

The
FIELD ARTILLERY
Journal

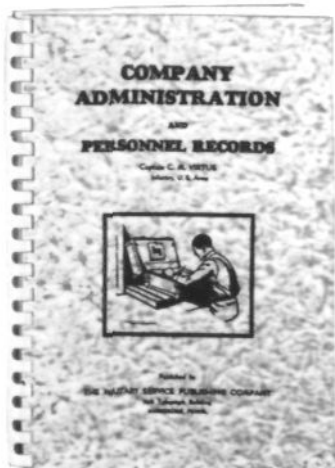


IN THIS ISSUE:

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FEBRUARY, 1941

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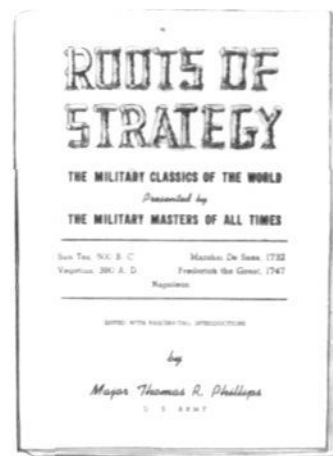
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MAJOR W. S. NYE, Editor
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BRIG. GEN. J. P. LUCAS was a member of the Field Artillery Board during the time the Board was testing our new 105-mm. howitzer. He is, therefore, especially qualified to describe the development of this weapon. All reports from those who have had a chance to fire the 105 are full of enthusiasm for it; its appearance in quantity in organizations is eagerly awaited. Perhaps two features of the 105 which make it superior to our previous light weapons are its power and versatility. Although primarily a cannon for close support of the infantry, it will find use with the armored divisions, and with horse cavalry; it is effective for counterbattery, and with direct fire against heavy tanks. Complete characteristics of the 105 have not been released for publication.

ONE OF THE most striking features of the current expansion of our Army is the establishment of the Replacement Centers. They are really more than the name indicates, and will provide a highly efficient method of filling organizations with men who have received sound basic training. General Snow started replacement centers for the Field Artillery during the World War, and his active assistant in this was Gen. Danford, now Chief of Field Artillery. The Field Artillery is justly proud of the part it has played in developing this scheme, and we predict that the Army will be repaid a thousand fold for the efforts which have been made in giving the Replacement Centers a proper start. Lieut. Col. Parker, member of the group which is organizing the Center at Bragg, gives us the general picture. Later THE JOURNAL will present detailed stories of how work is progressing at various Centers.

COL. LANZA, again voted the most popular JOURNAL author, and who (as announced in the ANNUAL REPORT) won the fifty-dollar award for the best article of the year, provides our readers a thrilling account of the great battle at Sedan. In an early issue we will present one of Col. Lanza's commentaries on the European War which contains some new and surprising information on the German conquest of Norway.

THE CURRENTLY important subject of training is covered well in the valuable ideas furnished herein by Captain Ellsworth.

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The Field Artillery Journal

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The 105-mm. Howitzer

By War Department Special Orders No. 289-0, December 11, 1918, a board of officers was appointed to meet at A.P.O. 706, France, "to make a study of the armament, calibers and types of materiel, kinds and proportion of ammunition, and methods of transport of the artillery to be assigned to a Field Army." The board, which has since been popularly called "The Caliber Board" and was presided over by Brigadier General William I. Westervelt, visited France, Italy, and England, conferred with officers of Allied Armies, studied the armament of our one-time enemies, and submitted its report at Washington, D. C., on May 5, 1919.

The subjects covered in the board report were many and broad and upon this report has been based much of the peacetime development of field artillery materiel, munitions, and equipment since the date of its publication. It is proposed to trace briefly in this article

By Brig. Gen. John P. Lucas, U.S.A.

the step by step derivation of a single weapon, the 105-mm. howitzer.

The United States and France were the only two important belligerents whose divisions were not equipped with a light field howitzer. The Germans, Austrians, and Italians had such weapons of 105-mm. caliber while the British had one of 4½ inches. The Americans and the French both used the 155-mm. howitzer as a divisional weapon and, while neither would admit that their artillery was less effective than that of any other power, artillery officers of both armies agreed that, from the standpoint of mobility, ammunition supply, and rate of fire, many advantages would undoubtedly accrue should a lighter weapon be adopted.

IN discussing the advantages of the 105-mm. howitzer over a weapon of 75-mm. or 90-mm., E. Hoffmann (a German gun designer) says:

"The advantage is greatly with the 10.5-cm. explosive shell with its weight of 15-16 kg. Whereas the effect of the 75-mm. or 90-mm. caliber is insufficient against targets protected by cover, or against materiel, and whereas a decisive effect can be expected against an enemy gun detachment only by means of short, sudden fire surprises (or with a direct hit), the 105-mm. caliber is remarkably well suited for carrying out such missions. Its effect against defiladed targets or targets with light overhead cover is excellent. Taking into account shell weight, the probable percentage of direct hits with the 105 is much higher than with the 15-cm. Moreover, the 105 is best suited, among all calibers, for laying down a smoke screen. With regard to splinter effect, experiments have shown that at mid-range and with the largest charge (zone 5) the 105 effect is 2.7 times that of the 75-mm.; while with charge 4 the effect of the 105 is 6.33 times greater than the 75-mm.

"Against barbed wire obstacles, too, the 105 shows a superior effect on account of the higher angle of fall, and its greater mass of metal and explosive charge. The 105-mm. howitzer furnishes a more favorable tube performance than in the case of howitzers generally. The weight of the piece and ammunition, on account of motorization, plays a much less important role than formerly. The higher weight of the projectile is fully compensated for by a decreased expenditure (as to number of rounds) of ammunition."

Division artillery must be sufficiently mobile to allow it to support by continuous fire the infantry of a division. Its objective must be primarily the infantry of the opposing division and its immediate targets must be those elements of the objective which are preventing the advance of friendly troops. Close contact with the supported infantry must be maintained, forward displacement must be possible with reasonable facility, and ammunition supply must not be too difficult of accomplishment. As the 155-mm. Schneider howitzer (1917), with its limber, weighed 8,770 pounds and its projectile 95 pounds, the difficulties attending its use as a division weapon are apparent.

That a howitzer as well as a gun was necessary in division armament was admitted by the board. It was pointed out that there were many instances where the terrain offered such protection to infantry that the flat-trajectory field gun could not bring effective fire to bear thereon. A howitzer with a proper diversity of propelling charges and a corresponding

This article represents the personal views of the author only.

choice of trajectories could occupy protected positions and still bring fire on targets that would be completely covered from gun fire. The low muzzle velocity of the howitzer would allow the use of a projectile double the weight of that of the field gun with the weapon still remaining within reasonable limits of weight.

The board recommended an "ideal" type of weapon but admitted that its attainment was far in the future. The military characteristics of this "ideal" divisional howitzer were listed as follows:

Caliber, mm.....	105 (about).
Weight of projectile, pounds.....	30 to 35.
Type of projectile.....	shrapnel and shell.
Maximum range, yards.....	12,000.
Maximum elevation, degrees.....	65.
Depression, degrees.....	5.
Maximum traverse, degrees.....	360.
Ammunition.....	zone, semi-fixed.

The board was undoubtedly influenced in its recommendations as to maximum elevation and traverse by war experience with enemy aircraft. The opinion of many artillery officers at the time was that all artillery weapons, at least those of the smaller calibers, should be mounted on carriages which would permit them to attack this class of target. The board recognized the necessity for special anti-aircraft artillery but believed, nevertheless, that division and corps guns would often, in the future, be used against airplanes and heavier materiel against balloons.

As the above "ideal" weapon was admittedly not attainable, at least not in the immediate future, it was recommended by the Caliber Board that the 155-mm. howitzer remain the divisional weapon but that "active development and test should be prosecuted on a type as stated under 'ideal' above." In the reorganization of the division immediately after the war, however, the 155-mm. howitzer was taken from the division and became an organic weapon of the corps to be attached to the division when necessary. Although obviously more suitable as a corps than as a division weapon, a change in policy about 1929 once more made this howitzer an integral part of the infantry division.

The development of a light field howitzer proceeded during the years since the war, perhaps not with the activity the Caliber Board hoped would be the case, yet with definite progress.

The system under which field artillery materiel is developed in time of peace is set forth in A.R. 850-25. The actual construction is, of course, done by the Ordnance Department but under specifications laid down by the using arm, the Field Artillery. Some experience is required

on both sides, else characteristics impossible to attain may be included or instruments of doubtful utility in battle may be built. The process starts with the drawing up of specifications by the Field Artillery under which a pilot model is designed and built by the Ordnance Department. This model is tested, first, for its technical qualifications at the Ordnance proving ground and, second, for its utility in the field by the Field Artillery Board. If found satisfactory, the model may be adopted as standard, if not, a new pilot model may be built in an attempt to correct the deficiencies found to exist. After field test, and either before or after standardization, the materiel may be issued to the army for extended service test to determine from actual use by tactical units whether or not the item will render satisfactory service under war conditions.

In this striving for perfection, compromise is always necessary. Any gun on an appropriate carriage is a complete unit and a change of any part may well affect a number of others. The old struggle between mobility and weight is always present; stability, range, weight of projectile, maximum traverse and elevation, all such characteristics must be balanced, one against another, until finally a weapon is evolved which will be reasonably satisfactory to the using arm and which, in the opinion of the supply service, can be manufactured with reasonable facility in either peace or war.

For economy of manufacture the caliber board recommended the development of a carriage for the 105-mm. howitzer which could be used also to mount the divisional light gun. Accordingly, the first carriage built, the Model 1920, was designed to mount either the 105-mm. Howitzer, Model 1920, or the 75-mm. Gun, Model 1920. The maximum range of the howitzer was 11,600 yards, it could be elevated to 80 degrees, its traverse (around a pintle) was 30 degrees, and its weight in firing position was 3,678 pounds. The dual-purpose idea was abandoned after this initial model.

The Model 1920 carriage was of the split-trail type and, as did all early models of split-trail carriages, employed an equalizer to enable the trails to gain contact with uneven ground. This problem has been solved in several ways. The equalizer allows one trail to be raised with a corresponding lowering of the other. It has, however, never been considered entirely satisfactory from the standpoint of stability in firing. Another method, that of the pedestal mount, is described below in connection with the T4 Carriage. A four-legged chair cannot be placed solidly on a rough floor. By changing the length of a leg (the equalizer) it can be done, however, or a three-legged stool (the pedestal) can be used.

The Field Artillery Board (report submitted 4-24-23) found the weapon to be heavy, based on six-horse draft, too clumsy to be maneuvered by hand with a squad of reasonable size, structurally weak, and generally unsuitable for adoption. The split trail was recognized as an advantage because of facility of service and increased traverse.

Meanwhile, another pilot, Model 1921, had been constructed. This howitzer weighed 3020 pounds in firing position but, being of the box-trail type with traverse on the axle, had a maximum traverse of but 8 degrees. The Field Artillery Board combined its report on this weapon with that on the Model 1920. A decided preference for the split-trail type of carriage was indicated.

The maximum elevation of the howitzer on the Model 1921 carriage was 52½ degrees and the Board discussed at considerable length the advantages to be gained by angles of elevation above that necessary for maximum range. The increased effect of shell against personnel targets when the angle of impact is increased was not thoroughly understood at this time. The discussion, which was confined principally to the zoning of the weapon, ended with the statement that, "if the carriage can be built within the weight limits fixed (3,000 pounds in firing position) and with the necessary strength, to allow 65 degrees' elevation, this feature * * * * should be specified." The Board added that provision for firing at angles of depression was not necessary. Self protection against mechanized attack by direct laying on moving targets which may be at short range and have a minus site, had not the importance at that time which it later assumed.

In spite of the remarks of the Field Artillery Board as to split versus box-trail carriages another pilot box-trail howitzer, Model 1925, was constructed. The weight of this model in firing position was 3,000 pounds.

Before it was given a service test, however, two other pilot split-trail carriages, the T1 and the T2, appeared. Both of these were shown by proving ground test to be unstable. The instability of the T2 model was corrected by increasing the length of the trail, whereupon the Chief of Ordnance wrote to the Chief of Field Artillery recommending the adoption of the T2 materiel as standard as to type without preliminary test by the Field Artillery. Items of equipment which are a marked improvement over existing types may be standardized even though not perfect. The classification of an item as standard enables the basis of issue to be determined and procurement planning for necessary production in war to be inaugurated. It does not mean that improvement of the item will cease.

The Field Artillery Board did not recommend any model for standardization and felt that it could not do so until all models had been tested.

The recommendation of the Chief of Ordnance was, nevertheless, approved (12-29-27), the materiel becoming the 105-mm. Howitzer and Carriage M1. Its weight in firing position was 3,600 pounds.

After standardization it was tested by the Field Artillery Board, found generally satisfactory, and extended service test was recommended. For this purpose authority was given, late in 1930, for the shipment of four howitzers to Fort Sill.

On August 30, 1932, a report on the result of this test was rendered. So far as accuracy and mobility behind

a 6-horse team was concerned, the materiel appeared satisfactory. Many weaknesses developed during the test, however, and the materiel was not considered suitable for high-speed towing.

It was, therefore, decided to build two new pilot carriages for further test. One, having a spur gear elevating mechanism, was designated the T3, the other, having a cone type of worm elevating mechanism, the T4. Both were to mount the 105-mm. Howitzer M2, which differed from the M1 only in the dimensions of the powder chamber.

After engineering tests at Aberdeen Proving Ground it was concluded by the Ordnance Department that the T4 model was the better of the two and accordingly it was sent to the Field Artillery Board for service test.

The carriage differed from any model previously built. In the first place, due to the gradual replacement throughout the army of horses for draft purposes by various types of motor vehicles, weight as a factor to be considered in materiel construction apparently was being forgotten. Strategical mobility of artillery weapons was being enormously increased but tactical mobility was declining at a correspondingly rapid rate. High angles of elevation, no pit for recoil, large angle of traverse, maximum stability when firing, high-speed axles and wheels, all these required characteristics added to the amount of metal in the carriage and promoted the cause of heavy weapons. The result was that, in spite of the fact that the specifications under which the carriages were built called for a weight not to exceed 4,200 pounds (considered the allowable maximum when motor drawn), the T4 howitzer, when received by the Board, weighed 4,976 pounds without cover, accessories, or sights. In addition, in order to improve stability in firing, to gain three-point support, and

eliminate the use of an equalizer, the weapon, when in firing position, was mounted on a pedestal to which it was raised by a manually operated jack. This mechanism was complicated and tied in with the trails so that an excessive amount of time was consumed in going into and out of action.

The Board, therefore, recommended (6-13-38) that the carriage be considered unsuitable as an organic weapon of the infantry division.

The deficiencies of the carriage were so fundamental that it was decided that the building of a new pilot carriage could not be avoided. Before starting work on this, however, a conference was held between officers of the Ordnance Department and of the Field Artillery in an attempt to iron out the difficulties anticipated in its design. This conference revised the military characteristics, adhering to a maximum weight of 4,200 pounds and prescribing the ability to put the weapon in action within 3 minutes by daylight and 6 minutes by night.

The project was brought to a successful conclusion by the acceptance, after test by the Field Artillery Board, of the 105-mm. howitzer carriage M2, which mounts the same howitzer as did the M1 carriage. The new weapon weighs 4,350 pounds, is of the split-trail type, has wheel segments instead of a pedestal mount for stability in firing; it is built for high-speed towing and has pneumatic tires. The controls and sights are of a new and improved design.

The 105-mm. howitzer has been adopted as the standard weapon of the artillery of infantry divisions, and will be used also by armored divisions and artillery with horse cavalry divisions, though not to the exclusion of the 75-mm. guns and howitzers. Contracts have been let for a sufficient number of the 105-mm. howitzers to equip all light artillery of the Regular Army and National Guard.



The Field Artillery Journal's Military Commentator



Colonel Lanza

Reports on the

BREAKTHROUGH

(Exclusive)

By Colonel Conrad H. Lanza, FA

INITIAL ALLIED PLANS

In May, 1940, the British and French having long foreseen the probability of a German attack through the Low Countries, had deployed their field armies along the south boundary of Belgium all the way from the English Channel to the Maginot Line. Quite correctly, they had not expected an attack on the latter line.

