. Patti mentioned as we got tossed around in the crowd of intense spectators, that the crowd hissed when Americanos left the shady side, but that if they left the sunny side, they threw things at them. After a little forceful line-breaking, we got two very excellent seats, and had the pleasure of having a group of intense fight fans right in front of us. Relax was a new word to them and they nearly worked as hard as the matador did, and much more vociferously. They were as much fun as the fight itself. We were both thrilled with the Latin idea of a thrill, and with the beauty of the art of getting as close to those quite vicious horns as one would dare, and then gracefully slipping aside. The fights were not too good, as a whole, but there were some very stirring moments. It started to sprinkle a bit during the fight, and Patti led a horde of fans over two barricades in rear of us as we clambered up into the boxes that were covered, and that formed the top of the ring. I was quite proud of the agility displayed by my Americana. After the fight we had a perfect view from the top deck of the crowd carrying the favorite from the ring, stopping traffic, and riotously depositing him in a taxi that pulled out with only nine men standing on the outside of the cab. On our way down we watched with interest as

they sold the already dressed carcasses that bring premium prices because of their fighting ability. I wondered at the chewing ability of the consumer, but then, I'm mostly Irish and we are used to mashed potatoes, slightly seasoned with whiskey. Oh these Latins!

Monday, July 17, 1939

Valles, San Luis Potosi

We planned to leave bright and early, but were dissuaded from so doing by reports that at this time of year the mist and clouds did not clear the mountain roads until at least 9:00 AM. After breakfasting on omelettes, toast, milk and tea, and packing the car to a gnat's eyelash with the overflow in Bud's Station Wagon, we got off at 10:00 AM. We had only a 295 mile journey ahead of us and were in no trouble to hurry.

We could hardly believe that we had been in Mexico City as short a time as the calendar showed, as we felt quite acclimated to it and in many respects hated to leave. There was a quite decided feeling of happiness at returning to the States, however, but it was in no way a reflection on Mexico. We think the States are sort of the best place in the world to live in and be from, although it is fun to poke around the rest of the world and see what they do to keep busy.

The road was comparatively crowded in both directions, and to us it seemed that Texas must be having a convention down here, but it apparently is the normal Texas way of spending a vacation. It's a newly acquired habit, however, as we spoke to a man who took the first Ford V-8 through in 1933 from Laredo to Mexico City overland under its own power. It took them 16 days, and instead of an 8,600 foot maximum elevation they had to climb in one place to 15,000. Mexico is now a vast network of new roads and others under construction, and we feel fortunate to have seen as much as we did before all of it is tourist ridden and spoiled.

Per usual, we pulled off the road into a grove of trees for picnic lunch, and the ice cold milk and ham sandwiches tasted swell. We got into Valles about 6:15 PM.

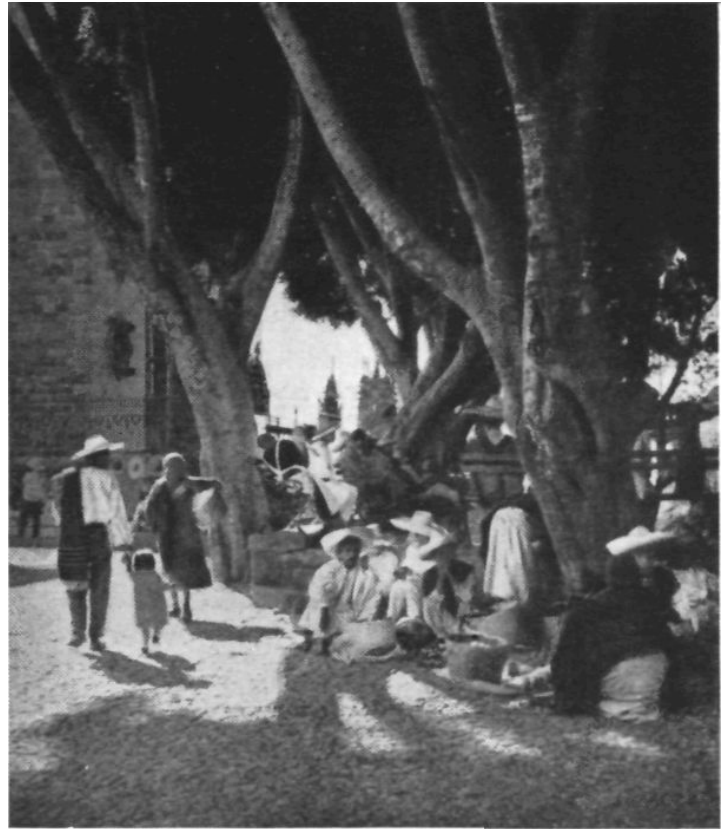
The Hotel Valles had no rooms left, except some nearly completed ones that are quite unique. Each really is one large room with the far wall divided into three stalls, all open to the center. The first is a most modern and new tile affair, the next a writing nook complete with desk and chair, and the last an excellent shower. I failed to appreciate the advantages of writing with such handy conveniences to the right and left of me, but then, maybe it's the Spanish way! "Quien sabe?" After all, we wanted only a good clean bed and bath, and this obviously had both.

Supper was again in the thatched roof dining room, and quite nice. Patti and I still have excellent appetites. That's the trouble with us.

Tuesday, July 18, 1939

Ft. McIntosh, Laredo, Texas

The night in Valles was a bitter reminder of the fact that we were no more at an altitude of seven or eight thousand feet. We got nearly no sleep as the heat and the oppressive humidity made us just endure the night, and get hardly any



Market Scene in Mexico

rest at all. Shades of Oklahoma! And memories of shivering in Mexico!

We were up at six and off at seven having gone back into town to fill up the ice-box. It was cool driving for the first three hours, but soon it was just plain hot. The ice-water in the box certainly came out of hiding and disuse in a hurry! We got in Monterrey about two-thirty and gassed and felt much better after a malted milk and a sandwich. Patti and I had tentatively planned to stay there for the night, but now saw no reason to delay and pushed on. At Sabinas Hidalgo, 65 miles from Monterrey, we blew the last of our Mexican money; the \$4.46 bought 6 cartons of Mexican wax matches that Patti wanted, and three covered baked clay casseroles that looked good to me to try to imitate Henri's onion soup in. I picked up some blank custom's forms, and while Patti drove, typed out our declaration. About a ½-mile out of Nuevo Laredo, Bud gave me the packages he had been carrying for us, and loaded to the gills we returned our credentials to the Mexican Inspectors, and rolled over the bridge into the hands of the U. S. Customs. They were most courteous, and when they saw our delicatessen in rear and the load we had, were immediately on our side. Our inspector turned out to be a former (World War) Field Artilleryman by the name of Mr. McNabb, and don't ever let anyone tell you that Irish or Scotch blood isn't a good thing to have. In very short order we were loose once again in the good old U. S. A.

Strictly ACCORDING TO THE BOOK



German 15-cm, howitzer loaded for rail transport

FORCING THE SOMME*

From the account of Major Reinicke, in *Artilleristische Rundschau*, April 1941.

This account has to do with the further experiences of the battalion of light artillery which, during the latter part of May, participated in the establishment of a bridgehead over the Somme, south of Peronne. An account of the latter action appeared in the July number of *THE FIELD ARTILLERY JOURNAL*. That account ended with the battalion assembled on the road on the night of May 25-26, just after having been relieved by another battalion in the positions south of Peronne.

As a matter of orientation, it may be recalled that the battalion in question was a divisional unit: the 3d Battalion of a regular divisional artillery regiment. As such, the battalion included three horse-drawn batteries of 105-mm.

*A sequel to the article "Baptism of Fire" in the July *FIELD ARTILLERY JOURNAL*.

howitzers (the 7th, 8th and 9th Batteries, respectively). In the divisional artillery regiment, there were two other battalions of light artillery (the 1st and 2d), and one mixed battalion of heavy (15-cm. howitzers and 105-mm. guns) artillery (the 4th).

Following its relief from the Peronne sector on the night of May 25-26, the division of which the 3d Artillery Battalion was a part was "reorganized," and moved to a sector near Ham-on-the-Somme, just to the east of the Peronne sector. In the new sector, the French still were holding the south bank of the Somme. The 3d Battalion took up positions just to the north of Sancourt (see map).

The situation in the new position was about as follows: Across the front of the sector flowed the Somme River, a small stream. Alongside the river, and just to the south of it, was the Somme Canal, somewhat more

of an obstacle. The Somme Canal was lined with poplar trees, spaced close together. These trees formed an effective screen for the well-prepared French positions on the far bank. Observation was possible only from houses very close to the river. The French positions were occupied by elite (Alpine) troops. French sharpshooters, occupying houses and trees, took a steady toll from the German observers and telephone operators. On the German side of the river, the terrain was gently rolling. Since the French artillery was "wide awake," and since it apparently had good observation from tall buildings on the far bank, it was necessary for the Germans to seek positions with good cover and concealment. Such positions were not to be found closer than about three miles from the river bank.

During the first 10 days in the new positions, losses were occasioned by the harassing fire of the French artillery. The French practice was to place fire on the exits of Ham and on the neighboring villages. This fire was in the form of scattered single rounds, interspersed with heavier concentrations. The CP of the 3d Battalion repeatedly was caught in the French harassing fire. The fact that casualties were low is ascribed to a combination of luck and the fact that the personnel of the CP always dug themselves in.

The attack over the Somme jumped off at 5:35 AM. June 5. On this day, the infantry in the sector west of Ham apparently made no effort to cross the river and canal; consequently, the operations of the 3d Battalion were not important enough to be recorded. East of Ham, crossings were made at several points, and shallow bridgeheads established. However, French machine-gun fire prevented any extensive advance. There is a note to the effect that such crossings as were made were the result of "well-directed artillery fire, which kept the enemy down"; and that "artillery lieutenants, operating as advanced observers, crossed with the assault infantry."

About 11:00 AM on June 6, the commander of the 3d Battalion received the following verbal order at the regimental CP:

"This division attacks this afternoon, on either side of Offoy, and forces a crossing of the Somme. Formation: Xth Infantry Regiment (until now in division reserve) in assault. 3d Artillery Battalion (and 4th Artillery Battalion) support the attack.