The original intention had been to hold the frontier, which had been fortified with trenches, antitank obstacles, concrete blockhouses, and wire. It was fairly strong, and plentifully supplied with munitions and stores.

Allied GHQ, however, had been severely criticized by their own people because

- a) They had failed to offer help to Finland, in her war with Russia—until it was *too late*;
- b) They had failed to send aid to Norway, when that country was invaded by Germany—until it was *too late*.

During the month of March the British and French governments had both been overthrown by their respective Parliaments, on charges of lack of energy in prosecuting the war. The French Army was grumbling over the lack of action. The soldiers wanted to know how a war could be won by sitting behind the Maginot Line and doing nothing while the enemy gobbled Poland, Finland and Norway.

The Allied governments were convinced that they would have to do something to appease popular clamor. They could not afford to depend exclusively on the blockade; obviously the people were not satisfied as to its value, and

demanded more vigor in prosecuting the war. Regardless of circumstances, the Allies would not be *too late* again. Next time they would act promptly.

Belgium and Holland, invaded on May 10, appealed early for HELP. In compliance with their decision, the Allied governments without waiting for consultation accepted the call, and issued orders to their armies along the south boundary of Belgium to march forward shortly after 7:00 AM. Before 8:00 AM the leading elements had crossed the frontier.

On this occasion everything started off *on time*, in a very orderly way and unopposed by the enemy initially. The possibility of such a movement had been foreseen since October, 1939. March tables were ready. Maybe GHQ did not approve leaving the fortified line, but the governments had no intention of allowing themselves to be accused of permitting two more small countries to be overrun by the Dictators.

The plan for the advance was based on the *assumption* that the main German effort would be on the north flank. The terrain was more favorable there than on the south, where was situated the Ardennes region. This was rough, mountainous and wooded, with but few lines of communications across it. Previous German campaigns through the Low Countries or against France had had their main weight on their right. This was in accord with the Schlieffen Plan, in the minds of the Allies a military Bible whose doctrines no German would date disregard.

The defeat of France in forty-five days has now been acknowledged universally to be one of the greatest, if not the greatest military disasters of all times. Since the Sedan breakthrough was the critical battle in this campaign, it will take rank with the decisive battles of history. So far very little has been printed concerning this titanic event. THE FIELD ARTILLERY JOURNAL is fortunate in being able to add Col. Lanza's analysis of the Sedan breakthrough to his already notable series.

AT SEDAN



The main Allied strength, including most of the mechanized units, was consequently placed on the left, or marching, flank. The advance was in the nature of a right wheel, with the pivot near Sedan, where it connected with the Maginot Line. The wing was along the sea. In this way the principle of the continuous line was preserved.

During the daytime of 10 May only a slight advance was made. The Allies considered it too risky to march troops before dark. They might be bombed; the enemy might discover their dispositions and intentions. But as soon as night came the roads became crowded with French and Belgian troops pushing into Belgium. Mechanized and motorized units raced ahead. The line to be reached was: The Meuse—Namur (a fortress)—Liege (another fortress). If this were not possible, the line could bend at Namur towards Louvain and thence into Holland; or, if necessary, directly towards the fortified area around Antwerp. Luxembourg was outside the wheel. No opposition was offered there.

The French Ninth Army formed the right of the Allied wheel. This army had to defend the line of the Meuse River from Sedan to Namur. It does not seem to have been part of its mission to offer battle beyond the Meuse.

The Meuse is a winding, unfordable stream crossed by only a few bridges. Naturally the Ninth Army promptly guarded these, and made preparations to destroy them should this become desirable. The banks of the Meuse are precipitous bluffs—schists and calcareous, averaging about 300 feet in height. The valley is only 300 to 400 meters wide. Along the stream is a railroad, which runs through numerous tunnels, and a second-class road. The main automobile road is on the bluffs. The valley is generally wooded, very impracticable for maneuvers.

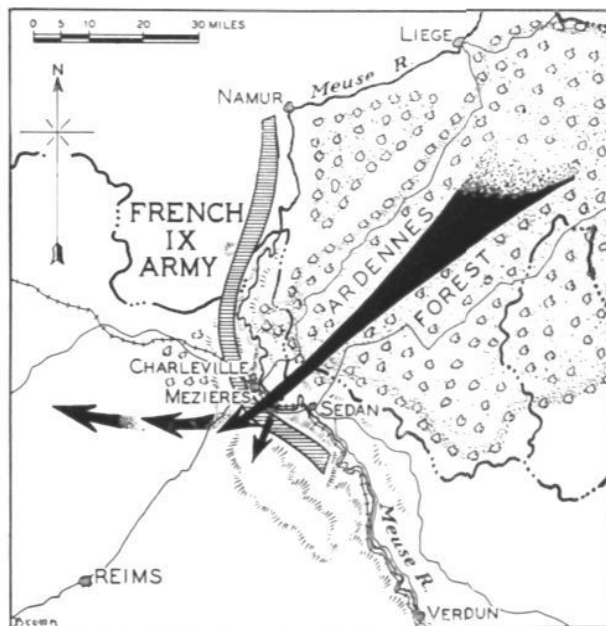
Thus the Meuse was a first-class military obstacle. On the enemy side were the wide Ardennes, defended by specially-trained Belgian troops. It was reasonable to suppose that these units would have little trouble in delaying the enemy, even should he attempt such a difficult feat as traversing the Ardennes.

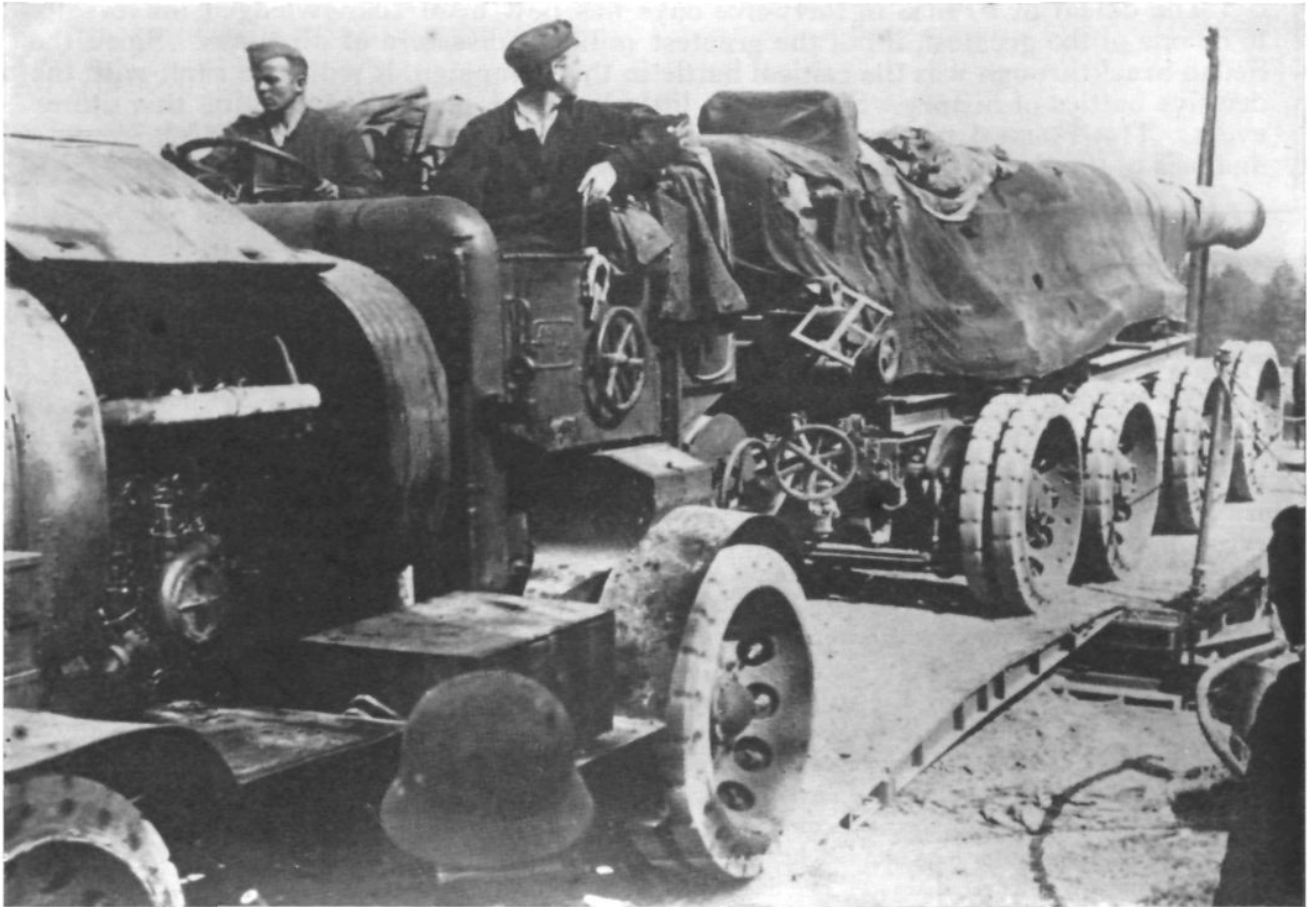
As the Allied right did not intend to cross the Meuse, the troops did not have far to advance to reach their positions. The covering forces arrived on 10 May, the main forces following more slowly in rear. French cavalry crossed the river to establish contact with the Belgians in the Ardennes, and to "see what was what."

THE GERMAN ATTACK

The Germans attacked the Ardennes front on 10 May but at first do not appear to have made much progress. The Allies assumed that this was the holding attack, or a diversion, to distract attention from more important events farther north. The specially trained Belgian troops did not report need of French troops; it was understood that they were accomplishing their mission. They had prepared demolitions along the few roads. To block these roads, trees could be felled, culverts blown up, and bridges destroyed. Everything had been foreseen; all was in order.

During 11 May news of German successes on the





German 240-mm. howitzer crossing temporary bridge over the Meuse.

north began to arrive at Allied GHQ. This continued hour after hour. The enemy was making more progress than anyone had believed possible. The invaders had gotten into Rotterdam, and into Liege. The British and French had not yet arrived in that area. To hasten the advance, day marches were authorized. Troops pushed forward to the threatened north as fast as possible, without much regard to enemy observation. Things in that direction did look urgent. Speed was required. Otherwise this might be another case of *too late*.

Nobody in authority seems to have paid much attention to the south flank. The French Ninth Army itself felt no great alarm; the front was still sixty miles away. The German attack on the Ardennes continued with extreme violence. There was a most violent artillery preparation accompanied by bombing. Luxembourg was occupied without opposition. The impression at Allied GHQ was that the Belgian line in the Ardennes had been dented, but not seriously so, and that those specially-trained troops would probably reduce the salient on the following morning. The danger point seemed to be, as expected, in the north.

During the night of 11-12 May, the Germans poured troops into the Ardennes salient. When morning came, the Belgian counterattack, meeting overwhelming numbers of

the enemy, failed utterly. The Germans seemed to have innumerable armored vehicles, with extraordinary artillery and air support. This was no disordered opponent, attempting to consolidate the gains of the preceding day. Here was a strong enemy, pushing resolutely forward. Not prepared for the fierce attack of mechanized forces, supported by heavy artillery and dive bombers, the Belgians gave way. The Germans pushed them aside and started through the Ardennes, headed west. It was only sixty miles to the Meuse. They had calculated that if they were quick enough they might seize the bridges before these could be destroyed.

In overrunning the Belgian and French detachments defending the Ardennes, the Germans made no stops. Occasionally a leading tank was blown up; those following went through the gap in the mine fields thus caused, or detoured around. They did not advance quite at the speed of a tourist on vacation, but they made the sixty miles to the Meuse River in half that day. The carefully-prepared road demolitions remained unexploded, for those in charge did not know the Germans were coming until they were there. The French cavalry had not been able to get word back. German motor cars moved faster than the horsemen could ride, and got to the telephones first.

Not all French on the Meuse were surprised. The bridge guards watched carefully. When they saw the Germans approaching they set off the demolitions and blew up the bridges. All except one; the Germans were too quick here. They came down the road so fast that they crossed before anything could be done to stop them. Pouring over that bridge, they had by dark on 12 May a bridgehead several miles deep. The last observations that evening showed Germans still crossing. What little artillery the Ninth Army had in position was used to support the troops who were fighting to prevent the enemy from enlarging their bridgehead. Neither artillery nor bombers were available to interdict the river crossing.

EARLY FRENCH ESTIMATE

The French Ninth Army headquarters was indeed surprised. They had never believed that the Germans could arrive so soon. Obviously something, they thought, must have been radically wrong with those specially-trained Belgian troops. However, no great damage had been done so far. The Allied front line had never been intended, in this sector, to extend beyond the Meuse. Except for the one small enemy bridgehead, the line throughout was intact.

Only the leading elements of the Ninth Army were on the Meuse. Orders were issued to bring the supports forward, and surround the German bridgehead. This would be reduced next day by attacks from both flanks and the front. The artillery could shell every part of it. The single road and bridge into the pocket could be blocked. Really, those Germans were in a delicate position.

During the night 12-13 May, the Germans pushed artillery and mechanized troops over the Meuse into the bridgehead, ready to attack in the morning. They prepared to force other crossings at various points over a front of nearly fifty miles. They were as busy as beavers.

THE TRAGIC 13TH OF MAY

When the sun arose on the 13th of May, the Germans were instantly in action. They attacked as planned. From the bridgehead already secured they opened a tremendous artillery fire against the opposing French lines. Dive bombers assisted the artillery by pounding front lines and rear installations. Shortly afterwards, the bridgehead seemed to vomit armored vehicles, which advanced in all directions, constantly supported by the artillery and air units.

The French Ninth Army itself had intended to attack. The infantry were ready. They had received instructions as to how to stop a tank assault. But they had never seen one. The real thing was not what they had envisaged. A terrific heavy artillery barrage fell on them; the dive bombers dropped enormous explosive bombs amongst them; 250 tanks in line came straight at them, all spitting fire. The sight, sounds and effects were too much for the French. They did not attack. Some fled.

The French line was shallow. Owing to the distance to the French supports, only enough had arrived to establish an attenuated front around the bridgehead. German tanks cut through in numerous places, separating the French into isolated groups which were attacked and reduced by infantry and artillery who had arrived close in rear of the Panzer units.

Germans crossed the Meuse at other places. Due to the wooded nature of the valley, they were able to approach under cover. As the stream was very winding, it was possible to establish enfilading fire on French troops on the other side. Under cover of a heavy fire from artillery and machine guns, ponton bridges were thrown over near the destroyed bridges from which roads ran up to the bluffs. Mechanized troops crossed first, then dashed to the front.

From the bridgehead and from the other crossings the German armored units pushed ahead. The roads were good. Germans arrived at French command posts before anyone knew they were near. They seized the personnel, maps and papers; and thus discovered the French dispositions. They used phones to give false orders; caused enormous confusion; kept on going.

French supports were still coming forward. They found the roads obstructed by refugees. Belgium is a thickly settled country. On the day before, the inhabitants had heard the battle raging. They too had been surprised, for they had expected that the great Ardennes forest would protect them and their homes. They were mistaken. That forest, that supposed protection, was now alive with German artillery, German tanks, German infantry, all kinds of Germans. They were coming out of the forest, making vicious attacks. The villages, the crossroads, the railroad stations, were being bombed, shelled and destroyed. Planes in countless numbers were roaring overhead; undoubtedly they were hostile. There was no staying in this inferno. The people fled, they knew not whither. They sought only to get away from what seemed to be sure death to them and their families. They used the family car if they had one; used busses, trucks, delivery wagons; they used farm vehicles, ox-drawn or horse-drawn; they used bicycles. Town citizens trudged along pushing hand carts. Those who had no transportation went on foot—men, women, children, infants. There were able-bodied persons hurrying; injured barely able to crawl; sick and aged carried on improvised litters. There were slow-moving vehicles piled high with a miscellany of worldly possessions. Cows and horses were led. It was pitiful. Incidentally, it was a first-class obstacle to troop movements. G-4 circulation control was swamped; it could not cope with the situation.

French infantry and artillery moving towards the front found the roads filled and blocked. German planes, noting troops and civilians on the same roads, took no time out to determine which was which; they machine-gunned



One answer to the question why the Allied aerial attacks failed against the German mechanized columns. At frequent intervals were vehicles carrying 20-mm. automatic AA guns. This view shows one of the German columns which participated in the Sedan breakthrough.



How German motorized columns moved quickly along blocked roads in the wooded Ardennes. Note German officer assisting the soldiers.



Bridge over the Loire

and panted with bombs whatever they saw. The roads became the scene of a hopeless, tragic catastrophe. Rumors spread. Stragglers and messengers going to the rear repeated all kinds of tales, some true, some exaggerated, some untrue. The refugees became more and more panic stricken. Wire lines were blown down. The Ninth Army could not keep track of events.

The German attack, however, took advantage of the disorder on the Allied side. They reached Sedan, found the bridges there intact. They rushed across. By dark the German bridgehead at Sedan was 10 kilometers deep. Mezières and Charleville fell. There was a gap in the French line; a penetration had been made.

SITUATION OF NINTH ARMY IS CRITICAL

As night fell on the 13th day of May, one half of the Ninth Army's divisions had not yet been engaged. Divisions which had been in army reserve had not come up. It had not been foreseen that they would be needed so early. These French troops were good, but not the best of France. The Ninth Army was rated by French GHQ as fully competent, but as less efficient than the other armies. This was why they held the Meuse. It had been assumed that this sector was the least likely to have anything important occur in it. The armies with high ratings had the posts of honor on the marching flank; those with next higher rating were in the center. With the impassable Ardennes in front, holding the Meuse should have been an easy mission. It did not call for the best troops; these were assigned to sectors where it had been foreseen there might be desperate fighting.

The Germans had piled into Sedan and other towns so fast that there had been no time to blow mines already prepared, nor to plant antitank obstacles across lines of approach. The French towns were stocked with a six-months' supply of munitions and food for the large forces based upon them. The Germans did not need to send forward gasoline, oil and rations. Everything was at hand in captured depots.

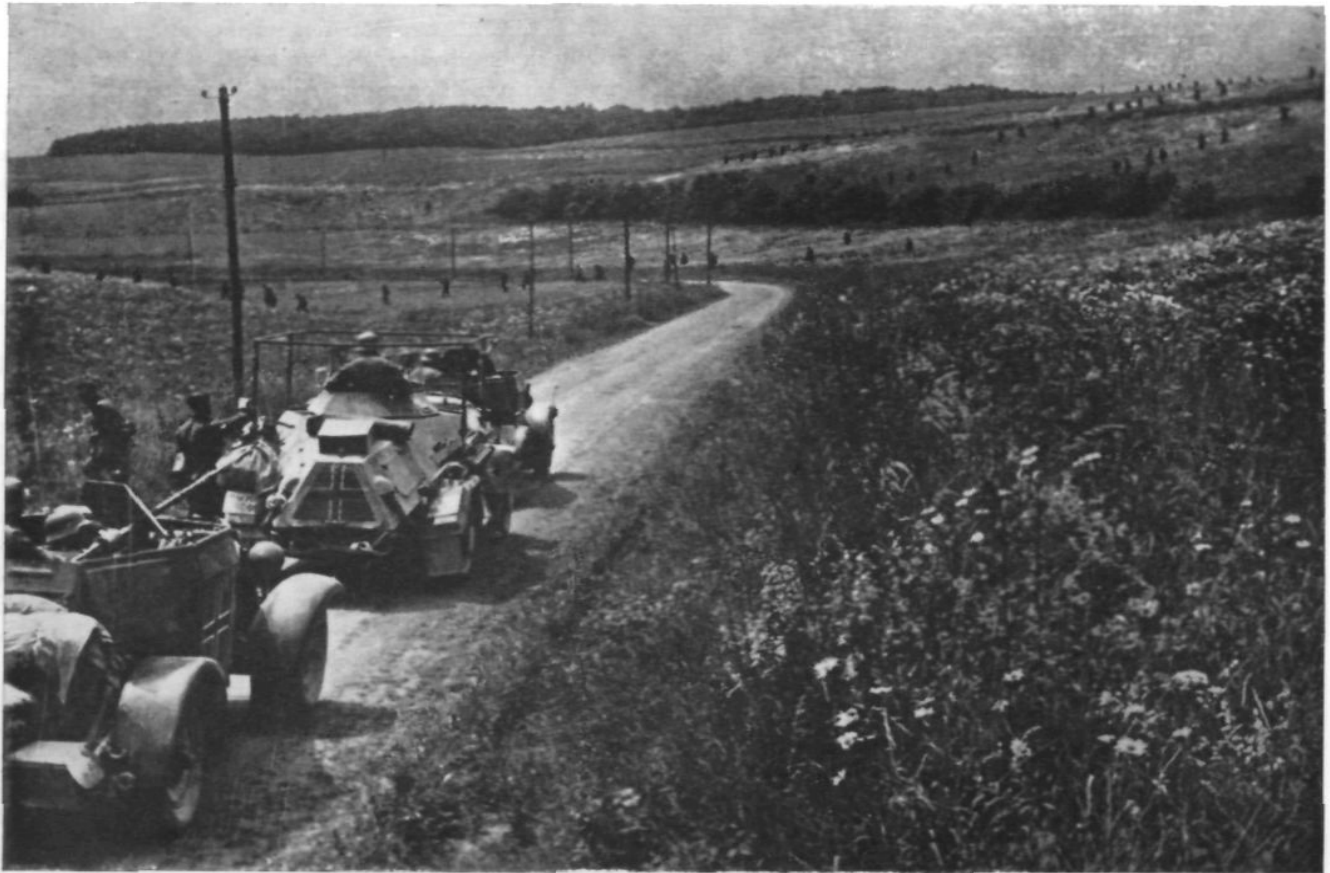
The Ninth Army now was short of supplies. Its depots had fallen to the enemy within the first twenty-four hours of fighting. Higher commanders did not know where their troops were. Many wire lines were down. Where they functioned, everyone suspected that the individual at the other end was the enemy. Telephone, telegraph and radio orders and messages were disregarded, or the execution of what was directed was suspended until the receiver had an opportunity to test the genuineness of the despatch. It was impossible to have things done in an orderly manner.

The divisions which had been in reserve were moving towards the front. They moved slowly, much too slowly. Traffic jams increased. Villages, crossroads and rail junctions were mercilessly shelled and bombed. Bridges went down. Some were destroyed by demolition details, who were in such a hurry that they cut off some of their own troops. Refugees were stopped. They flowed desperately

to the right and to the left, got into other lines of traffic. The military police and G-4 had no circulation plan for such complex, criss-cross and reverse movements. Congestion became even worse.

All during the night of 13-14 May, German tanks, artillery and infantry poured without cessation through the gap. The mechanized front-line troops received supplies sent from captured stores. Motorized infantry and artillery followed in rear of the front, and successively formed on right and on left into line, covering each flank of the gap. A corridor with both flanks strongly defended was organized.

The planes found the crossings. Observation was excellent, and they were themselves sighted by German planes. A fierce air battle resulted. Notwithstanding this, the French and British planes, over 150 in number, reported that they had dropped bombs from a low altitude; had wiped out 2 permanent and 2 ponton bridges; had destroyed large tank and troop concentrations; had blocked every main road. They considered this a notable success, quite sufficient to enable the Ninth Army to push through its counterattacks. However, a French liaison officer who saw the British planes leave for the Meuse states they were 60 in strength; only 20 returned. Apparently Allied planes



A battle scene near Verdun during the breakthrough. While the infantry advances on a broad front against the enemy, the armored vehicles stop in a defiladed spot.

ALLIED REACTION IS INEFFECTIVE

On the morning of 14 May, the battle beyond the Meuse and in front of Sedan raged furiously. Allied GHQ saw that the pocket the Germans had pushed over the Meuse must not be allowed to grow. They hoped to reduce it and perhaps cut off the Germans who rather recklessly had gotten so far ahead. Some mechanized troops being available, the Ninth Army undertook several counterattacks. Allied air forces were ordered to destroy the German crossings over the Meuse.

did not interfere materially with the Germans crossing the Meuse; the ground defense against aerial attack was strong and well organized.

The Ninth Army did counterattack. The Germans attacked too, advancing in all directions from Sedan. Armored units got into the French rear areas. They appeared at the Ninth Army CP, the personnel of which barely had time to escape. Papers, maps and records were lost. Telephones were captured undamaged. German officers speaking French seized the phones. They sent out fake withdrawal orders in the name of General

André Corap, commanding the Ninth Army. They received the reports of subordinate French units; thanked them for the information; radioed at once in the clear to their own headquarters and to other units listening in.

With the loss of the Army CP and its message center, liaison was lost in the Ninth Army. It became impossible to communicate between divisions or with higher authority. The French troops were unfamiliar with the region in which they found themselves. They had maps of the frontier, a long distance away, but no maps covering the terrain where they were now operating. The officers and men belonged to Reserve divisions from other parts of France, and were strangers in the vicinity. Their only artillery consisted of 75-mm. batteries. If these took position for direct fire against the German tanks, the enemy saw them and attacked them in flank with armored units, or with dive bombers from above. If they used indirect fire, they could not adjust deflection fast enough against the hostile fast-moving armored vehicles.

The French troops were bewildered. Here was the enemy deep in France, when he was supposed to have been met nearly a hundred miles away. They thought themselves abandoned. How else could they explain the absence of orders from Army Headquarters? How could they explain the absence of heavy artillery? How else could they account for what appeared to be hasty and badly-improvised measures, which the soldiers could see were ineffective? Why this swarm of refugees, constantly in the way, impeding movements, blanking the fire, and clearly indicating that something was very wrong with the high command?

CHAOS

Officers were unable to explain what was happening. They did not know. The enemy was not always in front. His armored units seemed to come suddenly and most unexpectedly from any direction. Dive bombers attacked anything in sight. The officers had no remedy. They could not remember anything in the Regulations which applied to a situation like this. They rallied their men; faced in several directions at once; took emergency measures, hoping to the last that some one would come along with an intelligible order. It never came. The confusion became hopeless. Every unit did something different. They sensed that resistance was useless. They had been abandoned by their own headquarters. They gave up. Men threw away their arms and joined the hordes of refugees which crowded the roads.

The Germans pushed around and ahead of this chaotic mass. According to their own statements the main idea of this day's maneuver was to open permanently the gap secured the preceding day, by destroying rear connections of the enemy, his reserves, his assembly stations, and by destruction of lines of communications to prevent other troops from closing in front. They did not find it necessary to fire much. Resistance was irregular, not very serious and

generally soon stopped. A few bursts of German machine-gun fire, a few volleys from the artillery, or a few bombs from the air force, according to the situation, kept the endless stream of stragglers and refugees going. The air force, the artillery and the armored units communicated directly with each other by radio *in the clear*. Little time was required to overcome the few centers of resistance which were encountered.

ALLIES STILL FAIL TO APPRECIATE MAGNITUDE OF DISASTER

There were places where French counterattacks, supported by mechanized units, made an impression. The Germans advanced this day, but not as much as on the day before. Afternoon reports indicating only a relatively slight advance were received by Allied GHQ, and by them passed on to the Allied Supreme War Council which sat at Paris from 6:00 PM to 8:30 PM.

It was realized that the situation around Sedan was serious. An enemy main effort was certainly being made in this area. But according to "military experts" the Germans were taking a dangerous strategic risk in forming a non-fortified pocket.

The fact that the German advance was noticeably less than heretofore gave an impression that it had probably reached its zenith. In the World War it had been a well recognized rule that penetrations reached a maximum depth of approximately one half of the base of the attack front. Applying this rule to the present case, Allied GHQ reasoned that the Germans would not advance much farther unless they enlarged their base. It was impossible to do this eastwards, for here lay the impregnable Maginot Line. On the other flank, beyond Namur, the Allies were not doing so badly, and might readily prevent more gains in this direction. The situation about Sedan might stabilize.

It was well understood that German success in enlarging the Sedan pocket would threaten the security of the Allied armies, particularly those in Belgium. The enemy might act against the flank of the Allies in Belgium; or threaten the Maginot Line from the rear, for which it was not prepared; or cut the lines of communication of the Allies by an advance westwards. There was no information as to which of these plans he would adopt. He might again shift the weight of his attack to the north flank, where according to Allied prognostications it ought to be.

The Ninth Army was authorized to use certain reserves to prevent any German advance from the pocket. In spite of British objection, and as a precaution, the Allied left was ordered to arrest its forward movement, and instead to withdraw, extending its right to resume contact with the Ninth Army so as eventually to close the gap in the Allied lines now extending from Namur to Sedan.

The subsequent failure of the French to close the Sedan gap is well known today.

ACTION OF PANZERS IN THE GAP

Among the German advance mechanized units, results varied widely. Some units had penetrated deeply into hostile territory. They had disrupted lines of communication and of supply; had attacked, destroyed, or rendered inoperative rear establishments; generally they had carried confusion into the Allied rear. Some German Panzer units continued to advance; others sought to retire to sheltered places to secure supplies; some held where they were until the supplies reached them; others fought until infantry and artillery arrived to consolidate their positions. The night of 14-15 May found the front to be not a line, but a zone of considerable depth, within which units of both sides were inextricably mixed.

However, the German mission now had been accomplished. The Allied front had been broken through. In five days of fighting, a penetration had been made to a depth, and on a front, sufficient for the maneuver of large forces. *Open warfare was ready to start.* And for this the Germans were armed and trained. The fate of France had been decided.

DISCUSSION

This case is a penetration of a continuous fortified line. The Germans selected the sector where they were least expected, the sector where the topographical difficulties were the greatest. They prepared most carefully for their attack.

Eight months of stabilized warfare behind their West Wall afforded time for the necessary materiel to be manufactured and distributed, and proper training given. Probably the most important single element was armored vehicles. The war in Spain, which only ended in January, 1939, had shown that vehicle designs then in use were unsuitable. They were scrapped, and new types ordered. It took until May, 1940, to design, produce, and issue the new armored vehicles and to train troops in their employment.

Initial dents in continuous lines were made by a *coordinated* attack consisting of heavy artillery fire, air bombing, and infantry assaults in armored vehicles. This method had been tried out on a large scale in Spain, where it had been very successful. There is not yet sufficient information to determine what improvements the Germans made on the Spanish method. The essence of this maneuver is to keep moving, and not to stop operations for lack of intelligence. All information concerning the enemy's positions is utilized. Any information received during combat is radioed in the clear. Artillery OPs are kept forward; observers radio back location of targets and positions of own front lines. They must be at the very front, and stay with it. The artillery fires at anything located by any method; it must divine the location of targets not observed, of which there are always many. During battle, artillery must never cease to support with fire its front line.

It must bring promptly, and without waiting for requests, effective fire on the enemy.

A noticeable reason for the German success was the pushing of fresh troops into dents and gaps secured, all night long, so as to have an overwhelming force ready in the morning. This was not a new idea. The French recommendation for the American attack on 26 September, 1918, was that the divisions in line, after reaching their objective by noon, be leap-frogged by fresh divisions in rear, who were to continue the attack the same afternoon, to be leap-frogged in turn the next day by the original front-line troops, who had in the meantime been rested and reformed. This plan was rejected by the Americans as being too complicated; in their opinion such a maneuver was suited only to highly trained troops, which they, at that date, did not claim to be.

It is necessary in modern war to have highly trained troops and generals, who can and will maneuver.

Once again, in the Sedan campaign, the Allies made an *erroneous assumption as to the enemy's intentions.* He did not make his main effort on his right, but on his left. The erroneous assumption was FATAL—led to catastrophe. After the error was recognized it was *too late* to correct the unsuitable disposition of the troops, or to arrest the spread of the disaster.

On 10 May, the Allied GHQ, apparently under orders from the governments, despatched all troops forward. They did not dare to wait and risk public criticism of being *too late.* Rushing forward to attack, without retaining a suitable reserve for unforeseen contingencies, might have been all right provided the assumptions as to the enemy had been correct. As it turned out they were materially wrong. The Allied action was not too late; it was *too hasty*—another extreme which can be equally disastrous. There is a mean between these two ways, which a wise commander should be able to employ.

REMEDIES ARE SUGGESTED

The problem at once presents itself as to how hostile mechanized forces can be prevented from operating in rear areas, thereby causing general disruption of communications, supply lines and rear-area installations, and of attacking fortified areas and defensive centers from flanks or rear.