"Firing positions of 3d Battalion (north of Sancourt) remain unchanged; but, OP's will be established along the road Toulle-Matigny."

Reconnaissance of the situation resulted in decisions to locate installations as follows (see map):

Battalion CP, 200 yards south of the CR in Matigny.

OP 9th Battery, immediate vicinity of battalion CP.

OP 7th Battery, last house in Matigny, on road leading to Toulle.

OP 8th Battery, open field south of road, about one-half mile southeast of Matigny.

Under this plan, the various OP's were far (one to two miles) off the line of fire of the batteries. However, the unfavorable situation had to be accepted for several reasons: there was no time in which to bring the battery position over behind the OP's; there was little cover for positions behind the OP's; and many other batteries already were in position behind the OP's. Later, due to the character of the fire as delivered, it was found that this displacement of the OP's had no serious effects.

Visibility from the OP's was restricted, as it is everywhere along the Somme, by the poplar trees along the canal. In order to alleviate that situation, the batteries were ordered to send advanced observers farther forward. Meanwhile, the battalion liaison section established contact with the 2d Battalion of the Xth Infantry, in Offoy.

The day was extremely hot; and as a result, the laying of telephone wires from the battery CP's to the battery OP's was a difficult task. In order to expedite the work, motor vehicles of the battalion were made available for use in laying the wire and transporting the equipment and operators. This expedient proved a great help.

The battalion CP was established in an old trench of the World War, close to the ruins of houses which had been destroyed in that war. During the afternoon, the following order came in:

"Time of attack: 7:00 PM.

"Direction of attack for Xth Infantry: western edge of Offoy—Hill 70 (one half mile east of Hambleux)—Esmery-Hallon."

In addition to the order quoted above, the commander of the 3d Battalion received further verbal orders from the commander of the divisional artillery regiment. Using a 1:50,000 scale map (enlargement of 1:80,000 scale map), the latter outlined the fire plan. Since it was impossible to pick out individual enemy emplacements, the 3d Battalion was given several successive target-areas over an area about 100 yards wide, immediately adjacent to the far bank of the canal, about one-half mile southeast of Offoy (see map). The battalion was to prepare a rolling barrage over the area in question. On the right, the 4th (heavy howitzers and guns) Battalion was to support the attack. On the left, a smoke battery was to lay a smoke screen.

The fire schedule for the barrage was as follows:

- a. 7:00 PM to 7:05 PM: fire immediately beyond the Somme (Xth Infantry crosses at 7:00 PM).
- b. 7:05 PM to 7:10 PM: first displacement of fire, by 100 yards.
- c. 7:10 PM to 7:15 PM: second displacement of fire, by 100 yards.

Each battery was to fire from 12 to 30 rounds per each fire period. Rate of fire was to be increased at 7:05 PM and 7:10 PM.

Considerations of surprise precluded any fire for adjustment. Accordingly, all firing data had to be obtained from the 1:50,000 scale maps. There was no weather

report, and so the map data were used without correction of any kind. However, experience near Peronne had shown that there was little difference between map ranges and ranges determined by actual firing.

The ammunition situation was serious. The 8th and 9th Batteries had about 360 rounds each, but the 7th Battery had only about 78 rounds. It was to be expected that considerable firing would be necessary after the initial fire missions (described above) had been completed. Therefore, during the afternoon, every effort was to be made to replenish the ammunition supply. In line with this thought, the battalion adjutant was sent by motorcycle to expedite the travel of the divisional ammunition supply column from the railhead at Forreste (one and one-half miles northeast of Douilly) direct to the firing positions. It was possible to drive the trucks of the supply column up to the positions of the 7th and 8th Batteries. The 9th Battery was forced to send its (horse-drawn) wagons for its ammunition. The latter returned to the battery position about 7:30 PM.

At exactly 7:00 PM, all batteries of the 3d Battalion opened fire. There was some initial concern as to whether the firing data would be adequate. However, the first few bursts showed that there was no serious error. At the first displacement of fire, however, the bursts were observed falling too far to the right. This evidently was the result of the oblique angle between the axis of fire and the front. The battalion commander immediately ordered all batteries to shift their fire 100 yards to the left. This brought the centers of impact directly behind the bridge southwest of Offoy, where enemy resistance was assumed to be strongest. Within a short time, the battalion liaison section reported that the fire was falling satisfactorily.

Meanwhile, in the river valley, rifle and machine-gun fire had increased in volume. About 8:00 PM, the battalion liaison section reported that parts of the 2d (right) Infantry Battalion had succeeded in crossing the canal, but that there still was some fighting against individual sharpshooters in trees. Similar reports came in from the advanced observers of the batteries. About this time, an engineer company was given the mission of repairing the demolished bridge at Offoy.

By 9:00 PM, the following picture could be discerned. The combat situation was completely uncertain. There continued to be heavy small-arms fire through the Somme valley. There were still many enemy sharpshooters in the poplar trees along the canal, and therefore the engineers had not yet been able to get started on the bridge. The 1st (left) Infantry Battalion had not yet succeeded in crossing the canal, and was being held up by flanking fire from the village of Canizy. The latter village appeared to be held in strength.

Considering the facts outlined above, the commander of the 3d Battalion arrived at an estimate of the situation as follows:

"The enemy in the Somme valley opposite Offoy can consist only of individual sharpshooters in trees, who are putting up

scattered resistance. As parts of the right infantry battalion have crossed the canal, this sharpshooter resistance soon will be removed. Meanwhile, it is not possible for the artillery battalion to operate within range of the sharpshooters.

"It is imperative that my battalion bring up its batteries by echelon, in order that at least one or two batteries remain close to the advancing infantry. The flanking fire coming from Canizy makes it difficult for the batteries to move up along the northern bank of the river. However, the present positions of my batteries are too far to the rear, since they are about three miles back of the river. Therefore, it is necessary for me to bring up at least one battery at once, despite the unsettled situation on the left flank. Although this battery will remain inactive during the remainder of today, since darkness has set in, it will be on hand for the continuation of the attack in the morning."

In accordance with the estimate quoted above, the 7th Battery was ordered to move up into positions immediately north of Offoy. The commander of the 7th Battery drove up by automobile, to reconnoiter the new positions and to establish contact with the infantry battalion CP in Offoy. Meanwhile, darkness had fallen, and the firing in the valley had subsided.

At 10:01 PM, the commander of the 3d Battalion received the following verbal order from his regimental commander in the CP of the latter in Toulle:

"Division orders have attached your battalion to the Xth Infantry. Enemy resistance has weakened.

"The attack continues tomorrow morning, June 7, at 6:00 AM.

"Your battalion will have two batteries in position immediately north of the Somme river at dawn."

After receiving the above order, the commander of the 3d Battalion left immediately to report to the commander of the Xth Infantry. After some search, he found the latter, at 11:00 PM, in a farmhouse in the southwestern part of Toulle. The infantry commander advised the artillery commander as to the situation, and gave him the following orders:

"The 2d (right) Infantry Battalion has crossed the Somme Canal and has advanced several hundred yards beyond. In front of the 1st (left) Infantry Battalion, enemy resistance now has weakened. At the moment, there is a pause in the fighting.

"The regiment resumes the attack at 6:00 AM tomorrow, same formation.

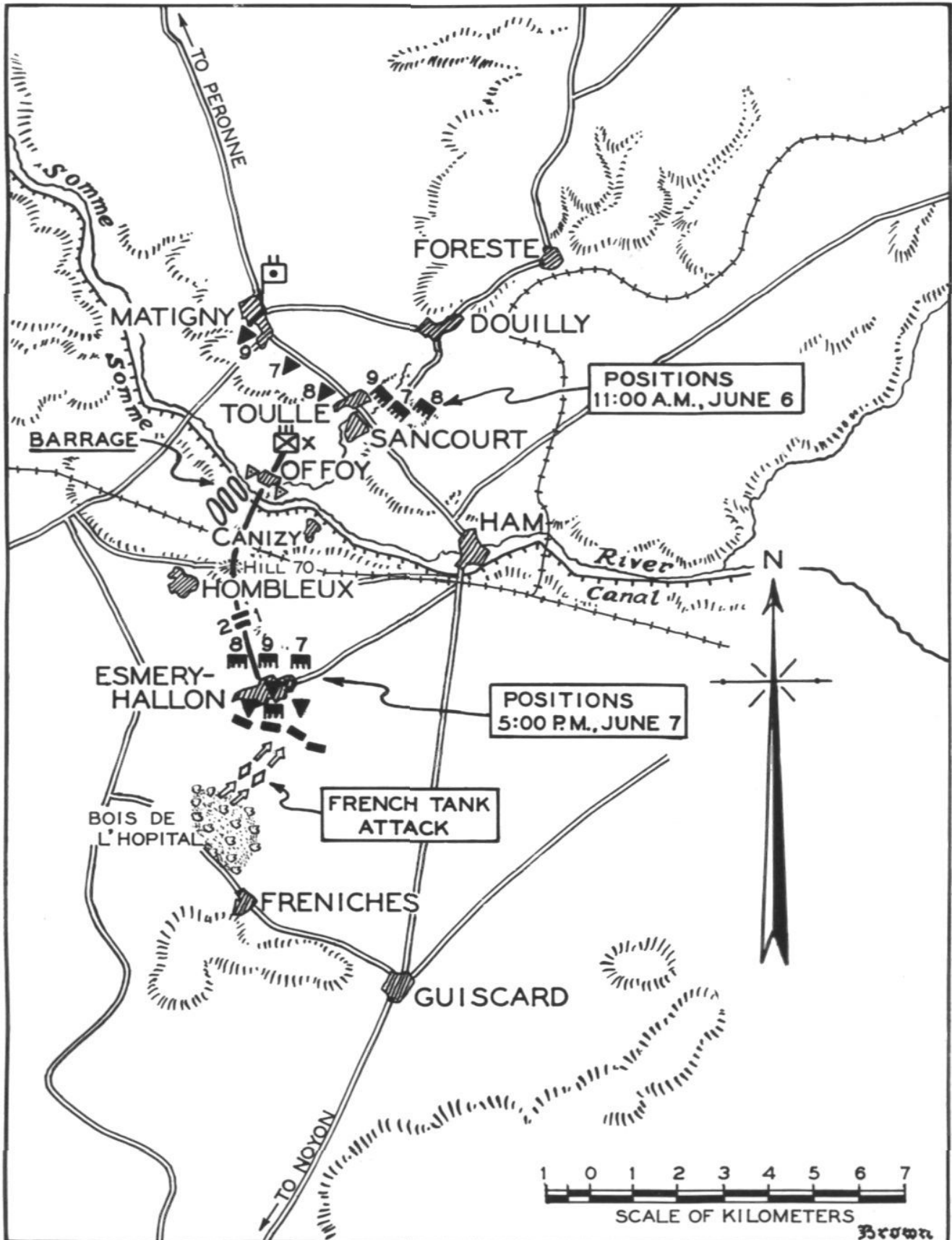
"First objective: Hill 70; second objective: Esmery-Hallon.