Obviously if the enemy has no space in which to maneuver, on his part there will be no open warfare. If continuous lines hold, nothing except the stabilized form of war is possible. If the line is broken through on a sufficiently large scale to give the attacker maneuver space, open warfare may start, and in back areas. The solution to the problem is to prevent the enemy from securing the necessary maneuver space.

French writers commenting on their defeat in May and June, 1940, have recommended, as a proper procedure, that special counterattack units be provided and

held constantly ready to attack immediately any hostile penetration. They suggest groups of about 2 battalions of infantry motorized, at least a battalion of tanks, and artillery and air units. The success of such a force would appear to depend upon the strength of the enemy, the time of day, and the terrain. It might succeed. If it did not, if it got lost because of darkness or other reason, or if it failed, it might cause more harm than good. If, owing to the lateness of the day, it waited until morning, it might be *too late*. The enemy would have had all night to go elsewhere, and to pour more troops through the gap.

It is more probable that where lines are continuous, and it is desired to keep them so, to prevent the enemy from securing maneuver space, it will be necessary to have a duplicate line. This will have to be sufficiently far back that it could not be pierced without requiring the enemy to displace his artillery forward and make a complete new assault. If the two lines are connected diagonally by rocade lines at convenient intervals, enemy penetration of the front line would find itself inside a fortified pocket until this in turn could be pierced. This method was used successfully in the World War of 1914-1918. It does require large forces and much materiel to man the various lines. It is now evident that a single defended line is dangerous. Once broken it may lead to

destruction of the entire line, even if it is hundreds of miles long.

Instead of counterattack battalions, complete divisions and corps will probably be needed to operate rapidly against a hostile penetration. Such a situation presents such hazards that safety should be secured by overwhelming forces. If the side making the penetration pours troops all night through the gap, the other side can do the same around it, possibly having better lines of communication. This will require more mechanized and motorized troops than have heretofore been provided, and more of them initially in reserve. It calls for quick decisions and action. The French at Sedan did not have motorized troops in sufficient numbers to close in around the gap the Germans had made. Having more motor transportation, the Germans had superior maneuver capacity, and could concentrate larger forces in the shorter time. This comment is outside the question as to whether the French correctly estimated the situation at Sedan.

The present tendency of war experience points to a large increase in mechanized and motorized troops where operations are conducted in terrain suitable for their employment. These forces must be provided in advance of the date of operations. The side with the greatest number of mobile units will certainly have the advantage as to maneuvers.

CONFESSION AND PRAYER FOR PARDON TO ST. BARBARA, BY A WORLD WAR ARTILLERYMAN

Barbara, the artillery's patron saint,
Hearken to one who whorshipped thee of yore;
Thy scarlet banner kept without a taint
And pridefully thy gold crossed cannon wore.
While pen, not sword, for years has been my passion,
"I have been faithful to thee," Barbara, "in my fashion."

Rife in the world again are war's alarms,
The thunder and the lightning of thy cult.
Thy devotee would fain have sprung to arms
And tried to with deplorable result.
Though willing as before and maybe bolder,
They cast me forth, for I was likewise older.

I may not watch the long brown traces strain,
Riding in dust cloud by the snorting teams.
I may not fire a battery again.
The red guidon waves only in my dreams.
I may not even—Barbara, be apprised—
Command artillery which is motorized.

Have mercy on me, lovely sainted one.
Let tear of pity glisten in thy eye.
What could I do but that which I have done?
Non mea culpa. From the depths I cry.
I, since thy arm would not have none of me,
Have joined up with the home guard *infantry!*

FAIRFAX DOWNEY



"Signal"

Fort Eben-Emael twenty-four hours after the first shot was fired. Wounded Belgian defenders on the ground.

TIME SHELL and the BLITZKRIEG

● By Major James R. Randolph
Ordnance Reserve

Finland's Mannerheim Line held out all winter against heavy odds, and yielded only when its guns were worn out and its defenders exhausted. By contrast, the French and Belgian defenses did not seriously delay the Germans.

There does not appear to have been any difference in the design of the fortifications that would be adequate to account for this. And the Allies had observers in the Finnish campaign, and had time to correct in their own defenses any weaknesses the Finnish defenses had showed. They seem to have entered the spring campaign fully confident that they could stop the Germans. Hence the

rumors of treachery that have been going around. Also, there was talk in the newspapers of the Germans having a "secret weapon that cannot be used against us" but this was a mistranslation. What the Germans claimed to have was simply a new technique or method of warfare. And as our knowledge of the campaign becomes more complete there is increasing certainty that no new weapon was used. The weapons were the familiar ones, no better in the German Army than in those of their opponents, and with which the Allies were as well supplied as they thought necessary.

The place to look for a new technique is the place

where the Allies were taken most completely by surprise—the place where something happened that they believed could not happen, and which thereby turned the course of the whole campaign.

In the capture of Fort Eben-Emael this was the ability of the parachute troops to maintain themselves within the area of the fort for a day and a night, and to cover the entrance of the engineers next day.

This fort was considered the strongest of the new fortifications, and guarded the important eastern side of Liege, and the crossings of the Meuse River and the Albert Canal. It was supposed to be almost impregnable. On the morning of May 10 the Germans began a heavy bombardment, which lasted several hours, and whose chief effect was to cover the area with craters. Immediately afterwards parachute troops were dropped into the fort and took refuge in these craters. Meanwhile an engineer battalion, with two companies of infantry and some light artillery, had crossed the canal four miles to the north, and was making its way down toward the fort. It arrived, and was ready to attack the fort, the following morning. The parachute detachment helped it to climb up the steep walls, and then the engineers captured the fort with demolition charges, hand grenades, and guns.

The fort had 1,300 officers and men inside it, greatly outnumbering the parachute detachment, yet in a day and a night they could not get rid of this detachment.

After the German blitzkrieg in Poland the Allies had studied the reports and decided that such an attack could not be made in France. The region around Sedan was considered particularly strong, because it contains numerous wooded hills which in themselves were thought to be tank proof, and which are too close together to permit unarmored troops to follow tanks through the intervening valleys, as long as these hills remained in French hands. The region thus formed a tank filter, and tanks unaccompanied by infantry are fairly easy to stop. So the French entrusted the defense of this region to second-rate troops. But that's where the Germans broke the line!

At Eben-Emael no tanks were used. At Sedan the decisive action was one in which tanks could not take part. What was it, then, that let the Germans through so easily?

In both cases the decisive action appears to have taken place under conditions which caused the fighting to be at short range, and which prevented either side from concentrating masses of men. It took place between small groups of men, sneaking around in cover looking for the enemy; and when he was found, the man who shot first won, was through with that fight, and instantly ready for another.

At Fort Eben-Emael the cover was provided by those numerous craters. At Sedan it was provided by the woods, and the natural roughnesses of the ground. The Belgians had machine guns in the fort. The French had machine guns in their strong points in the woods. These would

keep the Germans scattered. The Germans, in turn, had machine guns that would keep the defenders from massing against them, and make each fight an individual fight.

So the explanation of what happened lies in some difference between the men used by the Germans and the men used by the defense, such that the Germans could win a big majority of these fights. The same was true in the Finnish campaign, only there the advantage was on the side of the defenders, and resulted in a successful defense under conditions very similar to those in which the Germans made successful attacks.

Mental mobility appears to be the answer. This means the ability to think fast when excited, so that a dangerous situation appears as in "slow" movies. It means that the German or the Finn could get into action first in such a large percentage of their contacts that the enemy hadn't a chance. Mental mobility is common in Finland, where keeping alive depends more on the ability to meet emergencies than on the ability to work steadily. In a nation like Germany it occurs chiefly as an inheritance from the armored horsemen of the middle ages, but now it is scattered all through the population, and is not very easy to notice under ordinary conditions of life.

But the Germans developed psychological tests for it in their efforts to make their small treaty army as efficient as possible, and to permit its rapid expansion into a larger force. They give these tests to candidates for commissions. The resulting officers, taking their jobs seriously, trying to make their maneuvers *kriegsmässig* (as much like war as possible) and trying to build the best possible army in the shortest possible time, have picked mobile minds for what they consider their best troops. These are their airplane pilots, of course. All the larger powers know that much. But they are also the tankmen of the *Panzer* divisions, the troops that accompany the tanks, the parachutists, the *Sturmtruppen*, and the *Bahnbrecher*, or combat engineers.

These men look like anybody else. But it is born in them to go berserk in a fight, deciding quickly, moving quickly, with a glorious blazing sensation in the mind that makes them for the time indifferent to death as long as they get the enemy.

Ordinary run-of-draft troops should not be expected to face such picked men in the open with weapons that do not permit of defensive tactics. Massed bayonets were good in their day. Rifle fire at long range is good. But these modern fights in cover are settled with repeating rifles at short range, with light machine guns, tommy guns, pistols, hand grenades. In such fighting the mobile mind has a decisive advantage.

It is in this that the Allies failed. They supposed that the troops they put in Fort Eben-Emael, and in the wooded hills around Sedan, would be able to hold their own against equal or lesser numbers of Germans if these happened to get close. The possibility that the Germans

might be able to select men who, with no more training, would be vastly superior in that particular kind of fighting had not occurred to them. And it was a fatal mistake. But the remedy is simple, once you understand the problem.

This remedy is to stop thinly scattered enemy forces with a time-shell barrage instead of expecting the infantry to stop them. The infantry weapons are effective against masses of men, and against men who try to close quickly, running in the open. But with this possibility of selecting superior fighters and using them in attack, the time-shell barrage assumes a vital importance.

The parachutists at Fort Eben-Emael were protected, by the craters, against flat-trajectory fire, and from shell splinters from percussion shellfire. But they had no overhead cover. They had to stay there for hours before the

assault could begin. The defenders knew where they were, even though they could neither reach them with their weapons nor go out and meet them in the open. A barrage of time shell, with the knife-like action from above, probably would have wiped them out.

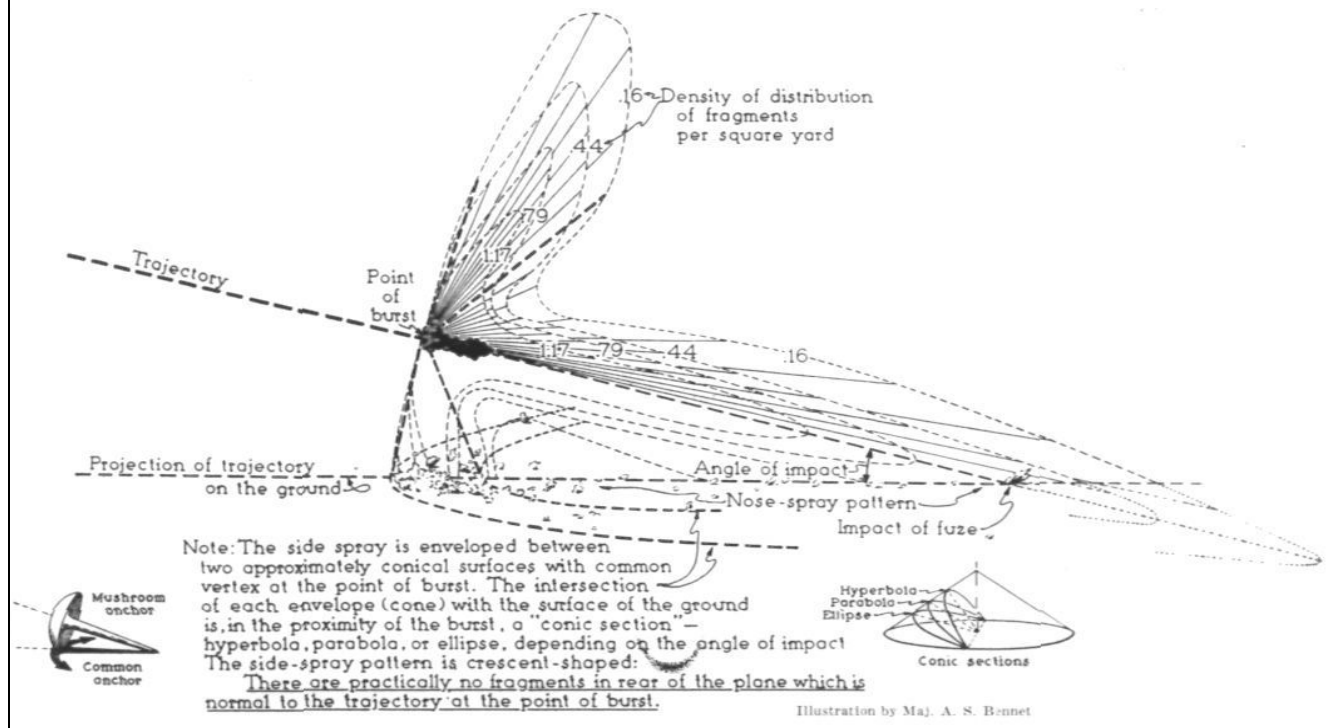
In the Sedan hills, too, the Germans were able to take cover against flat-trajectory fire and ordinary shell fragments, using the natural cover, as well as shell holes, running quickly from one bit of cover to another, crawling flat where the cover was thin, and gradually closing with the French positions until they were able to attack the defenders with rifles and hand grenades. The French have been accused of using the rifle as an area weapon, firing volleys at terrain "infested" by the enemy. And in such cover this practice merely gives the position away without accomplishing much in the way of casualties.

TIME SHELL

The drawing shows an air burst with ground pattern as determined from a technical study of the fragmentation pattern of an antiaircraft shell combined with a study of photos made at Fort Sill showing ground pattern of fragments from a high burst. To the fragmentation pattern have been added lines radiating from the point of burst, representing trajectories of the fragments, and drawn with densities corresponding to the densities given in an Ordnance technical study. The pattern is contained in the vertical plane through the trajectory. The "surfaces of equal densities" are the symmetrical surfaces generated by the rotation of the pattern about the trajectory as an axis.

The fragments from time shell are very numerous and irregular in shape, having at first a high velocity which is rapidly lost. Their penetration is slight. When a time shell bursts it delivers a vertical attack the effects of which are considerable but localized. Time shell can reach deeply defiladed targets not protected by overhead cover.

—MAJOR A. S. BENNETT, FA.



Pictures taken within the past year show the French using trenches of the type used in the last war, with men massed in the trenches and no overhead cover.

The proper way to defend such terrain against the blitzkrieg is to sprinkle rifle pits all over it, either single pits or squad pits, provide these with overhead cover adequate to stop shell fragments, provide it liberally with telephones, and then use a combination of direct fire and time shell for its defense, the latter being spotted by the men in the position. It is important to have telephone lines in multiple, so as to lessen the risk of their being put out of action, and also to have other means of signalling to the artillery in case the telephones fail.

Artillery to protect Fort Eben-Emael in this way could have been placed in the other forts. Or it could have been placed under cover several miles away. Mobile artillery, placed just before the attack and camouflaged, is less likely to be found by the enemy air force. In a region like Sedan the different hills can protect each other. Such a region should be defended in great depth, with artillery all the way back. The forward guns break up the enemy massed attacks. The rear guns protect the forward guns against close attack, and replace them if they are put out of action.

Trench mortars can be used in this way if they are equipped to fire time shell. These will usually be in the position itself, so that there is less trouble with the communications. But because they are close and can be located it may be best to keep them in reserve until telephone communication with the more distant artillery is interrupted.

In addition to thus protecting areas that are naturally tank proof, time shell can be used to filter a mechanized attack, stopping the unarmored troops accompanying and following the tanks, so that the tanks can be dealt with separately. When this is done the tanks themselves are fairly easy to stop.

In the attack on the Mannerheim Line the Russians used armored sledges pulled by tanks, the unarmored troops staying behind these sledges until the Finnish position was reached, when they would jump out and rush to the attack. These sledges had armor on the front and sides to protect the men from flat trajectory fire, but time shell coming down on top of them would have been very deadly to the men.

Modern time shell is superior to shrapnel from a manufacturing point of view, and now that accurate time fuzes are available it has wholly replaced it in the United States Army. The tactical use is practically the same. Each produces a cone of small projectiles, the area covered and the density of coverage being determined by the distance between the burst and the ground. Shrapnel gives a longer cone, and hence is less affected by error in the fuze, but that is no longer important.

Time shell also has the advantage, in use against a blitzkrieg, that the fuze can be set for impact instead of time, and then the shell can be used against tanks. It does not have the penetrating power of armor-piercing shell. But if used in high-angle fire it can easily go through the thinly armored top of a tank. And of course anything that bursts on a tank will throw fragments all around for a considerable distance, thus endangering accompanying troops.