"Boundary between battalions: Hill 70—Church in Esmery-Hallon.

"Your battalion supports the attack by fire on Hill 70. In case the advance is rapid, you will be prepared to follow close behind the infantry. As soon as the bridge at Offoy is completed, you will cross your batteries to the far bank.

"I will be at the southwestern exit of Offoy tomorrow morning, and later at the railroad station one-half mile west of Offoy, on the far bank."

After receiving this order, the commander of the 3d Battalion decided to bring up the 8th Battery, as well as the 7th Battery, during the night. About midnight, he got into telephonic communication with the two battery



commanders, and explained to them the situation and the plan. The 7th Battery already had moved forward in compliance with orders already given. Similar orders now were given to the commander of the 8th Battery. The latter came forward at once by automobile, and in the star-lit night he and the battalion commander reconnoitered the new position. The 8th Battery began its move shortly after midnight. Both batteries were in the new positions, ready to fire, at dawn.

All battery commanders were ordered during the night to cross the Somme in the morning with the attacking units, and to report to the battalion commander at the railroad station, one-half mile west of Offoy.

Shortly after dawn on June 7, additional elements of the Xth Infantry crossed the Somme and the canal by means of pneumatic boats. Not a shot was fired by the enemy, who apparently had withdrawn.

The bridge at Offoy was completed at 8:00 AM. At that time, the 9th Battery (which apparently had remained in the position north of Sancourt) was ordered up. It crossed the bridge and went into position on the south bank. On the south bank there could be seen evidences of the French positions, and of the effects of the German fire. It was concluded that the fire, while accomplished entirely by map, had been fairly accurate.

Positions for the other batteries on the south bank now were reconnoitered, and soon those batteries (the 7th and 8th) crossed over the bridge. However, there was to be no immediate going into position. The infantry was advancing rapidly without resistance, toward Esmerly-Hallon. Contact with the infantry was reestablished. It was now a matter of pursuit!

The 7th and 8th Batteries crossed the bridge and advanced at the trot. The 9th Battery, which had taken up positions on the south bank, also moved out. The orders were simple:

"Keep marching. Pursuit. Direction: Esmerly-Hallon.

"7th Battery will establish liaison with 1st Infantry Battalion; 8th Battery with 2d Infantry Battalion. In case enemy resistance is encountered, act independently."

The leading infantry battalion (the 2d) reached Esmerly-Hallon, and from there prepared to continue the advance in a deployed formation. As the deployed battalion left the southern exits of the town, it was taken under enemy machine-gun fire, coming from the Bois de l'Hopital, one and one-half miles to the south. At this moment, the 8th Battery, following closely on the infantry, was proceeding through the town. The point of the battery's column was at the southern exit of the town, and the rear was at the northern exit. The 9th Battery was a short distance to the rear. At this time, the commander of the 8th Battery received the following message from the commander of the 2d Infantry Battalion:

"Enemy machine guns are firing from over there at the edge of Bois de L'Hopital. My companies are held up. The exact locations

of the enemy machine guns have not yet been determined. Take the edge of the woods under fire."

As this message was received, occasional enemy artillery shells were falling in the town. It was impossible for the vehicles of the 8th Battery to turn around in the narrow streets; therefore, the battery commander decided to have his first platoon go into open position at the southern exit of the town. The two guns of the platoon soon were in firing position. They took the edge of the woods under fire, first with percussion, and then with ricochet fire. The enemy machine-gun fire subsided.

Following the engagement just described, the 8th Battery was ordered to go into position north of Esmerly-Hallon. A battery OP was established at the southern exit of the town.

Meanwhile, about the time the two guns of the 8th Battery had gone into firing position, the commander of the 9th Battery had received the following order from his battalion commander:

"Establish OP in church steeple of Esmerly-Hallon. Take up firing position immediately north of the village, where your battery is now standing. Fire on north edge of Bois de l'Hopital."

The 9th Battery was in firing position about 10 minutes after having received this order. A telephone wire was laid immediately by motorcycle between the OP in the church steeple and the firing position. Shortly after the guns of the 8th Battery had opened fire, those of the 9th Battery followed suit.

While these things were happening, the 7th Battery also was ordered to go into position north of Esmerly-Hallon and to direct harassing fire on the village of Freniches, one-half mile south of the Bois de l'Hopital. It was believed that the enemy might have withdrawn into that village.

The CP's of the Xth Infantry and of the 3d Artillery Battalion both had been established in Esmerly-Hallon. There the infantry commander informed the artillery commander that he had been ordered to hold up any further advance for the present. A lull in the fighting followed.

At 5:00 PM, there was a flurry of excitement, occasioned by the cry: "Enemy tanks." From the north edge of the Bois de l'Hopital a few French tanks were advancing at wide intervals across the fields of grain. The tanks approached to within 400 yards of the infantry companies which were deployed south of Esmerly-Hallon, and opened fire with machine guns and cannon. The infantry suffered casualties.

By this time, the battery observers had spotted the tanks, and had sent down the order: "Enemy tanks. Open fire!" As the first rounds fell in the vicinity of the tanks, the latter turned around and headed back toward the woods. They drove in a zigzag pattern, with the artillery shells falling all around them. There were no direct hits.

After the affair of the tanks, there was another lull in the fighting. During the night, the 3d Battalion was "reorganized," and was given the mission of supporting

another infantry regiment in the advance on June 8 along the highway: Guiscard—Noyon.

EDITORIAL COMMENTS

1. The effects of the poplar trees along the far bank of the Somme on cutting down observation from the near bank are mentioned several times. Here is a case in which the effectiveness of the battalion's fire was seriously impaired by a terrain feature—the trees—which probably did not even appear on the map. This is an illustration of the fact that the detailed characteristics of a position can only be determined by reconnaissance on the ground. Incidentally, these same trees served the French well in another way: by providing cover and concealment for sharpshooter posts.

2. Prior to the attack on June 5, French artillery was "wide awake," and German casualties were kept low only because the personnel of batteries and CP's were *well dug in*. Blitzkrieg or not, when a situation becomes even semi-stabilized, recourse must be had to the spade and intrenching tool.

3. The use of "artillery lieutenants" as advanced observers, crossing with the first waves of assault infantry, is typical German practice. Great emphasis is placed not only on getting observers forward, but on getting the *most competent* observers forward. Notations such as the one concerning the "artillery lieutenants" appear again and again in the German accounts of action in France. For example, later in this very account, the commander of the 3d Artillery Battalion ordered his *battery commanders* to cross the river in the morning, with the attacking infantry, and to meet him at a point *on the far bank*.

4. The distribution of the divisional artillery for the attack is of interest. Apparently, one light battalion (the 3d) and the heavy battalion (the 4th) were in direct support of the assault regiment. The fire of the light howitzers was laid down the axis of the attack; that of the heavy howitzers and guns was to the right; that of a "smoke battery," to the left.

5. The displacement of the battery OP's far to the right of the axis of fire illustrates the best being made of a bad situation. It is clear that all fire from the near bank suffered through inadequate observation (this in sharp contrast to the situation of this battalion at Peronne); and the perfunctory assurances that later developments showed the fire to be "fairly accurate" may be taken with a grain of salt.

6. Again there is illustrated the German practice of laying telephone wires between battery CP's and battery OP's. Normally, it appears that the wire is laid by foot parties; but, in both instances described in the account, motor vehicles of the battalion were pressed into service and were "a great help" in the laying operation.

7. Most of the orders figuring in the account were *verbal* ones, given directly by one commander to his subordinate. There is no hint of any formal written order having been issued at any time.

8. The comments on maps are of especial interest. The battalion was operating on the standard French 1:80,000 scale maps, blown up to a scale of 1:50,000. Of course, the blowing-up process did not add any to the intrinsic accuracy of the maps. However, it appears that the maps were accurate enough—a fact further evidenced by this battalion's work on the same maps at Peronne.

9. In connection with the matter of maps, there is no hint of the battalion having had any assistance in the way of airplane photographs—this despite the fact that the positions near Ham had been occupied for at least 10 days before the attack got under way. It is a puzzling fact that airplane photographs seldom are mentioned in accounts of German artillery actions in France.

10. The energetic means taken by the battalion commander to insure the delivery of ammunition (sending his adjutant to escort the supply train) are noteworthy. Here, again, as at Peronne, we see the situation of the divisional ammunition column picking the ammunition up at the railhead and delivering it *direct* to the firing positions. In the one case where that was not feasible, we see the battery relying on its own horse-drawn wagons to deliver the goods. Incidentally, the railhead was within four miles of the firing positions.

11. An essential element in the German plan was that the artillery follow close behind the advancing infantry. This made it highly important that the bridge at Offoy be put in service as quickly as possible. Apparently, no ponton equipage was allotted to this sector; but, the enemy was still putting up lively resistance on the far bank when the company of engineers was ordered to get busy on repair of the Offoy bridge. Incidentally, events soon demonstrated that no matter how tough the German engineers might be, there could be no actual working on the bridge until the French small-arms fire covering it was silenced.

12. By nightfall of June 6, it was apparent that the enemy resistance was weakening and that the attack probably would go forward rapidly on the next day. The reaction of the artillery battalion commander to this estimate was to get his batteries up close to the river, ready to cross over as soon as the bridge was completed.