Failure to stop the German blitzkrieg proved utterly disastrous for the Allies. And yet the reason for that failure seems simple and easily remedied. It is just that in modern war you have to keep alert and thinking all the time, trying to anticipate anything the enemy may do, and take precautions against it. It is no longer possible to say, even for a short while, that you have a "perfect" defense, and that there is no further need to worry. For if there is the slightest imperfection in it an alert enemy may be counted on to find it and to take advantage of it.

AMERICAN-MADE TRUCKS IN SIEGE OF BARDIA

Pictures of the British siege of Bardia in the current Egyptian campaign, just arriving in this country by plane, show Marmon-Herrington All-Wheel-Drive trucks pulling field guns across the North African desert to take part in the blasting of this important Italian port by New Zealand troops.

Arriving just at the time the newspapers are crowded with appeals for greater aid to Britain, these pictures are dramatic proof that the American automotive industry, at least, has been giving effective aid to Britain's war machine for some time. The particular vehicles shown in the pictures were shipped months ago from Indianapolis, and were units in several fleets of similar trucks ordered by Canada, Australia, New Zealand and South Africa.

"All-wheel-drive trucks as transport are particularly suited for desert operation," according to an official of the company. "Having power and traction applied through all four or all six wheels, they are enabled to haul or pull heavy loads through deep loose sand which would present an impossible obstacle to conventional two-wheel-drive vehicles. Their use in the Libyan desert campaign, no doubt, contributed much to the surprise and consternation of the Italians. Their own experience with greatly inferior mechanized equipment had led them to believe that they were safe from any sudden attack."



Work is being rushed at Fort Ord, California.

All plates courtesy "The Quartermaster Review"

FIELD ARTILLERY REPLACEMENT CENTERS

By Lieutenant Colonel Edwin P.
Parker, Jr., F. A.

Three Field Artillery Replacement Centers are now in the process of organization. These are located respectively at Fort Sill, Oklahoma; near Nacimiento, California (part of the Hearst properties); and at Fort Bragg, North Carolina. The capacity of these centers varies, that at Fort Sill being 7,000 white, 1,000 colored; at Nacimiento 6,000 white; and at Fort Bragg, 15,000 white, 1,500 colored.

Under the present plans the organization of these centers will be completed by February 15, 1941, and will be opened March 15, 1941, to receive men inducted into the service by the Selective Service System.

Although these centers are under the control of Corps Area Commanders, the Chief of Field Artillery will exercise supervision over the training therein. The present Chief of Field Artillery, Major General R. M. Danford, is preeminently qualified for such supervision, as during 1918 he organized and commanded the Field Artillery Replacement Depot at Camp Jackson, South Carolina. That Depot functioned very efficiently and filled a great need in the Field Artillery by supplying trained replacements as fillers for under-strength organizations.



Another view of Fort Ord, California.

Today a Field Artillery Replacement Center is, strictly speaking, a Field Artillery Basic Training Center, not merely a training center for replacements.

After March 15, 1941, all inductees selected for the Field Artillery will be sent to Replacement Centers for twelve weeks' training before being sent either as fillers for under-strength units or to organize new units. These inductees will come from the Corps Area Reception Centers, where they will be classified and equipped with uniforms.

In order to initiate the organization of and make the necessary preparations for the proper functioning of these Centers, the Chief of Field Artillery placed on temporary duty in his office during the month of November, 1940, six officers (two for each Center) whom he had selected for duty with the Centers. These officers, under the supervision of the Chief of Field Artillery and with the able

Fort Jackson, Columbia, South Carolina.



assistance and fine cooperation of the personnel in his office, completed, insofar as was practicable, the preliminary work essential to initiate these Centers. Such work included preparation of Tables of Organization (for Center Headquarters, Regiments, Battalions, and Batteries) designation of the strengths and classification of the required training personnel, preparation of Special Tables of Allowances to include all classes of equipment, listing of the number and kinds of training literature, Army Regulations and other regulations, studying and requesting the necessary training facilities, and conferences concerning the construction of the housing for these Centers. About December 1, 1940, one (of the six officers mentioned above) officer was sent to each Center for permanent duty to look after the many details incident to the organization thereof.

In order to have sufficient trained personnel for these Centers ready by the opening date, the Chief of Field Artillery has selected the instructional personnel in advance and has provided special training therefor. Many Reserve Officers have been sent to take special courses at the Field Artillery School. Provision has been made for the training of enlisted cadres to be used for instruction purposes. These men will be trained by their regular organizations before arrival at the Centers. After their arrival, one month will be available for intensive training in the specific duties which they will perform after the arrival of the inductees. Such special training will be essential, as a large number of the men in the training cadres will have limited service and experience. This condition has been caused by the necessity of calling on Regular Army units several times during the past year to supply training cadres for units being organized.

The number of officers and enlisted men to be used as training personnel will vary with the size of the Center. At Fort Sill this number will be 192 officers and 1,065 enlisted men, at Nacimientto 146 officers and 801 enlisted men, and at Fort Bragg 402 officers and 2,207 enlisted men.

Each Field Artillery Replacement Center will be organized into a Center Headquarters and Headquarters Battery and two or more regiments. The size of the Center Headquarters and Headquarters Battery will vary at different Centers. Each regiment will consist normally of a Regimental Headquarters and Headquarters Battery and three Battalions. Each battalion will include a Headquarters Battery and four Batteries each of 250 men strength. Thus a battalion will have an enlisted strength of 1,000 men and a regiment of approximately 3,000 men. These strengths include the men of the training cadres.

Besides a limited number at each Center Headquarters, there will be 17 enlisted men of the training cadres in each Regimental Headquarters Battery, 5 in each Battalion Headquarters and 31 in each Basic and Specialist Battery.

Table 1 gives the strengths of the various Centers along with the number and types of regiments, battalions and batteries.

As noted above, all inductees will be given twelve

weeks' training. The program to be followed generally is that listed in Mobilization Program No. 6-1 dated July 25, 1940, for Field Artillery Replacements at Enlisted Replacement Centers. Under this program all men will receive the same instruction during the first two weeks. Afterwards, they will receive instruction which will fit them for their specialty, this instruction varying according to the type of specialty.

Before the end of the twelve weeks' instruction all trainees will be examined for the purpose of finding out whether or not they are qualified in the subjects in which they have been instructed. Any man found not qualified will *not* be sent to an organization. He will either be retained for further instruction or sent to a Development Battalion.

In organizing these Centers considerable attention has been given to the number and types of specialists in the various Field Artillery units. The aim is to train these specialists in the number and kind required for organizing new units and for filling vacancies in others. Upon satisfactory completion of the course it is planned to list the specialty of each man and classify him accordingly. When he is sent to an organization he will be "tagged" with his specialty.

In the Basic Batteries the men will be trained as chauffeurs and cannoneers for the types of materiel with

which their batteries are equipped. Twenty men in each Basic Battery will be trained as automatic riflemen and machine gunners.

In the Specialists Batteries, after the first two weeks the majority of the training will be on technical subjects which will fit the soldier for his part in the battery team.

Training of the individual soldier will be aided by the issue to each soldier of a copy of the new Soldier's Handbook which has been prepared in the War Department and which should be ready for distribution before the opening of the Replacement Centers. In addition, a Field Artillery Supplement to this Soldier's Handbook is being prepared. This Supplement is planned to include those basic subjects listed in the Mobilization Training Program 6-1 for the first two weeks' period which are not covered fully in the Soldier's Handbook. This Supplement will be issued to each soldier also. Furthermore, each member of a basic battery will be issued a copy of the Field Manual on the Service of the Piece for the weapon with which his battery is equipped.

A large supply of training publications covering the specialists' subjects are being secured so as to have not only reference texts for the use of instructors but also texts available for study by the trainees.

A pamphlet entitled "Part I, Field Artillery Training:

TABLE 1
SUMMARY BY UNITS AND STRENGTHS
Three Field Artillery Replacement Centers

	FORT BRAGG	FORT SILL	NACIMIENTO
Officers	402	192	146
Enlisted Men—Cadre	2,207 (98 col.)	1,065	801
Enlisted Men—Trainees	14,016 (657 col.)	6,570	5,037
TOTAL ENLISTED MEN	16,223	7,635	5,838
WHITE			
Center Headquarters	1	1	1
Regiments	5	3 (2 Basic) (1 Specialist)	2
Battalions	16 (12 Basic) (4 Specialist)	7 (5 Basic) (2 Specialist)	6 (4 Basic) (2 Specialist)
Batteries—Gun			
75-mm.	21	5	8
155 How.	19	12	8
155 Gun	4	3	
240 How.	2		
	—	—	—
Total Gun Batteries	46	20	16
Batteries—Specialist			
	2—Cooks	3—Signal	1—Gen. & Mtr. Mech.
	2—Clerks	1—Radio	2—Wire Comm.
	6—Signal	1—Instr. & Survey	1—Clerk
	2—Radio	1—Cook	1—Instr. & Survey
	2—Instr. & Survey	1—Clerk	1—Radio
	2—Mtr. Mech.	1—Mtr. Mech.	1—Cook
	1—Gun & Gen. Mech.	1—Gun & Gen. Mech.	
	1—Composite	1—Composite	
	—	—	—
Total Specialist Batteries	18	10	7

General Principles, Methods and Suggestions; Part II, Course in Military Discipline," has been prepared and will be printed specially. One copy of this pamphlet will be issued to each officer in the Centers.

Due to the large number of men to be trained, it has been found necessary to provide considerable additional training facilities at Fort Sill and Fort Bragg. At Nacimientto complete training facilities must be constructed since this property has been leased recently by the War Department. Such facilities will include rifle ranges, pistol ranges, 1,000-inch machine gun ranges, 1,000-inch ranges for moving ground targets, antiaircraft ranges (both miniature and towed target), field ranges for machine guns, landscape target ranges, field artillery training ranges, moving-target ranges and ranges for artillery service practice.

Effort is being made to provide, wherever practicable, these training facilities exclusively for the Field Artillery Replacement Centers. In this connection, it will be found that the limitations on training facilities will control the training programs and facilities to a large extent.

The amount and types of equipment available for the Centers will affect materially the type of training and the results thereof. As is well known, there is a serious shortage in many essential articles of equipment for Field Artillery. It is anticipated that in the case of some articles the supply will be limited, in other cases substitution of other types of articles will be required. This will be true, it is believed, in the case of some Ordnance equipment in

particular. Also, it will be probably some time before the proper types of motor vehicles are secured. These shortcomings, however, will not deter the Centers from making the best of substitute materiel and obtaining excellent training results therefrom.

The building scheme of the War Department for Replacement Centers is based on cantonment construction. This provides for each battery four (63 man) barracks, one (250 man) mess hall, one battery office and storeroom; for each battalion headquarters, one headquarters building, one recreational building and classroom; for each regimental headquarters, a headquarters building, an infirmary, a post exchange, two large classrooms, a guard house and the necessary barracks and mess hall for the men of the regimental headquarters battery. For the Center are included the necessary quarters (one room per officer) and messes for officers and other essential buildings such as theatres, service club, hostess house, fire stations, shops and warehouses.

In conclusion, it is believed that the Replacement Center fills a definite need in the Field Artillery, namely, that of providing efficient training for the recruit or inductee so that when he joins his battery he will be qualified to fill and uphold his place in the battery team in an effective manner. Such training, if properly carried out, will leave its mark on the Field Artillery in the future and will cause the permanent retention of the system of training recruits or inductees in a Basic Training (now called Replacement) Center.



Canadian Militia Training Centres

By E. T. BURCH

Canada started conscription without much fanfare on October 9th, 1940, a little more than a year after declaring war against Germany on her own initiative. Up to that time, there was little need for conscription—indeed, there is still no need for it, as more men have volunteered than there is room for in the fighting forces of Canada.

There are several important differences in the Canadian

"draft" from the American variety. To begin with, the period of training is for a mere 30 days. After that time, the boys are sent home to their jobs, and continue their training attached to non-permanent units, the regular N. P. A. M. units of Canada.

All that is attempted in this brief period is a "shakedown"—the aim is to "sell" the trainees on army life; to let them look behind the scenes and see what life in

the army is really like—with an eye on the future, of course, when it may be found necessary to conscript men for the fighting forces.

National registration took place in Canada during the third week of August, 1940, and in the third week of September notices went out to the 21-year-old age group, stating the time and place for them to present themselves for their medical examination.

All across Canada, placed in towns adjacent to the thickly-populated areas, are the training centres, each one accommodating 1,000 to 1,500 conscripts. But they're not called conscripts—they're known as "candidates"—and they're being treated with kid gloves. No fatigues, and not too much rough language from the N.C.O.'s.

And how is this plan working out, and what the dickens is the army coming to, anyway, with no fatigues?

The powers that be express their satisfaction over the way the whole plan is working. Launched amid lukewarm enthusiasm, the plan is showing itself to have real merit. The loudest horse-laugh, of course, went up over the shortness of the time allotted to train the men—after all, Hitler says it takes a year to make a soldier. Thirty days was merely enough to get the rough edges smoothed off.

I visited the Training Centre at Portage la Prairie, Manitoba, during the first week of the first class. I never saw such a scared lot of kids gathered in one spot in my life. Remember, these were all kids who had *not* volunteered—there are thousands of youths all over Canada taking training with Militia Units across Canada who joined to take training two nights a week of their own accord. These kids, most of them, were afraid of army life. They seemed sullen, and resentful that events should catch up with them and snatch them away from their jobs. Many of them felt that the 30-day period was just a bluff, and they were in the army for keeps. They obviously wondered what the army was going to do with them. When the N.C.O.'s barked at them, they jumped—not through any discipline they had, but because they were scared stiff.

I paid another visit when the thirty days were nearly up—I was astounded! These kids were becoming soldiers—to look at them, you'd be certain they WERE soldiers! As I drove up the entrance drive a platoon swung past, their heads held erect, their arms swinging as high as their shoulders, in perfect step, and obviously enjoying the prospect of a long route march. And did they look smart! As they followed their subaltern into the highway out of town, I watched them, and they broke into a song that was as lusty as ever came from the army in France in the last war.

The officers and N.C.O.'s had a man's job on their hands at first—it took the best part of the first two weeks to get the scared look off the faces of the "candidates"—and to get them to realize that army life can be the best life in the

world, despite what civilians have been saying about it the past twenty years. That was the first big task. After that it was easy. The kids took to the army like ducks to water, and bombarded the instructors with so many questions they had to stay up nights studying to keep ahead of the classes. The training staff say it's twice as easy to teach a 20-year-old kid as it is to try and drum something new into a man of 35. Despite the accusation that the "candidates" are being pampered, I discovered that they really work hard during their short period of training, and the results are certainly amazing.

All fatigues, kitchen and otherwise, are performed by the permanent staff, which leaves the trainees free for really intensive training, despite the obvious fact that it gives them a somewhat distorted picture of army routine.

Lance-corporals are appointed after two weeks, to help out in such routine matters as calling the rolls, marching the boys to meals, classes, etc. This plan works very well, for naturally the incentive provided for promotion tends to keep the boys on their toes. Not that they needed any incentive; there never was a keener bunch of students than the kids that were called up on the first draft.

The day was spent in a combination of lectures—military law, map reading, anti-gas instruction, care and cleaning of arms, tactics—and more active training such as physical training, squad drill, musketry, manœuvres, and field engineering. No attempt was made at specialized training. Lectures included merely a classification of the various combatant arms, how modern armies are organized, together with the characteristics of the various arms—light and medium machine-guns and the basic principles of their operation—now modern tanks and aircraft have changed tactics—the ranges of the various field guns—the purpose of the various forces such as artillery, infantry, air force, mechanized cavalry, and the different services. No examinations were set, although an inspection was made by the G. O. C. at the termination of the 30-day period. Records were kept of the progress of each man, which will be of invaluable assistance if and when the forces call the "candidates" out for full-time duty.

When that day arrives, these kids won't be afraid of army life—most of them look forward to the day. Indeed, almost 25 per cent of these former "scared rabbits" have tried to join active units since the first class terminated. Unfortunately, there is room for only a few of them, as more Canadians have volunteered for the fighting services already than there is room for.

Altogether, Canada's N. P. A. M. Training Centres seem to be pulling their weight, and plans are already afoot to extend the 30-day period to 4 months. But that is still in the form of a rumor, and won't come until well on in 1941, unless unforeseen events increase the pressure of needed reinforcements to Canada's fighting forces.

A Mobilization Training Program

Production-line method of producing trained field artillerymen in four months

By CAPTAIN R. A. ELLSWORTH, FA.

INTRODUCTION

We are all concerned with the problem of utilizing the year's training for our Field Artillery selectees to the best possible advantage. Herein are set forth some ideas for developing well qualified products during the present "limited emergency," as well as for providing a speedy, but effective, method for unit and replacement training after an urgent emergency exists. The system to be discussed pertains mainly to the latter need but is readily adapted to the present problem, by suitably reapportioning the time allotted to the various phases of training.

The system provides for definite, progressive stages of training. The first stage is devoted to the individual phase for proficiency in *all-around* training in all basic subjects for everybody; next, the training of the several different battery and battalion headquarters teams; then, the training of batteries and battalian headquarters as separate whole teams; then, training as battalion teams. The battalion is now ready to train with associated arms in the artillery-supported unit teams; first with regiments, then divisions and, where possible, progressing to corps and army maneuvers. The schedule then reverts to individual training and culminates with an all-inclusive gunners' examination. The procedure to be outlined covers this comprehensive program in four months.

The schedule differs from present training directives in several respects. The most important suggested change is the *all-around*, individual training in small groups in all field artillery basic subjects, as well as general basic subjects, prior to organizing into batteries. This approach is novel, and at variance with the present system of organization and early specialization. It has the distinct advantage of thorough classification of the entire group by means of complete proficiency tests. It definitely places the round and square pegs in their proper holes; it also gives each man the broad, general picture of training and a well-balanced field artillery education at the outset. The men thereby gain a thorough concept of how each individual fits into the team.

Other important variations are the pooling of all materiel

and equipment in the battalion, and the specialization of expert instructors in each basic subject. These two steps are essential to the success of the initial stage of training in small groups, where individual performance is stressed.

Before launching into a detailed discussion of schedules and programs, two assumptions are made. First, that complete equipment and materiel are on hand and issued to the cadres before the recruits arrive, thus eliminating the possibility of makeshift schedules. Trying to train soldiers without a full allowance of working tools gets results little better than does teaching a band without instruments. Next, all recruits will be available every day, all day, for training—sickness would be the only reason for absence. There would be no fatigue, guard, kitchen, or other overhead details demanded of the new arrivals; all these functions would be assigned to the Regular personnel of the Training Center or to civilians. It is further assumed

that all recruits would arrive on the same day, after having been duly processed and trained in the military fundamentals, which training would be the same as is now being accomplished at our various Corps Area Reception Centers.* Of course, the Training Center would be at one of our large posts where all facilities for

housing, administration, and training are already created and functioning. Also, the Training Cadre of Regular Army enlisted personnel would be on hand and thoroughly trained in all field artillery basic subjects, as well as being well grounded in methods of instruction and the procedure to be followed.

CADRE OF INSTRUCTORS

The following cadre is suggested as being necessary for the efficient and expeditious carrying out of the training program. For each firing battery there should be one first sergeant with clerk, one mess sergeant with four cooks and three kitchen police, one supply sergeant with clerk, one motor sergeant with one dispatch clerk, three mechanics, and six good drivers for driving instruction.

*After the Replacement Centers begin to function, no training will be given in Reception Centers.—Editor.

There should be one chief of section and one gunner corporal for each gun section, one instrument sergeant with two instrument corporals and two good instrument operators, one signal sergeant with two signal corporals and two switchboard operators. Battalion headquarters should be provided with suitable NCO staffs, clerks, communication and motor experts to assist with instruction. This cadre would not be permanently assigned to the battalion, but would be on temporary duty from the Training Center during only part of the training period.

The officer personnel should be one Regular Army captain or first lieutenant, and four Reserve officers with each battery. The battalion staff would need one Regular officer in command, with Reserve officers as staff members. All officers and the enlisted cadre should be thoroughly acquainted with the entire training schedule, and each one assigned a special subject for the individual instruction phase, prior to the commencement of instructional duties. All of the enlisted cadre and officer personnel act as group instructors without regard to the provisional organization to which they are assigned for administrative functions. Conferences of all members of the cadre should be conducted each Saturday in order to check on the progress of instruction, answer questions, and to obtain suggestions for improvements. No excuses would be accepted for poor presentation of subject matter or for dispensing faulty or superficial information. Special schools for officers would be conducted as circumstances require. The difficulties of the enlisted cadre would be ironed out as needed, after drill, by officers in charge of each subject.

PHASE I—INDIVIDUAL TRAINING

The individual phase of training lasts seven weeks, the last week being devoted to proficiency tests. Thus, this plan gives one week of concentrated instruction to each of the six field artillery basic subjects before the proficiency tests. However, if we use Wednesday afternoons for supervised athletics and recreational activities of an intramural nature, for the purpose of seasoning and hardening, with Wednesday mornings for small-arms instruction and general basic subjects; and if we use Saturdays for inspections, ceremonies and competitions, there remain only four full days for instructing in each basic field artillery subject. During this individual training period calisthenics is given before breakfast and dismounted drill only from 7:30 to 8:00 for leadership, disciplinary, and command purposes, leaving the remainder of the day for strictly field artillery subjects. Battalion guard and guard mounting, with daily retreat parades, would be in vogue after the individual phase is completed.

During this individual phase the entire battalion is divided into six instructional groups, the men being assigned to organizations merely for administration and housing. The six main groups are rotated each week. Each main group is further broken down into the numerous component elements of the six subjects, in a manner

described below. Further sub-groups for the various elements of each subject are formed so as to permit practical individual instruction by "doing." All recruits should be required to buy, or be furnished, sufficient books and paraphernalia necessary for the proper study of each subject; in many cases abbreviated, step-by-step mimeographs simplifying training literature can be prepared within the unit. All these texts become the personal property of each man and serve as a nucleus for a military library. This first six weeks is going to be an intensified course of study which will necessitate home work, as well as extra instruction where needed. All materiel and equipment will be available for individual self-instruction at all times when not being used by the instructors. The secret of the whole system is to create a natural interest and enthusiasm in the men by the instructors, to the point where application and outside self-learning on the part of those instructed will follow naturally instead of being forced.

Let us break down these various groups and subgroups and make general assignments of available instructors. This will enable us to get the broad picture of the program and to see how closely we approach the desired state of individual instruction. First we have the six general instructional groups: materiel, service of the piece, transport, communications, instruments and preparation of fire, map reading and survey—in addition to small-arms instruction and general basic subjects. These general subjects are broken into small instructional groups generally as follows:

Group 1. Materiel: Small subgroups are formed for instruction in the several different elements of materiel such as: (1) Breechblock; (2) tubes; (3) recoil and counter-recoil; (4) elevating and traversing mechanism; (5) sights and quadrants; (6) undercarriage; (7) general nomenclature, care and maintenance; (8) ammunition and fuzes.

The organization for teaching these separate elements of materiel would require one fourth of the guns, one third of the gunner corporals and chiefs of section, one Regular officer and three Reserve officers. If facilities permit, the group is best supervised and most easily controlled from a large square or circle formation. Each student spends half a day with each subgroup, and then is sent to the next; each subgroup is broken down into as small instructional cells as the materiel and number of instructors permit. It amounts to controlled decentralization of small groups, which procedure makes for closer attention to instructor, and eliminates the possibility of the "smart few" getting the information while the backward ones sit around. It makes *all* of them learn.

For this materiel instruction the guns are completely disassembled so that each part can be seen clearly without anything being left to the recruit's imagination. The book is explained by demonstration of the action of each part, along with the nomenclature. Wherever possible, the students actually disassemble and assemble the particular

part. They get their hands on it, see it, feel it, work with it. Instead of learning by disconnected explanation or trying to unravel the mysteries of a book, they learn by "doing," with the simple picture before their eyes. Four full days of continuous rotation in these materiel groups gives the beginner an indelible working knowledge of the weapon.

Group 2. Service of the Piece. This drill is divided into three sections or phases as follows:

First section (with prime movers) covers the following subjects: (1) Formation of the gun squad and changing posts; (2) posts of the squad (piece coupled) and changing posts; (3) posts of the squad (piece uncoupled) and changing posts; (4) posts and duties for coupling; (5) posts and duties for uncoupling; (6) posts for preparing to mount, mounting and dismounting; (7) moving the piece by hand; (8) posts in front, rear, right and left, piece coupled and uncoupled; (9) posts and duties for "prepare for action"; (10) posts and duties for "march order." During this drill smartness, snap, alertness, and discipline are stressed, frequent commands of "change posts" are given, and each member of the squad holds up his hand as a quick check for mistakes. One fourth of the guns and prime movers would be available for drilling as complete gun squads, with each squad covering the ten subjects. Another one fourth of the gunner corporals and chiefs of section would be employed along with one Regular officer and two Reserve officers. Competitions can be utilized to good advantage for creating interest.

Second section (without prime movers) covers the following subjects: (1) Settings; angle of site, range, fuze setters and quadrant. This instruction is best accomplished by breaking down into smaller groups for each type of settings and then rotating. (2) Work with sights; deflection settings, recording base deflections, shifting from base deflection, convergence, deflection difference, leveling bubbles, and laying on aiming stakes. (3) Recording; this instruction should go along with the sight-setting groups and rotated with them. The two operations fit hand-in-glove and help clarify each other—if a man can record, he is a good gunner and vice versa. Anybody can learn this if it is kept simple. Wooden or pasteboard sight-setting devices are easily made, and are a very practical aid in conducting this preliminary instruction, leaving the gun sights for the final phase. Also, all available FA Trainer sights can be used to good advantage. (4) Laying guns parallel on a compass with the aiming circle. (5) Reciprocal laying. One half the guns and the remainder of the enlisted cadre are used, along with one Regular officer and three Reserve officers.

Third section—posts and duties in firing.

After one day with section No. 1 and one day with section No. 2, the entire group is consolidated for standing gun drill, with prime movers, for two full days. All previous instruction is reviewed, and precision in the duties in firing is stressed. After every problem, "change posts" is given in order to rotate all men in the squad, and to give

equal opportunity for learning. This is hard, fast, intensified drill with no lagging, but frequent rests, the tempo being increased after proficiency is acquired. At the end of the second day the smartness and exactness of the drill is amazing.

Group 3. Transport.

For this instruction we have available the qualified enlisted drivers, mechanics, motor sergeants, one Regular officer, and three Reserve officers to conduct instruction. The group is broken down into three general subgroups, which are further broken down into as small squads as the number of instructors permit. For driving practice there should not be more than two men per instructor. This instruction is divided into the following sections: (1) Nomenclature and care of the vehicle with a general description of the working parts, and technical inspections; (2) drivers' instruction, traffic regulations, convoy procedure, drivers' maintenance, starting inspections, stop inspections, arm and whistle signals, trip tickets, and accident reports; (3) driving practice; individual instruction on all types of vehicles, backing through stakes with trailers, maneuvers from line to column and column to line; convoy driving with proper inspections, making out trip tickets, field expedients and difficult driving; march discipline is stressed.

Instruction is arranged so that each man gets one day each with section No. 1 and No. 2, and then two days with section No. 3 on driving instruction. The average recruit knows not only how to drive but also considerable about an automobile. However, he is lacking in a correct concept of army maintenance and convoy discipline. These must be stressed at the outset in order to prevent forming bad habits.

Group 4. Communications.

For this instruction all the enlisted men of the communications cadres are available as instructors; one Regular officer and two Reserve officers can handle this group. All the telephones, switchboards, wire, hand reels, and wire trucks with motor reels are consolidated. Three sections are organized as follows: Section No. *one* on telephones, taking up nomenclature, functioning, operation, circuits, tests and care. One telephone per man, two men per group, one instructor with every two groups. The phones are taken out of the cases for explanation of the functioning of all parts; telephones are then hooked in pairs for tests and sending *prepared* fire-command messages. Section No. *two* on switchboards taking up nomenclature, functioning, operation, tests, care, and controlled operation of miniature nets (lines about twenty feet long); five telephones and one switchboard per group with one instructor for each group. The switchboard is disassembled for nomenclature and clear explanation of the functioning of all parts and circuits; tests are made by each member of the group; operation and explanation of proper net procedure is demonstrated. Then the net is tested and *prepared* messages are sent

as directed by the instructor, with the group rotating so that each man tests the net and operates the switchboard correctly. Section No. *three* takes up operation of motor reels and use of hand reels, splicing, laying and picking up lines, crossing obstacles, tagging and taking lines and the general duties of line guards. All the motor reels mounted in trucks are used. The section is divided into four men per reel, with an instructor for each group of four.

Each of the three sections spends one day on each subject. On the fourth day the entire group is divided into a suitable number of wire sections and the men act as telephone operators, switchboard operators, and linemen in simple, four-circuit nets. This drill is conducted in accordance with tactical conditions, but without any tactical considerations. It is merely stressing the mechanics of the procedure. The nets are short, permitting easy supervision, quick installation, and numerous changes of position. The procedure is as follows: the officer in charge first gives a brief explanation of how the battery commander gets orders from the battalion commander to bring his party forward, what orders the battery commander gives the signal sergeant, and how the signal sergeant proceeds in carrying out these instructions. This talk gives the men the picture and portrays the system of proper dissemination of essential information as well as bringing out the idea of teamwork and how the correct execution of the duties and cooperation of each member is essential to the smooth functioning of the whole team. The wire sections are now organized on the parade ground and each man is given an arm band with his assignment on it. Each signal sergeant then explains the posts and duties of each member of his section and describes the net. Each section is then broken into the party and remainder of the detail, and the signal sergeant proceeds with the party wire truck to a point designated as an OP. He assumes that he has received instructions from the battery commander concerning the location of the guns, switchboard, OP and CP, and gives instructions to his signal corporals for establishing the communications. After one prepared message is sent and received by each telephone operator, *March order, close station* is given; corrections are made, questions answered, and the process repeated with a complete change of personnel on the different jobs. About eight of these changes can be made in a day by using nets not exceeding two or three hundred yards in length. This concentrated "doing" unfolds the procedure of the wire section in a vivid fashion and quickly does away with any mystery associated with it.

Group 5. Instruments.

All available instruments in the battalion are assembled at a place affording good observation. Not more than two men per instrument, and one enlisted instructor for every three instruments, are necessary for the best results. One Regular officer and three Reserve

officers are needed to organize and supervise instruction. The instrument group is divided into four sections as follows: Section No. *one* on the BC scopes, covering: setting up, nomenclature, operation, measuring angles of site and of shifts from a base point. No preparation of fire is taken up with this instrument. The mil relation, calibration of hands, and measuring angles without instruments are also covered. Section No. *two* on the range finders covers the same as with the BC scopes, plus measuring ranges, along with an explanation of all the elements of fire commands and of visualizing angles. Section No. *three* on the aiming circles covers: setting up the instrument, nomenclature, operation, setting off the declination constant, centering the needle, measuring azimuths, computing target offset and applying it to the azimuth for a compass, also the mechanics of using aiming circle for laying guns parallel on a compass direction by using an arbitrary point for the sight of number one gun. Declinating the instrument is also taught. Section No. *four* on plane table methods; plotting base deflection shifts when guns, CP, and base point have been accurately located and the shift and range to a new target given; also, plotting the target offset and applying it to a measured azimuth. Plotting the guns and OP from an adjusted compass and range, and the steps for commencing the observed-fire chart are also covered in the instruction for this section.

By spending the whole day with each section a recruit with a fifth grade education can make astounding progress. Remarkable results are obtained after four continuous days of instruction in such small groups that each man has ample opportunity to follow and apply the instructor's explanations and demonstrations. The processes are made easy and simple—never involved or complicated—and the recruits learn quickly by a constant repetition of "doing."

Group 6. Map Reading and Survey.