13. The division commander's reaction to the situation as of nightfall of June 6 was to *attach* the 3d Artillery Battalion to the assault infantry regiment.

14. The situation actually developed about as had been estimated on the night of the 6th. The actions of the artillery battalion commander in putting into effect his estimate are of interest. During the night he brought forward two of his three batteries (reconnoitering positions in the dark), leaving the one back, but apparently ready to move at a moment's notice. As soon as the bridge was completed (8:00 AM, June 8), the battery which had been left back was rushed forward, crossed the bridge and went into position on the far bank. As soon as the one battery was in the new position, the other

two moved across the bridge. By this time, the advance had turned into a pursuit, and all batteries moved forward, "at the trot."

15. How close the artillery kept behind the advancing infantry is indicated by the action near Esmery-Hallon. There, the infantry had deployed at the southern edge of the town, and as they advanced in deployed formation, they were fired upon. At this moment, the point of the leading battery was itself at the southern edge of the town. The distance between artillery and infantry must have been a matter of only a few hundred yards.

16. The prompt action of the one battery commander in going into "open" position at the edge of the town when he could not get the battery turned around is noteworthy. Also noteworthy is the fact that the battalion commander, wishing no doubt to cover his exposed guns, immediately ordered the other batteries into position north of the town. Incidentally, it took the 9th Battery 10 minutes to get off its first shell after having received the battalion commander's order.

17. One of the striking lessons of this account is contained in the orders of the artillery battalion commander to his battery commanders as the pursuit towards Esmery-Hallon got under way. These orders provided that, in case of enemy resistance, the batteries were *to act independently*. Here we see illustrated the German command principle of *decentralization*.

18. After having reached the objective of Esmery-Hallon, the 3d Artillery Battalion was peremptorily removed from support of the Xth Infantry, and was assigned to support of another of the division's regiments. Here we see illustrated the manner in which the Germans make re-distributions and re-assignments boldly to meet any new situation.

19. The German chronicler takes pleasure in recounting how quickly the fire of the batteries put the French tanks to flight. However, he admits that the chances of scoring *direct hits* under such circumstances (indirect fire) are very small.

20. Note that rolling barrages are still used.

Action of the Artillery in Forest Areas

[From Russian Artillery Regulations]

The action of the artillery in forest areas is characterized by the following:

- a. Concealment of dispositions and movements;
- b. Difficulty of control, maintenance of communication and cooperation with the infantry.

The particular employment of the artillery will depend on the extent and nature of the forest areas, on the availability and condition of roads, clearings and glades.

As a rule, large-scale artillery employment is impracticable; there can be no centralized control. Difficulty of orientation demands, of the artillery,

maintenance of the closest contact with the infantry, especially with advance units.

The action of the artillery should be based on the employment of individual guns of gun batteries of the divisional and regimental artillery for longitudinal fire, and flanking of clearings, glades and edges of woods.

Shell fire is used, shrapnel being employed only for adjustment purposes.

Artillery positions should be selected at the edge of clearings in glades and in sparsely wooded areas, when necessary, cutting away obstructing trees or branches. Restricted observation necessitates the organization of a system of observation posts supplementing one another.

Russian Antitank Doctrine

[Extracted from "Artillery Regulations for the Red Army," Vol. II]

The artillery constitutes the basic means for employment in fire action against tanks.

In conjunction with the field fortification development of the area and natural barriers the artillery fire forms the system of antitank defense.

The organization of the antitank defense is the responsibility of the commander of the larger unit.

Action of the artillery against tanks is conducted throughout the battle.

Before the main line of resistance the artillery conducts its action by means of:

- a. Long-range fire;
 - b. Concentrations against the dispositions of hostile tanks;
 - c. Antitank and fixed barrage fire.
- On the main line of resistance and within the defensive zone:
- a. The fire of special antitank guns;
 - b. The fire of the entire artillery from basic and antitank positions.

Point-blank fire of antitank weapons is the most effective means of action against tanks and constitutes the basis of antitank defense. Aside from this, the entire artillery of the defense position must be prepared to repel tank attacks.



"Psst! General — you're out of step!"

The Professional Soldier and Criticism

Of all the professions, the one of arms is the least open to criticism from within. While this tendency varies from extremes of iron clad conservatism, to periods of open-mindedness, and the acceptance of many changes, still there is that adamant wall of law, regulation, and custom that forbids criticism, especially when it comes to the publication of such ideas.

Basically, there is a sound reason behind this. Any army must be trained along certain lines of doctrine, and the teachings and means of execution of same. Public argument to the contrary tends to weaken the command, and might weaken discipline. While this prevents individuals and groups from making their criticisms public, or at least public outside the confines of an army, too often it leads to "private gripe fests" that in a great number of cases cause no evil results. But, it tends to lend to the professional soldier that air of "so what?"

It is this last named attitude that sometimes causes civilians, volunteer and drafted soldiers to have that feeling that "the regulars are certainly hidebound." This results in that type of unfavorable publicity with which we are so familiar that followed the period of the World War.

In a discussion of this kind, it is well to mention the various types or subjects upon which an army may be criticized.

1. *Customs and regulations.* An example is the case of voluminous paper work.

2. *Tactics.* Some of the critical points of the past might be why was antiaircraft defense allowed to lapse for so

many years after the World War, and why did we do away with our Mechanized Force years ago?

3. *Arms.* The ancient case of the Lewis Machine Gun and the Disappearing Gun. "Case," the singular, is mentioned inasmuch as legend somewhat connects the two incidents.

4. *Uniforms, rations, and living conditions.* As an example, we are still trying to standardize a sub-zero, cold-weather field uniform.

5. *Politics, appropriations, and foreign policy.* Obviously, this will be the most taboo subject of all, and rightfully so as far as the US soldier is concerned. Nevertheless, this affects army "jobs" to the utmost. Still, this category is mentioned, and should be, as it comprises one of the group topics subject to criticism.

6. *Reputations.* Undoubtedly, this is most harmful. Particularly if it is indulged in during actual campaigns. Naturally, the field of historical studies and criticisms are valuable. But, nothing is gained by such an argument as that which followed the Spanish-American War as to "who won the naval engagement of Santiago?"

7. *Maneuvers and present day training.* To obviate great personal animosities, and the dangers thereof, this is also a touchy subject as far as maneuvers are concerned. The War Department stresses the point that maneuvers are for field training and are not to be competitive in the sense of "what side can win, and who did?" At the same time, the WD wants the feeling of competition and aggressiveness to be instilled in all units and troops. The reasons for this are obvious. Only, if

By Major Burgo D. Gill, 61st CA(AAA)

General "A" was inept, and mishandled his command, why not publish the reasons for same?

The other part of this type is training. In some posts too much stress is still laid upon parade-ground inspections, drills, parades, and the presentation of troops in spite of the fact that everyone agrees that this is the small side of present-day training.

A great historical example of how public criticism is denied soldiers and is punishable is the case of a high ranking British officer during World War I who was relieved of his command for causing the extreme shortage of artillery ammunition to be published. While this action awakened the British, it harmed this officer professionally.

Naturally, it should follow that a critic should have a real suggestion, or be able to offer ideas on how to better the conditions he attacks. Many articles in the semi-official publications by army officers do not carry their critical articles forward to a complete conclusion. In many cases, one feels the hand of regulations stifling them. True, one finds attacks on our past blindness, such as the criticism of the continuance of the "square" divisions for so many years, and the wiping out of our original and experimental mechanized force at Camp Eustis some years ago. However, these facts have been recognized by the army, and changes are rapidly being pushed to counteract them.

The above is the first proposal that this writer has to offer in a change of the present system of forbidding officers to criticize publicly. One should have a suggestion for improvement to offer; or at least honestly try to prove that he has.

Continuing these suggestions for the betterment of present conditions, could there not be a more widespread dissemination of the methods whereby officers and soldiers can offer what they think are good ideas? Each branch has its own "board" to pass on inventions, new arms, etc., but this fact is little known. At the same time, these boards deal more with "inventions of materiel, and improvements of same," than they do with basic military ideas on tactics, organization, and kindred subjects.

This government protects a military inventor by taking out patents for him in his name. However, he receives no monetary reward from the U. S. A. If these inventions are sold to other governments, or private firms, he does receive royalties. To cite two cases. One officer invented a searchlight gadget; it was accepted and made an article of issue. However, the government did not reward him monetarily. He did make a few dollars when a private firm manufactured the item and sold it abroad. Another instance, a sergeant invented an excellent submarine mine-control system. He did not receive a cent, or promotion in recognition before he died. An effort was made to pension his widow, but this writer cannot say if this was passed by Congress.

In other words, a definite system of rewards should be established and made known, not only for material inventions, but for the abstruse ideas on administration, tactics, organization, and so forth.

A further suggestion is to open wide the channels for criticism and new ideas. Something of this nature has been done for years by private corporations.

In this present time of mobilization, which is about the same as what happened during the World War, the U. S. A. has set up a national board to pass on inventions and ideas. This should be continued even during the long years of peace.

Furthermore, why not deliberately choose a board of brilliant, advanced thinking, open-minded officers as an "army board" over the present branch boards? The ancient Chinese had an excellent branch of their own government known as the "Censors." Their function was something like our own Inspector General's department *plus* the fact that they could investigate and try to correct any evil or fault that did not fall within the narrow sphere of an ordinary inspector.

It would also greatly help, it is believed, if a magazine for the army as a whole with the editorial policy of "criticism, new ideas, and advancement" were established. If this were done, those with advanced ideas, as well as mere writers, could open themselves up more freely than can be done in the various military magazines or civilian publications.



Gunnery during the Dark Ages

Artillery Observation

By Lt. Hans Revermann,
Member of a German short-range
Reconnaissance Squadron

(From *Voelkischer Beobachter*)

It is Sunday, June 9, 1940. A week ago, after participating in the fight in Belgium and Artois, our short-range reconnaissance squadron was transferred to the southern front. East of Laon we prepared our field airport. A small cornfield served as landing field. A wood was our camp.

Already on June 5th, the entire front of Chemin des Dames up to the Channel coast was in position for the attack. In our sector the French still held their defensive position which they had built along the Oise-Aisne-Canal and the Aisne during the past 14 days. They gave our divisions which were being employed in battle for the first time a great deal of bother. Again and again the enemy fired, with his strong artillery, on the roads and assembly areas of our troops along the Chemin des Dames, thus causing many casualties among the German troops. Our artillery was at least equally strong, but the French batteries were invisible to our ground observation. Utilizing the possibility of the many side-valleys on the Aisne and the numerous small woods, they were well camouflaged and by firing from concealed positions they caused much trouble to our attacking regiments, without being discovered by the observation posts of our artillery and by our sound-ranging and flash-spotting sections.

During these days, therefore, one of the main tasks of our reconnaissance squadron was to locate hostile battery positions and direct the fire of our heavy artillery on these targets. During the first three days our squadron had reconnoitered about 90 enemy batteries in our 12 km zone of action, ranging our artillery on about 30 of these targets. By these means many French batteries were eliminated or at least damaged; our Stukas did the rest by attacking the targets we had previously located. But from their numerous alternate positions the French batteries repeatedly gave our infantry great trouble.

During the early morning hours of this day I was employed as artillery observer. According to instructions our Henschel 126 rose at 5 o'clock from our "spring board," as the runway of the landing ground was called, because by a little transverse furrow our machines were lifted as by a spring board. We left the steeples of the beautiful cathedral on the rock of Laon below us and after 10 minutes we reached the front. As in the dawn of the days before, artillery fire was



German long-range camera, used for observing artillery fire and making photos of distant target areas. Has taken clear photos at ranges up to 45 kilometers.

flashing on both sides of the front; a wild hell. Pay attention! In this hour of dawn, when flashes can be observed particularly distinctly, seven enemy batteries

were located, plotted on the observer's map and their positions quickly broadcast to our artillery which was waiting for counterbattery employment. One after another, these targets were ranged by our observation. Everything went according to schedule.

Individual shots of light antiaircraft fire could disturb our work in the Henschel. We soon recognized the effective range of the antiaircraft artillery, as it was firing too short; now we were flying on another route. Air fighters usually are more dangerous. The day before one of our crews was severely injured by hostile fighters during an artillery mission. Therefore: Attention! My pilot surveys the aerial space like a hunting dog. If a target is ranged and effective counterbattery fire has been started—of which he will be aware by overhearing the radio conversation of the observer with the firing artillery—only then may he look at the effect of our work. When an enemy battery is covered by the fire coordinated by us, "Emil" and "Franz" nod at each other; their faces are smiling since they are happy over our successful employment.

After two hours of flight we have silenced four enemy batteries, when a call from the battery which is cooperating with us interrupts our activity: "Attention! Attention! Heaviest flat-trajectory fire from the direction of Fismes. Please observe the railway lines there. Probably it is railway artillery." Life comes into our machine. We know that for two days, especially during the night, this heavy artillery has been troubling our ground troops but has not yet been located. Now as the morning is getting bright we must find it. I watch eagerly. Nothing! We fly over all railways. Nothing! The French artilleryman says: Do not fire if a Henschel is over you for then you will be discovered and fired upon. And we must admit that the French are masters of camouflage; their positions are very difficult to discover if they do not fire. Therefore we must employ a trick. We leave the front over which we have been flying for about two hours, and act as if we are a departing machine. But I watch the territory in the rear around Fismes. And what do I discover? Two extraordinary great flashes, one quickly after another. We make a sharp turn and fly towards the spot where they were observed. As I approach to within some kilometers of the point, the flashes are repeated. Now I have you! Quickly I plot the accurate position of the French battery in the map. I report to our artillery: "I have discovered two heavy guns, probably railway guns." Then my pilot reports that the duration of our mission is nearly finished. To our great disappointment we must return home. Another radio message to our artillery: "Wait! We will be back in half an hour." They will anxiously await our return.

After landing on the field airport we at once prepare for the next take-off. Our photographic service gives me an aerial photo of Fismes which we had reconnoitered some days before. I study the terrain in which I had discovered the guns; I am astonished to note that from the great

railway line near Fismes a line leads to the newly discovered positions. It is scarcely to be discerned: A spur track which is camouflaged very carefully. We must hurry before the guns are moved. After a cup of coffee as Sunday's breakfast we hurry to the field. The attendant reports that the Henschel is ready to start; he adds, "You have had luck, Lieutenant, 15 small splinters hit the machine." We, the pilot and the observer, had not noticed these hits. Now as we learn about them, they cannot frighten us. On the contrary. We fasten our belts, open the throttle and soon are over Laon again.

Our rest lasted only for a quarter of an hour. We approach the enemy position, watching to see if the guns are firing again. I already discern the flash, and note the position accurately on the map. I proudly report to the artillery below: "Two railway guns are discovered," and mechanically the ranging begins. After three shots the fire is properly directed. Now "my battery" is firing as fast as the guns can be served. "How many groups have they shot?" 30, 50 or 100? I do not know that, but I know that the fire is all right and that these enemy guns will fire no more.

I try to discover some more targets for our artillery. It is daytime now. I can only report: "Artillery silenced." By wireless I receive two more missions from the squadron: (1) Surveillance of the roads which lead through our sector of attack; and (2) to fix our own front line. So we fly over the roads. But we discover nothing. The French are very cautious in making their movements.

Now we have to fix the front line. At an altitude of 50 meters we fly over our infantrymen, firing light signals. White panels are laid out on the ground below us. I discover them in the terrain; they indicate to me and my command the points of attack. Our comrades on the ground wave their handkerchiefs and steel helmets to us. In a trench we discover a number of soldiers who are receiving heavy machine-gun fire from the edge of a wood. We are flying along the edge of the wood: I fire with my M.G. upon the enemy positions. "I can do the same as you," my pilot is thinking; he approaches to the edge of the wood in order to fire with his fixed gun upon the positions. Now it is becoming dangerous. When we fly over the wood at a low altitude we are fired upon by several machine guns. My pilot receives a hit in his left arm. We will fly home at once. Quickly I bandage his arm and call our doctor to the landing field. Again we are over Laon. "Emil" can scarcely move his arm. So we make the landing together: He handles the stick and I handle the throttle.

Again we are with the squadron. Proudly we report our success to the commander. The arm of my pilot is dressed; it will take some weeks before he has completely recovered. But that does not matter. We have assisted the High Command of the Army and the troops on the ground. We have helped to carry the advance over the Aisne, we, the unknown scouts of the army.

PROBLEMS IN GUNNERY

EXAMPLE 7 BRACKET, SMALL *T*

Target: Infantry assembling in vicinity of group of trees. Mission: Neutralization, Materiel: 75-mm. gun. Ammunition: HE shell, quick fuze.

$$T = 270; r/R = 0.7; s = 9.$$

Initial commands: BRD 80, Cv 3500, On No 1 Op 9, Si 295, Sh Mk I, FQ,



Comman ds	Results	Sensings		Remarks
		Rn.	Df.	
Br, 3300		+	+	With only two bursts, the location of the burst center is not known. 400-yard initial bound.
		Lost		
		Lost		
R 40, 2900		1. ?		Because of high observation post it is possible to sense the rounds as close (possibly 50 yds.). Left 10 (15 × 0.7) to center bursts on OT line, then left 5 to center them on GT line.
		2. -		
		3. -		
		4. -		
L 15, B 1 Rd, 2950		Correct	App- rox. correct	
3000		+	App- rox. correct	Command for this volley is given as soon as the first volley is on the way.

Good bracket is 2850—3050.

EXAMPLE 8 BRACKET, SMALL *T*

Target: Infantry mortars in vicinity of trees in saddle of a ridge. Mission: Neutralization. Materiel: 105-mm. howitzer. Ammunition: HE shell, quick fuze.

$$T = 200; r/R = 0.5; s = 5; c = 10.$$

Initial commands: B Adj, BDL 210, Cv 4000, On No 1 Op 8, Sh MI, Ch 4, FQ, No 2 1 Rd,



Comma nds	Results	Sensings		Remarks
		Rn.	Df.	
Q, 310		Lost	+	Adjustment begun with one round to conserve ammunition. Considering terrain, burst is believed to be lost over. 4-c bound is made.
270		?		40 × 0.5 = 20.
R 20, 270		—		
R 10, BL, 290		4. ? 3.	+ 2.	Burst of No. 4 would be over except for hill.
		Lost +	1. ?	
L 5, B 1 Rd, 270		—	Appr- ox. correct	Personnel are seen moving forward and a volley is immediately placed at the short limit of the bracket.
280		Correct	Appr- ox. correct	After seeing this second volley, there should be sufficient information for changing bracket to conform to any visible movement of the target.

JUNIOR OFFICER'S PRAYER TO SANTA BARBARA



(With apologies to my Gunnery and English Instructors—oh yes, and Ogden Nash)

Barbara, sancta; hearken to my prayer—of course, I know you have plenty on your mind
These days what with all the gunnery going on abroad: but gosh, you were always very kind
They say, in days of yore, and now we need you even more, what with antitank work and aerial observation and 155-mm. rifles;
Saint Barbara, them ain't no trifles!
Keep me, oh patron saint, from all things junior officers do that they shouldn't do
And whenever I don't do something that I should do it would be nice if you could have some small elf holler at me like this—"yoo-hoo"
And please keep me from figuring my initial data so far off it isn't even funny
So that the burst sounds far away somewhere and I weakly holler "Lost" and the instructor looks like he has a bad case of frost. No, please, Saint Barbara, let my very first round be right on the money—
And when it comes to figuring bounds and shifts and drifts and all that; let me be a mental giant and know right away whether I go right or left or up or down or one-s or two-s's.
And not drool around like a lot of molasses.

Gosh, Saint Barbara, please keep me straight on small-T and large-T and K and VE transfers and all the rest of it.
And if it's got to be gunnery or me let it be me and not gunnery that gets the best of it,
And horrors of horrors and heap not coals of fire on my brow and when it comes to my book of firing tables, be sure I pack it;
But whatever you do, Saint Barbara, don't EVER EVER EVER let me jump my bracket:
If you will do those things for us junior officers, while our pay does not permit gifts of diamond and ruby and topaz,
We will surely be eternally grateful if you will deliver us from these faux pas.