These subjects naturally divide themselves into the two main sections. By using ten enlisted men, two Reserve officers and one Regular officer for each main section, the classes are cut down to a size where attention can be easily maintained. For map reading, a ten cent cardboard scale and protractor and a ten cent map is furnished by each man. For survey, a ten cent grid sheet must be purchased and extra plane tables improvised. Two full days on each subject suffice. The map-reading course is strictly a field artillery study. It is kept simple and made practical. After the fundamentals of map reading (scales, coordinates, elevation, declination, and signs) are covered, problems in the map determination of firing data are taken up. The following two type problems are drawn to scale on map. First, plotting an azimuth and measuring a target offset for obtaining a compass; and next, drawing a base-deflection shift and figuring an angle of site on the map. The guns, OP and base point are plotted by coordinates or identified by objects. These problems involve every essential element of map reading. They also clarify preparation of fire to

the point of being self proving and understood by the slowest recruit. Determining the scales, grids, and locating points on mosaics and air photos are also taught.

The survey course is the most difficult to provide within the short time allotted. However, it has been found that furnishing a mimeographed copy of a simple type problem to each student, with all the operations elucidated by a clear step-by-step explanation, solves the difficulty. The problem contains all essential phases of survey, but the distances are short in order to save time. The problem should include the location of all elements of the battery, a base point and two targets with respect to an orienting line, and filling out work and command sheets for varied concentrations. This last step is a bit difficult to put over to some of the slower students, but should be covered since it is a very important part of a soldier's education. It can be done.

Group 7. Small-Arms Instruction and General Basic Subjects.

This includes instruction in all small arms that may be assigned to the battalion. It covers stripping (in the field), nomenclature, sighting, squeezing exercises, safeties, firing-line discipline, and practice firing with each weapon. The general basic subjects include a review of the subjects covered in the Reception Center (May not be given there.—Ed.) such as first aid, hygiene, defense against chemicals, military courtesies, guard duty, equipment, organization, etc. This instruction is best carried on by each provisional organization every Wednesday morning. Each unit is broken down into small groups by utilizing the whole cadre of instructors. It serves to break any possible monotony of a solid week of instruction in one subject, and thus affords diversification.

PROFICIENCY TESTS

The general, all-around education of the individual is now completed; the group launches upon the proficiency tests during the seventh week, with the same general setup and rotation. The men rotate in a prescribed manner from one subject to another, under the supervision of the first sergeants, who are instructed to watch carefully for bottlenecks and to keep a free flow of examinees through all subjects, thus preventing any unnecessary idleness. The whole procedure when properly organized and supervised should run smoothly and efficiently. The examination is thorough and complete, covering every phase of all the basic subjects; it is a real test of each man's knowledge and of his ability to apply what he has been taught. Every man is graded in every part of all major subjects by each instructor, who is furnished a roster grade sheet with grading instructions; these grades are continually collected by clerks who post them on a master grade sheet in battalion headquarters.

In addition to this technical examination grade, the officers and first sergeants of each provisional battery compile a leadership grade on each man, which is a rating of the man's soldierly attributes and includes all the

qualities of leadership and character. Leadership is given a weight of twenty-five percent; technical knowledge comprises seventy-five percent of each man's final rating.

At the end of the tests, and upon completion of the compilation of all individual data, all commanding officers confer on the final selection for the personnel of their organizations. Special qualifications such as those of clerks, mechanics, radio specialists, visual signalmen, cooks, etc., are taken into consideration as well as the individual rating of the group. This affords a fair distribution for all organizations and a leveling influence for the entire battalion. This assignment and reorganization takes place on Saturday of the seventh week. All grades and ratings are effective that date, and each battery is ready to train as an independent unit the following Monday.

PHASE II—BATTERY TRAINING

The first part of the next week is conducted individually by the four separate teams of the batteries, i.e., transport, cannoneers (first by separate sections), communication section, and instrument section. The perfection of the separate teams is stressed. During the latter part of the week, transport combines with the cannoneers to complete the firing-battery team, and the communication and the instrument teams are brought together to form the detail. These two teams now operate independently on the mechanics of R. S. O. P. (or R. O. O. P.); continuous changes of positions are conducted, stressing speed, prevision, and teamwork.

During the ninth week the entire battery is brought together as a complete team with all elements cooperating. Short, standing (or gun park) installations are made and drill of the entire battery is conducted without movement. Next, short mechanical R. S. O. P.'s are taken up, where only short distances are involved and all installations are clearly visible to the entire organization, and are easily supervised for corrections. With this preliminary picture well in mind, the organizations are now ready to move out and take up tactical positions under rigid restrictions of cover, camouflage concealment, and security of approach, with all-around protection. The first occupation is slow, but thorough and methodical, with every detail checked and corrected. From then on, the battery is ready for continuous training by numerous changes of tactical positions of all types, stressing rapidity of communications, occupation and commands, as well as concealment and security.

At the end of this battery training, the enlisted cadre is returned to the Training Center, the organizations are weaned from leaning on the experienced help and begin rolling under their own power. This is their real test and every man puts his shoulder to the wheel to prove his fitness and self-reliance. The officer cadre stays on for guidance, supervision and command.

PHASE III—BATTALION TRAINING

The firing batteries are now ready to function with the battalion, which has been perfecting its telephone,

radio, and fire-direction-center teams. A solid week of all day on battalion R. S. O. P.'s, under every sort of imaginable tactical situation, covering fast movement, quick displacement, liaison, forward observation, airplane adjustment, fire direction, survey, map data corrected, schedule fires, ending with a night problem on Saturday, gives a lot of seasoning in a short time.

The next two weeks, spent in the field, provides for hardening, and is intensified unit training. Marches, shelter, service practice, night problems, defense against airplane and mechanized units, and small-arms firing for record, as well as all previous phases of training, are emphasized and repeated. At the end of twelve weeks you not only have a crack battalion ready for training with supported units, but you also have an excellent group of individual soldiers.

The next three weeks provide the finishing touches and round out the training of the unit. One week is devoted to actual maneuvers with each of the principal tactical and strategical components of the Army, beginning with the regiment of the supported arm and progressing to the point of functioning as a part of a corps or army, in the field against suitable opposing forces. This completes the seasoning and hardening experience of the unit and individuals. The last week is devoted to the polishing experience of a rigid gunners' examination "for pay"—only the highest fifteen percent winning the award and honor of wearing the medal. This final technical review brings us to the end of the program which should provide an excellent battalion, ready for frontline service, or a group of individual soldiers, ready to be replacements for any and all needed vacancies.

It would be wise to use them at once and not allow them to deteriorate into "gold-bricks" and "dead beats." The highest five percent could be kept on as a training cadre, and be further schooled and considered for commissions. They would continue to take hold in the same enthusiastic fashion in which they were trained—eager, fresh, and willing; ready for functioning efficiently in any man's army, under any and all conditions.

DISCUSSION

Now let us analyze this system and weigh the advantages and disadvantages that seem most apparent. Some will claim that the program as outlined has no precedent, is extreme and unorthodox, and merely the outburst of unwarranted enthusiasm. On the contrary, this is no fly-by-night scheme; it is a positive, practical system that will work and get results. Every idea on training, contained in the article, has been tried and proven successful. The rotation of small groups which makes possible the close supervision of each individual is acknowledged by our foremost educators as the best way for obtaining quick, practical results in teaching how to do an operation. This basic principle for learning is emphasized to the fullest, and has been found especially applicable for instructing in our basic field artillery subjects. The system gets quick and thorough results, and is the key

for the success of the individual training as outlined. The schedule is simple to write up and easy to follow. Each day is spent on definite subjects, which corrects the antiquated method of jumping from one subject to another on set time periods as is called for in our present mobilization training programs. It eliminates the spasmodic procedure of shifting instruction before sufficient time has been allowed for a complete study in each subject, and then returning to it after a cooling period. By continuous application all day on each subject, much time is saved, and thorough instruction is accomplished—the student stays "hot" on the particular subject and gets a firm grasp in the time allotted. The old dabbling methods are thereby remedied, and worthwhile results are obtained. There is sufficient diversification in each general subject to prevent monotony or staleness—interest is easily maintained.

It is natural that numerous objections will be raised; the most reasonable one being that the training schedule covers too much territory in the time allotted. It definitely does not, but in case this objection cannot be reasonably overcome, a compromise on a six months' period could be arranged whereby all phases of training, as outlined, received a proportionate allotment of time. This is better than a year of piddling with *specialized* training on *one* job where the recruit naturally falls into all the bad, lazy, shiftless soldier habits, and acquires the prevailing mental attitude of disgruntled, dissatisfied griping. This latter is a natural and inevitable reaction when a man believes that he is merely putting in time without being given any opportunity to learn, to improve himself, or to compete on a fair basis for promotion. A system must be evolved which gives free rein to developing the inherent desire of the individual to advance and progress to the fullest extent of his capacity. It must be a system that will put our training into high gear for efficient mass production and prevent any adverse reaction which might occur if there is any general feeling, or evidence, of wasted time and money resulting from ineffective methods.

The above system can be readily adapted to our selective service and National Guard training where a full year is allowed each trainee—and it would get excellent results.

The six phases of training could be proportioned throughout the year, generally as follows: the first three months on the all-around, individual phase of training in small groups, including the final proficiency test; one month on the various separate teams of the batteries and battalion headquarters; three months as battery teams; two months as battalion teams; two months on progressive maneuvers as active members of the artillery-supported unit team, culminating in corps and army maneuvers; the last month being devoted to preparation and conduct of the gunners' examination, along with competitions for awards to the best batteries, units within the batteries, and individual honors.

The entire program could be catalogued with a complete

record of each individual's rating in all technical subjects, as well as his general ability and leadership qualifications. Such procedure would provide definite information for future service as units, or for replacement. Wherever possible, complete units could be kept intact ready for quick reconditioning in case of an emergency. This would facilitate a quick mobilization.

Another possible objection to this method is the size of the qualified enlisted training cadre.* This objection is quickly refuted by pointing out that the cadre does not become an integral part of the new organization, but is only present during the individual and battery training phases, and is then permitted to return to its original organization for training. This method prevents the continuous disruption of the Regular units in the Training Center as has been the case during the recent activating process of new units. In the meantime they have profited tremendously by becoming experts, through having had the opportunity to tell others how it should be done—no one really knows a subject until he teaches it. Incidentally, our late cadres have been far below par simply because they are engrained with the slow, prodigious methods of haphazard peacetime instruction. They must be taught quick, simple, direct ways of teaching and instructing in effective mobilization methods, if they are to become proficient for the job. They must change their unprogressive, stagnant attitude, which has been brought about by their having been several years in carrying on in their particular little niche, and believing that their job cannot be learned in less than three "hitches." On the other hand, we have far too long overlooked and underestimated the possibilities of our previous service men as instructor material for field artillery basic subjects. When properly guided and given definite responsibilities they can get as good, and sometimes better, results than some officers. In fact, they often know their basic subjects better than the officer does, simply because they are in closer touch with the practical application and have specialized in their particular subject.

In this system of training, the enlisted cadre actually conducts all the instruction. The officers organize, supervise, and control the instruction. This does not mean that the officers are standing around watching and

"bulling" with one another, with their hands in their pockets and being the other end of a cigarette. They must give the greatest possible assistance with the least possible interference. They establish the tempo and maintain the standards. However, the enlisted cadre must be given full rein in their prerogatives, and allowed to assume their proper responsibilities and get over the idea that it is beyond their capabilities to give correct instruction when properly supervised.

CONCLUSION

In conclusion we may classify this system of training as the "American way," since it is based on the resourcefulness, initiative, enterprise, and ingenuity of the American youth. It takes full advantage of his interest and his enthusiasm and he more than responds when he is properly guided and led. We have the highest "I.Q." of any nation or race in the world. Let's take the fullest advantage of this fact in training our Army. This system is basically sound on all of these principles and takes the fullest advantage of these facts. It stimulates a natural interest and creates enthusiasm, which makes for voluntary application and self-instruction by instilling a spirit of individual competition where the best man wins the reward of promotion. Far too long we have been underestimating the ability of American youth to grasp quickly and assimilate readily the knowledge and attributes necessary for soldiers to acquire. At the outset they must be put into a school of intense instruction, before they develop the usual bad habits of sitting around with their faces hanging out, doing as little as possible, and moving only when they are told what to do, and when to do it, without any interest in learning. With the right system of training, they never learn to growl; their morale and spirit is kept high because they stay keen, alert, and interested by being kept busy and seeing the reason and purpose for teamwork and cooperation. This spirit must be injected into each individual soldier.

The Germans decentralized to the point that often their success depended on the accomplishment of a mission by the individual enlisted man. We must go them one better by instilling a sense of free cooperation and responsibility to the lowest grades and encourage the complete exercise of all of the attributes in the soldier that have made us a great nation of individual "doers."

*The cadre in the Replacement Centers will be larger.—Ed.

During a long period of peace the sense of the realities of the battlefield and familiarity with the fighter's reactions fade away. It is therefore essential that in the basic schools there should be taught not only history but also military psychology, the latter illustrated by a large number of historical examples. By facts culled from recent campaigns there should also be shown the efforts of the fire when two large masses of artillery face each other. Thus the young officer would gain a better appreciation of realities; these at times may be deceptive, and complicated by the variations introduced by the infinite variations of the terrain. He will learn that nothing in the military art can be reduced to those simple formulas which are so attractively logical. He will mistrust the artillery range where so many errors are given birth.—GEN. FREDERIC CULMANN.

ARTILLERY HINTS

Derived as a Result of Recent
Combat in Europe

By Colonel Kruse, German Army*

It would be premature at this time to write much concerning the war experience of the artillery. It may be said, however, that one of the principal lessons of the war is that our artillery training has stood the test, and has proved sound. The following "hints" are merely mention of points upon which greater stress may well be laid.

THE OBSERVATION POST

In the effort to see as much as possible, battery commanders often select observation posts on a forward slope. Such posts are soon disclosed through unavoidable movements, especially by messengers and line guards. It is better to place them on the rear slope or even on the crest, but not on the highest point, and not too close to conspicuous objects, such as bushes, woods, etc. If no such point can be found which gives a good view, forward or lateral observers must be used. The general principle for selecting and organizing a post is, to see and not to be seen.

Since fire can not be smoothly conducted unless all elements of the observation post work well together, the men must be kept reasonably close to one another. But on the other hand, to avoid unnecessary risk to the men upon whose training so much time and labor has been spent, the battery commander must scatter them as widely as possible. The limit of distance is the range of the voice of the officer conducting the fire, when aided by the megaphone, taking into account the noise of battle. Not more than two men should be kept together. The reconnaissance officer should not be with the battery commander, but remain in observation at some little distance, and near the telephone to the battalion. The battery telephones should be placed at a little distance from the officer conducting fire, where repetition of the orders and commands can just be heard. All the other men should remain at a distance, but where they can see and be seen by the battery commander.

If, as is often the case, the megaphone is carried in the instrument cart, it will be late in reaching the observation post. Then, since the unaided voice will not carry far, especially if there is wind, all the men have a tendency to crowd in too close. For this reason it is better to carry the

megaphone with the battery commander's party.

Whenever it rains, the maps and other papers required at the observation post are

damaged. Hence when going into action, whatever the weather, every member of the detail should carry his shelter tent, on his person and not on his horse.

Peacetime maneuvers run off too rapidly, and this leads to the habit of keeping the horses of the detail too close to the observation post. This should not be permitted. As soon as the battery commander has taken his station at the observation post, the horses should be sent back at least as far as the gun position. Only when it is evident that the position will be occupied only briefly, it is permissible to keep the horses near the observation post, and even then they should be at least 500 m. away.

Equipment not actually in use at the observation post—e. g., the aiming circle of Instrument Sergeant No. 1, which is generally left standing—should be put in a place of safety.

In spite of all firing instruction, when it came to action any new target was often taken under fire as if there had been no previous firing at all. This is a waste of time and ammunition, which is unjustified, and which can be avoided by a procedure somewhat as follows:

The battery commander notes a new target, and designates it to the reconnaissance officer, who notes by reference to his sketch that it is near Target No. 105, which has already been fired upon or for which data have been prepared. Instrument Sergeant No. 1 is so informed, and he at once calls off the charge, deflection, range and site for No. 105, corrected for weather. Firing is now based upon this information. The instrument sergeant, during the firing, keeps record of the changes, especially in deflection, and when firing ceases he notes in his target record the stripped final data. He assigns a new number to the new target, and calls it off to the reconnaissance officer, who enters the point to scale on his sketch.

THE GUN POSITION *Defense Against Attack*

(a) *Defense against armored forces.*—Ranges should be measured. To secure a good field of fire, the guns should be placed as far as possible from the mask. The

*From *Artilleristische Rundschau*, Munich, September, 1940. Translated by O. L. S.