—LT. N. M. G. LOCKSLEY



Battery executive laying battery with an aiming circle. Guns are under cover in woods. Photo by "Life."

Tests for Battery Executives

EDITOR'S NOTE: *Gunners' examinations are designed to help train smooth-working gun crews. The 5th Division Artillery has gone a step farther, and drawn up a series of tests for Executives. The publication of these may be helpful to other units.*

1. General.

a. Each battalion commander of the 5th Division Artillery will conduct tests for executives of firing batteries of his battalion. Inter-battalion competitions will not be conducted at this time.

b. Five sets of tests are prescribed; they may be conducted concurrently, with three batteries in position, or successively. In any case, each officer takes any particular test with the same battery as all other officers and with starting conditions as nearly identical as possible.

c. Until an officer is called for the test, he will be kept out of sight and hearing of the battery.

d. Officers being tested will be rated on time and accuracy. Inaccuracies or defects will be given a value in seconds and will be added to the time. The resulting total will determine the rating given to the tested officer.

2. Test No. 1.

a. *Conditions.*—Battery in position with guns staggered. Guns pointing in general direction of fire. No gun laid on the compass to be used in the test. Gun positions and initial direction to be staked or otherwise marked so that guns can

be relaid after each officer has completed the test, making the starting conditions identical. The executive's aiming circle, set up and leveled, to be in the same spot for test of each officer; the test of each officer to start with scales set at zero, with line of sighting in the same direction as for all other officers tested, and with the locked needle coinciding with the zero of the scale. Each chief of section will determine and record the minimum elevation for his piece.

b. *The test.*

(1) The command, "Compass (so much)," will be given and the officer tested will be required to lay his instrument on the compass direction ordered and then to lay the battery. Time will be taken from the time the command is given to the time that the officer tested completes the command, "Aiming Point, aiming stakes (or other aiming point). Refer, record base deflection." The laying of the aiming circle on the prescribed compass and the laying of the guns will be checked. For full credit, laying must be accurate within one mil.

(2) The command, "Compute the minimum elevation" will be given. The officer tested will then compute the minimum elevation. The testing officer will announce to each tested officer the same piece-mask range, the information that the mask is occupied by friendly troops and the fact that each chief of section has measured the minimum elevation for his piece. Time will be taken from the time the command is given until the

tested officer completes the report, "Minimum elevation (so much)." For full credit, the announced elevation must be within two mils of that determined and checked by the testing officer.

3. *Test No. 2.*

a. *Conditions.*—Similar to those given for Test No. 1. The aiming circle will be set up on a well-defined orienting line and will remain in the same spot for all tests; the test of each officer to start with the scale set at zero and with the line of sighting in the same direction as for all other officers tested.

b. *The test.*

(1) The command, "Base angle (so much)," will be given. The test will proceed as indicated in sub-paragraph 2b (1), above.

(2) The command, "Measure the adjusted compass," will be given. The officer tested will perform the necessary operations. Time will be taken from the time the command is given to the time the tested officer completes the report, "Adjusted compass (so much)." For full credit, the adjusted compass must be accurate within one mil.

4. *Test No. 3.*

a. *Conditions.*—Battery in staggered formation. Guns pointing in general direction of fire. No gun laid on the proper deflection. Gun positions and initial direction to be staked as before. A suitable distant aiming point visible to all pieces to be designated; the line of AP-gun to form with the general front of the battery an angle of from 400 to 1,000 mils. The officer to be tested to be acquainted with the problem and to be allowed a maximum of ten minutes for pacing off the required distances and making of convergence table. The testing officer will give the tested officer the distance to the aiming point.

b. *The test.*—The command, "Aiming point (such and such), Deflection (so much), Converge at (such and such), on No. 1, open (so much)," will be given. The officer tested will then go through the operations to lay the battery with the announced data. Time will be taken from the time the command, "Deflection (so much)," is completed to the time that the tested officer announces,

"Battery laid." For full credit, laying must be accurate within 5 mils.

5. *Test No. 4.*—Battery in staggered formation. Executive at post. Written commands for two battery salvos, prepared in advance, are given to executive. Written commands for same two battery salvos are given to chiefs of section, but containing divergences either in deflection or in range (but not for both deflection and range on a single gun) sufficient to cause an obvious appearance of error in laying, in the case of from one to three guns in each salvo. Executive, informed in advance that errors will prevail, is required to give prepared commands and without moving from his post to indicate, for each salvo, within 10 seconds after guns are laid by data given chiefs of section, the guns erroneously laid and whether in deflection or range. Deficiencies will be rated in seconds and will be added to the times of Tests Nos. 1-3, inclusive.

NOTE: The written commands given to the chiefs of section should require traversing and laying for elevation in the same sense as is required by fire command of executive, but different in amount. Likewise the chief of section should give preliminary practice to his gunner and No. 1 in executing the fire commands of chief of section. The object is to prevent over-easy detection of error by the executive.

6. *Test No. 5.*—Battery as in Test No. 4. Executive at Post. Written commands are prepared appropriate for four battery salvos and containing rather extensive changes of data. Battery executive is required to deliver these commands successively to observers about 40 yards distant. Observers judge work of executive from point of view of (1) distinctness of pronunciation, (2) use of appropriate artillery terminology, (3) loudness of tone, and (4) rapidity of diction, suitable to state of training of his battery in fire discipline. Deficiencies will be rated in seconds and will be added to the times of Tests Nos. 1-3, inclusive.

By command of Brigadier General PARKER:

ALLEN L. KEYES,
Major, FA. S-3.

Extended Order

German artillery regulations prescribe a standard extended order which batteries on the march assume when threatened by air attack. This increased distance, which is taken upon signal, may be in width or depth, or both. The interval between vehicles is usually at least 100 meters, but may be varied.

Antitank Fire for Medium Artillery

German medium artillery (15-cm. howitzers and 10.5-cm. guns) is trained to employ direct fire when threatened by mechanized attack, the same as is light artillery. German howitzers have such long tubes that with the higher charges they are effective against armored vehicles. German sighting equipment is identical on all medium and light artillery.

FROM



THE CHIEF'S OFFICE

NOTES ON NEW GUNNERY METHODS

Pending inclusion in the revision of FM 6-40, Firing, parts of the new FA Book 161—Gunnery are being printed at the Field Artillery School and distributed to Field Artillery organizations.

The pamphlets being distributed are:

G-6—Determination and correction of Map Data.

G-10—The Firing Battery; Ballistics, Effects of Projectiles, and Dispersion.

G-11—Observed Fires.

G-12—Massed Fires.

G-6 was distributed during the latter part of June and G-10 is in the process of being printed. G-11 and G-12 will be printed and distributed in the near future.

Experimentation in methods of massing fires, simplification of transfers of fire and use of metro data and VE, use of C instead of F in precision fire for light and medium calibers, and change in sequence of commands has been conducted at the school for some time. These new methods have proven superior to the old, have the approval of the Chief of Field Artillery, are being taught to current classes at the school, and will be contained in the revision of FM 6-40, Firing. All are simplifications and result in more speed in bringing fire upon targets without loss of the desired degree of accuracy.

The revision, printing, and distribution of FM 6-40 will not be completed for some months. For this reason, the War Department has authorized the printing and distribution of these pamphlets in order that instruction and procedure in gunnery in organizations will be in step with that at the Field Artillery School.

The most important changes announced in G-6 and G-10 are:

a. Sequence of Commands.—The new sequence of commands is

- (1) Special methods of adjustment and particular missions.
- (2) Projectile
- (3) Charge
- (4) Fuze. For time fire: corrector, corrector and time, or corrector and fuze range.
- (5) Direction
- (6) Distribution
- (7) Site
- (8) Pieces to fire
- (9) Method of fire
- (10) Zone, if prescribed.

(11) Use of quadrant or elevation scale.

(12) Elevation or range

The change in sequence was made to expedite the prompt opening of fire. Early designation of the ammunition will allow the ammunition to be prepared while the remainder of the commands are being transmitted.

b. Executive handling sheaf for convergence.—This procedure has been omitted. Computations and procedure for obtaining a uniform sheaf have proven unwarranted. The beaten zone of a uniform sheaf is not materially different from the beaten zone of a sheaf that is non-uniform because of staggering. The executive lays the battery parallel initially and when he is ordered to record base deflection he reports the front of the battery in yards to the battery commander immediately upon occupying position, and this information enables the officer conducting fire to form a sheaf of proper width by a command for deflection difference.

c. Volley fire sweeping.—This method of fire has been eliminated. If the target front is wider than the sheaf used for fire for effect, the target may be covered by the fire of more than one battery. When the fire of only one battery is available, the target is covered by shifting the whole sheaf, which is much simpler than volley fire sweeping and is equally effective.

d. Zone Fire.—When the elevation scale or gunner's quadrant is to be used, the command is ZONE, (SO MANY) MILS. It is followed by ELEVATION (QUADRANT) and the elevation for the *center* of the zone only. The executive has the designated pieces fire at five elevations, in the sequence: the center elevation; the elevations differing from the center elevation by the announced number of mils; and the elevations (to the nearest mil) midway between the center elevation and the other two. For example, if the command is ZONE, 10 MILS, QUADRANT 190, the executive has the designated pieces fire at 190, 200, 180, 185, and 195.

When the range scale is to be used, the command is merely ZONE, followed by the range for the center of the zone. The executive has the designated pieces fire at the center range, the ranges 100 yards over and short of the center, and the ranges 50 yards short and over of the center. For example, if the command is ZONE. 4200, the executive has the designated pieces fire at 4200, 4300, 4100, 4150 and 4250.

This procedure simplifies the command and computations.

e. Transfer-of-fire-limits.—Transfer limits have been changed to 400 ~~m~~ to the right and left and 1500 yards over and short of the check point. This enlargement of transfer limits was made after thorough investigation. The accuracy is satisfactory.

f. Recording new base deflection.—Deflection corrections obtained by registration are not applied to the base deflection for the purpose of recording new base deflection. On the contrary, they are applied at the time data for transfer are computed. The old method of recording new base deflection after each registration has proven unsatisfactory.

g. K-transfer data.—*K* is determined, expressed as yards per thousand, and applied to map ranges as heretofore. When map data have been computed and uncorrected quadrant elevations determined, the range correction is converted to mils by dividing it by the range change for a one-mil elevation change at the target range (determined from firing tables).

When *K*-transfer data are to be used, registration is made on a check point near the center of the area, the adjusted data are compared with the map data, and a deflection correction and a *K* are determined. Deflection corrections for ranges 1000 yards short and 1000 yards over the check-point range are obtained by applying the differences in drift corrections to the check-point deflection correction. By use of *K*, elevation corrections are determined for the same ranges. The corrections determined for these three ranges (check point, 1000 over, and 1000 short) serve to correct the map data for all targets within transfer limits. By use of these corrections, a correction scale is prepared and corrections for a particular target are obtained therefrom by interpolation or extrapolation up to transfer limits (1500 yards short or over the check point).

h. Metro data.—When metro data are to be used, the net range correction in yards and the net deflection correction in mils are determined for the check point by using the meteorological message and firing tables. The range correction is reduced to a *K* by dividing by one-thousandth of the check-point range. The procedure of determining the area corrections and setting up a metro-correction scale is the same as for a *K*-transfer scale.

i. Metro-transfer data.—Whenever possible, metro data are checked by registration on a check point, preferably the point for which metro data were calculated. The adjusted data are compared with the metro data, a new deflection correction and a metro *K* (and a VE correction, if desired) are computed and the metro correction scale for area corrections is modified accordingly.

An important use may be made of the deflection correction change (difference between metro and adjusted deflections) and the metro *K*. When weather conditions have materially changed and a new registration is impossible, the corrections from registration (deflection correction change and metro *K*) are applied to metro data determined from a late meteorological message and a new metro-correction scale is made.

LESSONS FROM THE MANEUVERS

Observers from the Chief's Office who witnessed the June maneuvers noted errors which are summarized here with the hope that they may be helpful to other units in correcting faults which may still exist in training, operation and maintenance:

Liaison and forward observation.—Infantry-artillery liaison and forward observation for artillery seem to be the weakest links in combined operation of these two arms. Deficiencies were caused by the following: Inadequate (undependable) radio communication, in many cases due to untrained personnel; lack of a systematic procedure in sending out forward observers; faulty methods of operation of forward observers, and the failure of front-line commanders to seek their assistance; and the lack of experience and technical ability of some liaison officers and forward observers furnished.*

Infantry regimental and battalion commanders, it appears, are seldom in positions from which artillery fire can be observed and adjusted. Accordingly, liaison officers with them will seldom be able to adjust fire. The wide fronts over which units operate today increase the difficulties of forward observers and require an increased number of them. Best results seemed to have been obtained when battery commanders were used as forward observers, although each situation will dictate the most logical officers to use. The tendency to use the least experienced officers for liaison and forward-observer work cannot be too strongly condemned.

An infantry battle and an artillery battle should not be fought—but rather an infantry-artillery battle. Above all, for success, commanders and their liaison officers and forward observers must be aggressive in fighting and seeking opportunities to employ their battalion in closest cooperation with the supported infantry.

Organization of position; camouflage.—Many infantry commanders do not appreciate the difficulties and time required for artillery to reconnoiter and occupy positions. Artillery commanders should explain these difficulties to the infantry prior to the problems.

Although many units did excellent work in camouflaging their positions, others merely dropped trails and made no attempt at concealment. One battalion emplaced two batteries at regular intervals in an open burned-over area. No effort was made to hide these batteries, and the dirt thrown up at the trail pits made the position even more conspicuous.

Some units failed to improve positions selected at night, with the result that daylight found them with faulty concealment and cover.

Little if any study was given (at one maneuver) to the road net in the vicinity of the battery positions, with the result that the vehicles were driven into the positions from all directions, making many series of tracks, clearly visible from the air.

On the other hand, another better-handled battery,

*Read the article on *The Forward Observer* by Major John F. Bird in the July issue of the JOURNAL.

taking advantage of an old trail running in rear of a good battery position in low scrub oak, unlimbered its guns on the trail, carefully manhandled them into position without noticeable disturbance of the surrounding terrain and vegetation, and continued past the area to concealed positions for its trucks.

In many cases orders reached battalions so late that they did not have time to make proper reconnaissance and plans. This was a matter of frequent complaint.

Fire direction.—Fire-direction centers too congested. Too much reliance was placed on centralized fire direction. In one battalion this was carried to the extreme that this unit did not believe in selecting battery OP's. Batteries must, of course, be ready to deliver effective fire with the means available to them alone.

In some cases batteries were ordered not to put down any fires, except observed fires, without authority from brigade. As a result, the infantry did not get fire on prearranged concentrations when desired.

Survey.—In many instances survey planning was weak; some vital step was usually missing. Some units used the aiming circle in preference to the transit, because of insufficient training.

Communications.—In several instances the SCR 194 failed because it was placed in brush or against trees.

Wire lines were not always well serviced; in many instances no care was taken of these lines after they were one installed. Many lines were laid along the wheel tracks of dirt roads where they were exposed to much traffic.

In the establishment of wire communications, best results were obtained when wire trucks in the battalion were pooled, *viz.*, when some battery trucks were used on battalion lines, and vice versa.

One brigade commander shortened his telephone circuits by placing brigade headquarters in the artillery area, and running two circuits to division headquarters, where he was required to stay.

Materiel; maintenance.—Many battery officers (including battery commanders) were not trained in and did not realize the importance of checking and adjusting sights and quadrants. These matters are covered in the Field Manual on the Service of the Piece for each weapon. They should have the unremitting attention of commanders of all grades.

Some organizations failed to have dismounted guides precede trucks moving in woods and over rough terrain, with the result that quite a number of front-axle bell housings were broken. The use of such guides for backing vehicles was excellent.

First- and second-echelon maintenance of artillery motor equipment was generally unsatisfactory. Our vehicles must be better serviced and cared for. "Stables" for vehicles and material are just as important as "stables" for animals.

Bearings disintegrate rapidly unless care is taken in the maintenance of air cleaners and oil bath filters, especially in dusty terrain.

Soaking new transfer-case seals in oil before installation is important.

Most oil seal trouble arises not from the seal, but from too much lubricant or the wrong kind of lubricant.

Some steering-gear failures may be attributable to loose cab mountings, which caused mis-alignments.

The major deficiency in first- and second-echelon maintenance is in lubrication—the lack of lubrication or the use of the wrong kind of lubricant. The spare parts section of the Army Quartermaster Depot on one day received 13 generators from new GMC trucks—all unserviceable because of freezing of bushings on front end of shaft—no lubrication.

Storage-battery maintenance was particularly poor.

Proper air pressure was not maintained in all tires. The Chief's Office is studying the provision of a lightweight air compressor for each battery.

Higher commanders were not sufficiently motor conscious. Until they become so and take an intelligent and aggressive interest in the condition, maintenance, and proper use of their motor vehicles, mobility will suffer and maintenance troubles will mount.

Reports were made of corroded SCR-194 antennas. They must be kept clean.

Engines on RL-26's are continuing to give trouble. Main troubles are gas-line breakage and difficulty of adjusting carburetors and keeping them in adjustment. These reels are not being properly lubricated. Clutch mechanisms of those coming to army depots for repair are always dry; starter gears poorly lubricated.

Marching; driving.—Night driving in convoys was excellent, with very few accidents. However, in one maneuver individual vehicles used bright lights where blackout lights had been prescribed. There was some tendency to jam up on roads during daylight, failure to take advantage of cover along roads, and neglect of aircraft warning and protection.

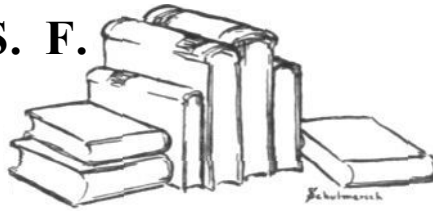
Antitank guns.—The use of antitank guns was confined too much to covering roads. Some guns should protect other avenues of approach, and be located in depth.

Artillery Fire Marking.—Some cases were observed where individuals failed to go around an area marked by the Fire Marking Umpires.

Dual command of artillery.—Frequently, confusion existed because too many people were trying to command the artillery—CT commander and organic commander. Subordinate unit commanders should be kept informed at all times under whose command they are operating. Information was not definite as to when control of the artillery passed from one commander to the other.

Secret of success.—Have you, or are you destined to have, a good unit? If this question is bothering you, the answer can be obtained from a searching self-examination. Your unit will reflect you—your knowledge of your job, your *aggressive* leadership, your initiative in training and fighting your unit.

BOOK By H. S. F. REVIEWS



"Like the manufacturer, the modern soldier must always look for something new and not stay hypnotized by the lessons of the last campaign; but that does not prevent him from giving them some consideration."

—GENERAL ESTIENNE.

SEA POWER IN THE MACHINE AGE. By Bernard Brodie. Princeton University Press, Princeton, N. J., 1941. \$3.75.

The author, a former field artilleryman, is a member of the Institute for Advanced Study at Princeton, and this book is an authoritative and highly readable account of the changes in sea warfare which are the result of mechanical and scientific progress. In general, the result has been to reduce the elements of sea warfare. Today there are fewer battleships mounting fewer guns fighting fewer battles, largely because the task of building a modern fleet has become too vast for any but the greatest nations to attempt, and even their efforts are restricted by the enormous cost. The machine age has likewise doomed "the Nelson touch." As the author remarks, the English fleet no longer recklessly brings on an action with superior forces—steam, armor and electricity have eliminated most of the advantage in navigation and gunnery which formerly fell to a fleet manned by highly trained personnel. Moreover, battleships have now become so expensive that battle has become the last, rather than the first, resort of naval warfare. It will be remembered that during the Great War Jellicoe consistently refused to risk the Grand Fleet precisely because of the difficulty in replacing any units that might be lost. This book will inevitably leave the military reader with an interesting speculation—will armor plate and the internal combustion engine have similar results upon the land forces in some future generation?

RANKS & MEDAL RIBBONS OF THE FIGHTING SERVICES. Published by the London Daily Mirror, and distributed by Messrs. Collins. Toronto. 25c.

This is a handy little manual which will enable you to distinguish the rank and branch of the members of the British armed services. It is well illustrated, and becomes more useful every day.

MILITARY TRAINING FOR NATIONAL DEFENSE. American Library Association. Chicago, 1941. 25c.

A product of the combined work of several agencies, this bibliography lists pertinent books under the following headings: National Defense, The Army, The Navy, Military and Naval Aeronautics, Military and Naval Dictionaries, Military and Naval Uniforms and Insignia, Military and Naval Magazines. It forms a handy and useful index to the literature dealing with the armed services.

THE ADMIRABLE TRUMPETER. A BIOGRAPHY OF GENERAL JAMES WILKINSON. By Thomas Robson Hay and M. R. Werner. Doubleday, Doran & Company, Inc., New York, 1941. \$3.00.

Lately there have been several attempts to defend those figures of the Revolutionary period whom our schoolbooks denounced as scoundrels. There is currently appearing a sympathetic biography of General Gates, and we have here the life of a soldier who, although twice commander in chief of the army, is certainly not remembered with much affection today. Wilkinson's was an interesting life, and two previous biographies have appeared in recent years, neither of which, it may be added, found much to say in his favor. His present biographers follow him through two wars and a thousand intrigues, and while they in no sense attempt a "whitewashing" job, they do give Wilkinson his fairest and most objective treatment.

MY FIRST WAR. By Captain Sir Basil Bartlett, Bt. New York, The Macmillan Company, 1941. \$1.25.

The author of this book was a British playwright who, at the outbreak of the present war, was placed in charge of the Field Security Police of a British division stationed north of Lille near the Belgian frontier. The duties of the Field Security Police were to discover and apprehend fifth columnists, saboteurs, and enemy agents of all sorts. The book is Sir Basil's diary for the month of May, 1940, during which time his unit marched from Lille to Brussels, and from there back to Dunkirk. Although he does not say it in so many words, one gathers that Sir Basil does not consider that the fifth columnists played so significant a part in the Allied defeat as the newspapers would have us believe. There is little that is new in this book; rather, it holds the interest because it relates the personal experiences of one man in the most exciting month in modern history.

A PATHFINDER IN THE SOUTHWEST. Edited and annotated by Grant Foreman. The University of Oklahoma Press, 1941, \$3.00.

In 1853 Lt. Whipple of the Topographical Engineers, U. S. Highway 66. All those who have motored over continental railroad route to Los Angeles. His journey, which took over a year, followed generally what is now U. S. Highway 66. To all those who have motored over this scenic and historic route, or who have lived in the states traversed—Oklahoma, Texas, New Mexico, Arizona, and California—will find the Whipple Journal fascinating. Originally published as a government documentary

report, it has been reprinted by the University of Oklahoma Press, well edited and annotated by the eminent and experienced Oklahoma historian, Dr. Grant Foreman. One could spend no better vacation than to take a copy of this book in his car and head west leisurely over Whipple's route to California, stopping at all the highlighted spots to study the flora, fauna, geology, and aborigines—all of which are still there in much the same state as seen by Whipple.

DESCRIPCION SIMPLIFICADA DE LAS AMETRALLADORAS MODERNAS SISTEMA HOTCHKISS. By Capitan 1 de Artilleria Reynaldo Garcia Macias, Mexican Army.

This is a materiel handbook in Spanish of the Hotchkiss automatic weapons, caliber 7-mm., 13.2-mm., 25-mm. and 37-mm. It should be of interest to all who are concerned in the study, development, and employment of single- and multiple-barreled automatic weapons for antitank and anti-aircraft defense. Its main value will apply, of course, to members of military forces in the Americas who are equipped with this make of weapon, but our own people, especially those who read Spanish, will find it interesting also. The book, of some 140 pages, is liberally illustrated with detailed drawings. Of especial value to the unit intelligence officer will be the complete list of characteristics, especially the muzzle velocity and penetrative power of these weapons.

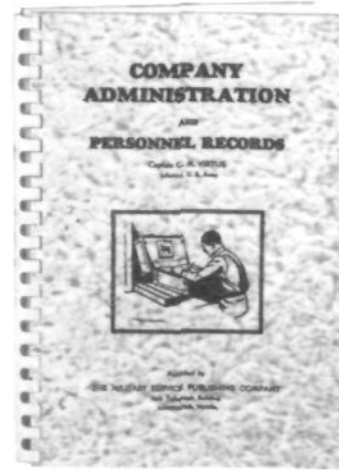
DIARY AND LETTERS OF JOSIAH GREGG. Edited by Maurice Garland Fulton. University of Oklahoma Press, 1941. \$3.50.

This is one of the handsomest and most valuable products of the University Press. Josiah Gregg was an early trader who made several journeys along the Santa Fe Trail. His book, *Commerce of the Prairies*, was a classic. Long out of print, it used to command fabulous prices, until finally republished. It was well worth the price asked, if only for its intrinsic interest. Now new sources of Gregg material have been unearthed, and the University of Oklahoma Press and their authors have done a genuine service in making them available to us. This particular book deals with Gregg's life subsequent to his leaving the Santa Fe trade in 1840, through his experiences on the plains, and in the Mexican War. A splendid addition to the picture of western American life one hundred years ago. Of special interest to this reviewer is the fact that one of the old maps shows that Gregg apparently was the trader, or one of the traders, who about the year 1837 operated a post on Cache Creek about two miles from the site of Fort Sill. The existence of this trading post has been known, but not the name of the trader. The Fort Sill country was certainly a blank spot on the map in those days, but Cache Creek was shown, and so named.

W. S. N.

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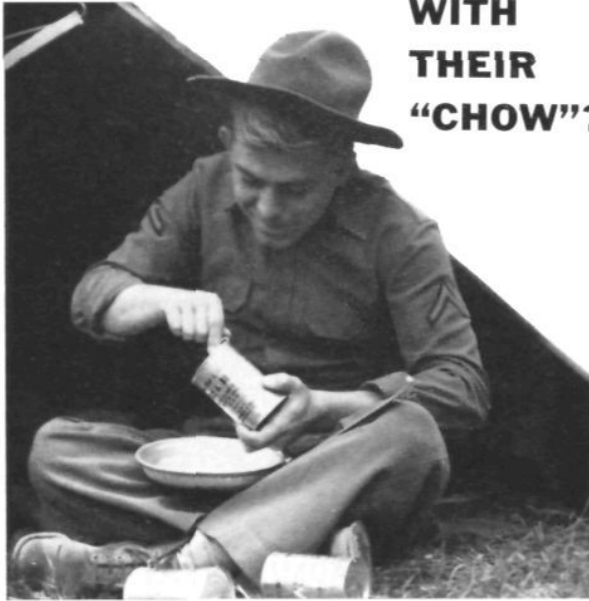
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SPA. VERSAILLES, MUNICH. By Samuel G. Shartle. Dorrance & Company, Philadelphia, 1941. \$1.50.

Colonel Shartle was military attache in Berlin, 1909-1912, observer with the German armies, 1914-1915, and a member of the Armistice Commission which sat at Spa after the Great War. It is with the latter episode that his book is principally concerned, and is based largely upon his letters and notes of that period. In this useful historical document the author, although not advocating isolationism, points out how the Versailles treaty led to the rise of the present regime in Germany, and that the policy of avoiding entangling alliances is still sensible.

APPROACH TO BATTLE. By Major Leonard H. Nason. Doubleday, Doran & Co., New York, 1941. 113 pages. \$1.50.

The cover of this book has this printed on it: "This book is going to make a lot of people mad. It's going to make a lot of politicians mad, and it's going to make a lot of army officers mad. They will be mad at the author. It's going to make a lot of civilians mad, too. They will be mad both at the politicians and the army officers."

Actually, the average army officer will probably feel more regret than anger at this book,—regret that a reserve officer (who has written some excellent fiction about the A. E. F., and some unrealistic fiction about the peacetime regular) should present as factual a picture of the army which is largely unsupported criticism. Major Nason is not responsible, probably, for the publisher's description of him as "one of the foremost military authorities in the country," but he is responsible for the careless writing and destructive attitude that marks his book.

His condemnation of our officers is sweeping—Regular, National Guard and Reserve. Our system of officer training in the Regular Army "has been a complete failure." His argument in support of this opinion is not clear. He says that "all officers were going to be staff officers—by God, it's an order—and so the army went about it to make all its officers staff material." On the same page he contradicts this and says "they were going to select those officers who had the best records with troops and send them to Leavenworth." Curiously, he also has these officers go to their special service schools between Leavenworth and the War College.

Major Nason makes some good points about care of men, supply, personal reconnaissance and personal knowledge by commanding officers and staff officers of the actual conditions under which men are working and fighting. It is unfortunate that they are obscured by the errors and lack of clarity of the remainder of the book.

H. W. B.

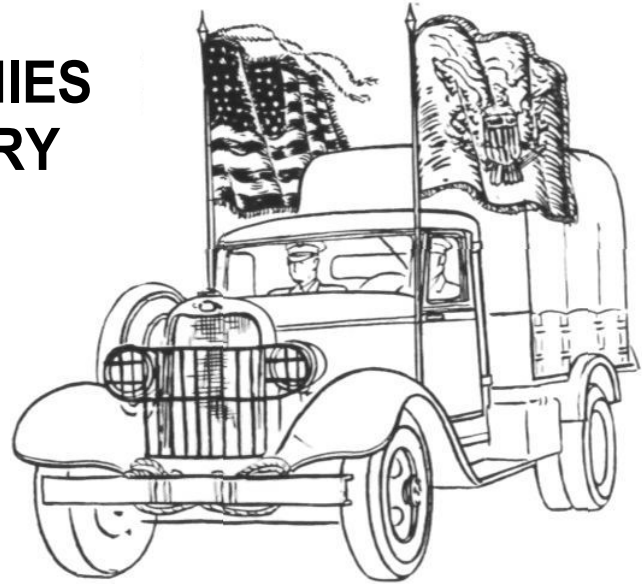
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