Heavy artillery on the advance to the Marne.

special ammunition (armor-piercing) should be distributed, and tasks assigned to the special weapons. A post for close observation should be selected, and wire connection established. For emergencies, connecting files should be posted in prepared stations. Protecting trenches should be dug, with embankments as high as the carriage axles, and far enough to the flanks so that the guns may be traversed freely. Works in rear of the guns are undesirable, for convenience of movement there. Surplus earth should be used in constructing splinterproof cover in front. The trenches should be as narrow as possible, and just deep enough to permit small-arms fire standing.

A limber should be held in readiness, so that if required one or more guns can be moved promptly to the crest for direct fire. Orders should be given beforehand to cover such a case.

For protection against tanks, limbers should generally be posted in woods. Here, too, suitable trenches should be dug. Care should be taken not to betray the location of the limbers by unnecessary movement or by premature opening of fire.

A test alarm should be held, to determine whether the battery, including limbers, can be made ready instantly to meet a tank attack.

Upon the approach of tanks the battery executive, in the absence of communication with the observation post, must decide whether the guns shall remain silent unless a target appears in their own field of fire, so as to avoid disclosure of the position; also, whether the gun crews shall be withdrawn to neighboring woods. In the latter case, watch should be kept of the gun position, and machine guns should be kept ready, so that if members of the tank crews open the observation slits or dismount, fire may be opened upon them.

(b) *Defense against aircraft.*—If an attack threatens by aircraft upon the gun position, orders are given for the gun crews to take post in the trenches. If there has been no time to construct these, chiefs of flank sections lead their men to the front and flank, interior sections to flank and rear, so that bombs intended for the guns will not find the men. Regulations for fire upon aircraft must be observed, and economy of ammunition insisted upon. In case of attack upon the limber position, fire should be opened from outside the woods. For posting limbers, the suggestions in (a) will hold.

(c) *Attack by hostile infantry.*—Our own infantry is trained, in case of necessity, to fall back upon the guns as supporting points. Defense should be made with the guns, with machine guns, rifles and finally with pistols. Do not waste ammunition. Security of the gun position should be provided for in rear and in both flanks. The limber position should be prepared for defense. Under no conditions should the limbers go to the rear. If the enemy penetrates the gun position the pieces should be made unserviceable by removal of the panoramic sights and the firing pins.

TECHNIQUE OF FIRE

Only a reasonable number of targets should be considered. It might be well to discriminate between point targets and concentration targets, giving the former numbers and the latter names. Thus, numbers would be given

(1) To points upon which fire has been adjusted or is to be adjusted, at the discretion of the battery commander or his forward observer, or by order of a higher commander. Numbers from 180 to 199 should be reserved for the forward observer. Target numbers are

assigned by the battery commander or a higher commander.

(2) To terrain points selected to facilitate target designation between regiment and battalion, or between battalion and battery—e. g., haystack on hill 345; angle in farm road; lone tree. Numbers are assigned by the regiment or battalion, as the case may be. If possible, such points should be indicated to observers by an officer.

Names would be given to areas upon which concentrated fire is to be placed, or for which data are to be prepared. The names are selected by battalion or higher commanders. To secure greater density of fire, concentrations may be laid upon small villages, woods or assembly areas. In map firing, such concentrations should be marked on maps or sketches, not by "goose eggs," but by a cross in the center of an area, and a name. The fire of several batteries should be at a single range, calculated for the cross; that of a single battery should be according to the ordinary rules for sweeping. For map firing upon large villages, etc., several crosses should be marked on the map. All would receive the same distinguishing name, but with a small letter subscript; care should be taken that there shall be no similarity of sound. Fire may be placed upon one or more crosses, with appropriate sweeping.

For these concentrations distinguishing names are to be preferred to target numbers; they are not points, but areas. Then, too, the use of names makes it easier to deal with neighboring regiments which may take part in the concentrations; for these regiments, too, use the numbers from 300 to 399.

"Fire surprises" alone should not be used, but fire surprises combined with harassing fire. The "fire surprises" alone are too short in duration. In preparing a fire surprise, the command should be "Make ready, 4 rounds," instead of "4 rounds, make ready"; otherwise a quick working battery may open fire too soon.

In preparing data for fire for destruction it may be found clearer and more effective to mark the areas with crosses, as above suggested. Barrages should be indicated by straight lines on the map.

Attempts to "couple"¹ should not be allowed to complicate firing methods. Coupling is useful only in the following cases:

(1) If, after adjustment of one battery, the whole battalion is to be laid upon the same part of the target.

¹This term appears throughout German artillery training literature; it is not entirely clear just what the equivalent is in our terminology. Possibly it refers to tying batteries together by survey so that the adjusted data of one battery may be used by the others.—Editor.



The Germans appear to make good use of captured artillery.

In this connection it should be considered whether the same result could not be gained, with better surprise effect, by map firing. Coupling should be adopted only if there is no reliable weather report available, or if the target can not be accurately located on the map.

(2) When the target can not be accurately located on the map, and it is desirable to make use of an adjustment by one battery as initial data for the other batteries, which are to fire upon adjacent parts of the target area. If all parts of the target lie at the same altitude as the adjusting battery, then, with careful work on the battalion firing chart, fire for effect may be opened with all batteries immediately. If the other batteries are not accurately located and laid on the base deflection, or if differences in altitude are considerable, then even with "coupled" data further adjustment will be necessary.

The exceptionally cold weather last winter has shown how important it is to take powder temperatures as soon as the ammunition has been brought up. Short shooting was in almost every case due to failure to give enough attention to this point. Throughout the march, especially in extreme temperature, the thermometer must be carried with the ammunition.

ADVANCE PARTIES

In sending out detachments to prepare a new position to which the guns may retire, the following hints as to procedure are given.

(a) The battalion is informed by the regiment, where the regimental reconnaissance officer will be found. Only the mounted men will be sent to this point; for the vehicles, the battalion will designate a concentration point in the region of the new position. To permit this, the regimental order sending out the advance detachments will indicate the approximate assembly area of the battalion.

(b) The battalion will designate a rendezvous for the battery details and the communications details. All other vehicles, such as ammunition columns and trains, will go direct to the concentration point above mentioned. For the assembly, orders should be given not only as to place but as to time of arrival. Plenty of time should be allowed; it is better to leave the rendezvous a little later, and have all the vehicles reach the new position at the same time, rather than to have them straggle in.

This procedure will serve to prevent crowding at the rendezvous, and also insure that all elements will reach their proper places, even though there may be a shortage of maps for the lower commanders. For the same reasons, it is a good plan to attach the battery communications details with their transportation to the battalion communications platoon.

Designation of a time for arrival at the rendezvous does not make it necessary for the battalion communications officer and the commander of the consolidated details to wait there until the specified time. It is better for them to turn over their commands to the next in rank, to be brought

on later, and for themselves to go to meet the regimental reconnaissance officer.

(c) If, upon their arrival at the specified point, the regimental reconnaissance officer is not yet there, they should not go to find him, but remain in place. It is not unusual for him to be delayed, giving instructions to other battalions.

(d) The regiment should send to the battalions as early as possible the warning, "advance parties, march order." Upon receipt of this warning, all wire lines not absolutely necessary should be taken up, so that the reel carts may move with ample personnel and materiel. But even though there may be radio communication between observation posts and guns, one wire line must be left in place, for radio communication may be broken by mechanical or atmospheric conditions.

(e) By reason of the importance of this duty, the commander of a battery advance party will normally be the officer next in rank to the battery commander. If, as is usually the case, he is also the executive, the reconnaissance officer should take his place at the guns; but he should not wait for the arrival of his relief.

(f) If the commander of the consolidated parties of the battalion is a battery commander, he must handle all the details of occupation of position for his own battery, since there will generally be no officer to command his advance party.

(g) It will be well for battalion headquarters to provide motorcycle messengers for the commander of the advance parties, and for battery commanders not to send their agents to the concentration point until it is known what road the battery is to take. The principal duty of the agent will be to find out where the battery commander and the parts of the detail remaining with him should leave the battery to come forward and prepare for occupying the new position.

COMMUNICATIONS

Preparation for action and conduct of fire call for many technical operations, and require much time. Hence this process should not be further delayed by requiring use of code in all cases. If there is no danger of listening in on the wires (e. g., in meeting engagements, or in progressing attacks upon an enemy who has not established a defensive position) telephone messages may be sent in the clear. Decision on this point should be made by the higher commanders. With radio, there is always danger of listening in.

Even the knapsack radio sets should always be dug in for protection against artillery fire. To facilitate this, the two boxes of the set should be placed side by side, not one on top of the other. These sets do not work as well in woods as in the open. Hence when the observation post is in the woods, the set should preferably be placed outside. Any station that picks up orders, weather messages, etc., should report them at once to the next

higher commander, so that they may be repeated if desirable to stations which have not received them.

It will be found convenient to place the knapsack set at the gun position near a flank gun or the adjusting gun. When the other guns are firing at the same time, each command from the forward observer should include the number of the gun for which it is intended; e. g., "No. 4, right 20, 6400."

TROOP LEADING IN THE BATTALION

Since the infantry regimental commander has a motor car, he will frequently use this instead of a horse, going forward from point to point. This brings up the following suggestions for the artillery battalion assigned or attached to the infantry regiment.

(1) The battalion commander will often find it necessary to travel by motor.

(2) The horses of battalion headquarters should be placed as far forward in the column as possible, and should be under command of an officer.

(3) By the time the advance guard makes contact with the enemy, the battalion commander should exchange his motor car for his horse. In the car, he is too closely tied to the roads. His movements will be hampered by road conditions, or by hostile fire which he can not avoid, besides any mechanical difficulties with the car.

(4) The commander of a battery brought up to the tail of the advance guard should ride with the advance guard commander, instead of with the battalion commander; this will often give him the opportunity to put in his battery on his own initiative. Command post flags² should be carried in the battalion commander's car, and with the mounted echelon of his detail, so that the post of the commander can always be indicated.

It is well to keep the battery whose commander is least experienced, at the disposition of the battalion commander, and the best commander in advanced positions, where the greatest demands will be made upon him. If a battery is originally emplaced far to the front, as for example beyond the main line of defense, it is convenient to designate this battery later to answer calls from the battalion commander, and to post the other two batteries on the flanks. Until the arrival of this battery in its retired position, the battalion observation post can be placed somewhere in the center, and provide for observation of the entire sector.

In a maneuver situation, where changes of position are likely to be frequent, the battalion commander may find it useful to designate not only an observation sector, but also

²Small metal guidons marking location of CPs.

a combat sector, within which the batteries, including both observation posts and gun positions, are to be kept. This will prevent crowding and interference during a change of position. Observation posts and guns should always be kept at least 300 m. from the boundaries of the combat sectors. Frequently, of course, the observation sectors and combat sectors will coincide.

It has been found that instead of a report on visible and invisible areas, a commander will prefer a report on visible and invisible points—e. g., "Road AB from ----- to -----; Edge of woods 500 m. north of -----." The report on areas is often difficult to prepare and to transmit. The report on points can be changed from time to time, as the batteries get more information or observation improves. Such reports should include points visible from advanced or flank observation posts.

It is desirable to keep, at the command post, running notes on the work of the batteries, so that it may be known at any moment which battery is free for assignment of target. These notes help also in making up the war diary.

MISCELLANEOUS

When the shelter tent is carried over the shoulder, the muzzle of the rifle³ should be kept outside the tent, to prevent wearing through the cloth, and also to expedite preparation for fire against aircraft and to facilitate mounting and dismounting.

Drivers should not be allowed to crowd their vehicles together in the limber position, which they have an inclination to do for convenience in conversation. We must habitually spread the limber position over a large area, so that a bomb or projectile will not put two vehicles out of action.

The troops should be trained in proper fortification of observation posts, and gun and limber positions. For this purpose the battery must have long handled shovels. Every opportunity should be taken to replace losses on tools.

It is important that the cannoneers, especially in heavy batteries, be trained in marching, so that in hilly country, or in maneuver on poor roads, the draft be lightened for the horses.

All situations that may be met by the cannoneers when in position—attacks from the ground or from the air, firing by command from the principal observation post and from the advanced observer, hostile artillery fire, delivery of harassing fire, fire for destruction and barrage fire—should be simulated at drill; this helps to relieve the monotony of the work.

³German cannoneers and drivers carry the rifle slung across the back.

Origin of the Field Artillery School

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

On July 19th of 1917, while a Colonel and stationed at Syracuse, New York, in command of a provisional brigade composed of the 8th and 15th Field Artillery, I was ordered to Fort Sill to command the reservation and schools there. This was three months after we had entered the war and, as I remember, six months after diplomatic relations had been broken off with Germany. Although I was presumed to proceed "over the shortest usually traveled route," I determined to go by way of Washington, D. C. My object in doing so was to find out what I could about the present and future of the School of Fire, to see whether I was to be marooned there during the war, and to get some instructors and equipment.

Upon my arrival in Washington I was fortunate in finding Major Dan T. Moore still in the city, though, as I remember, under orders to leave. I think he was at the time on the General Staff of the Army War College. Moore was the father of the Sill School, having started it in 1910 after attending a similar school in Germany, where he had been sent by President Theodore Roosevelt. Moore had accomplished remarkable results while Commandant of the School of Fire. He really gave the American Field Artillery its start toward efficiency in gunnery. Too much credit cannot be given him for this.

When I met him in Washington in 1917, he told me that the School had been closed for nearly a year and a half because the School Troops had been sent to the Mexican border, but that it has recently been reopened with Colonel A. S. Fleming as temporary Commandant.

I found out in Washington that the same order which sent me to Sill also ordered about 12 or 15 other officers to report to me as instructors. I selected a few additional field artillery officers to be instructors and asked that they be telegraphed or cabled to proceed at once to Sill. This was done. I also made out a list of equipment in guns, airplanes,

and other materiel which I wanted, and this also was promised. In fact the War Department was disposed to help in every way.

One thing that impressed me considerably at that time was that the usual war demoralization at the War Department had set in. Everybody wanted to get away, and most officers seemed to be succeeding. While it was, of course, perfectly natural to want to serve with troops in war, yet it was perfectly evident that the War Department

machinery was being badly crippled at the very time it should have functioned best. One afternoon as I was going along a War Department corridor I met a Signal Corps officer, whose name I cannot now recall. This officer told me he had come to Washington to get the fire control equipment for the First Field Artillery Brigade, which was shortly to go overseas, and that he had not the slightest idea as to what items to include. He, of course, appealed to me for help. I explained that I was not on duty in the War Department but was simply



Genesis of Blitzkrieg, Fort Sill, 1918

passing through the city en route to Sill, and suggested that he see some field artillery officer who was on duty in the Department. He said he had tried to do that very thing but had discovered there *was not a field artillery officer on duty in the War Department*. I agreed to meet him at the club after dinner and tell him what I would ask for were I a brigade commander, impressing on him at the same time that it was little better than guesswork on my part, since the only thing I knew about the new brigade organization was what he could tell me. He seemed extremely grateful for my assistance, because it enabled him to proceed with greater assurance and with reasonable prospect of securing essential items.

As soon as I had finished my business in Washington, I left for Fort Sill and arrived there on July 27th. I found Colonel A. S. Fleming trying to organize a School with a class of students, a very few instructors.



CLASS OF 1916 (LAST PRE-WAR CLASS)

Front, left to right: Lt. J. R. Davis, Lt. J. C. Maul, Capt. F. B. Hennessy. Capt. T. Campbell, Capt. P. Booker, Capt. W. C. Potter. 2d row: Capt. Wm. Bryden, Lt. D. E. Cain, Lt. W. W. Merrill, Lt. W. E. Dunn, Lt. E. J. Dawley, Lt. H. Eager. 3d row: Lt. W. A. Capron,* Capt. Ned B. Rehkopf, Lt. Col. E. F. McGlachlin, Comdt., Capt. Fox Conner,* Capt. L. J. McNair,* Capt. E. T. Donnelly.* (*Instructors.)*

and no equipment. As I remember, there were no guns, two rounds of ammunition, about a thousand horses, no horseshoers, no harness, and no horseshoes; in other words, there were plenty of students to be instructed but no means of imparting the instruction. It seemed that the plan to start the School had been first to send the students, then the commandant, then the instructors, and equipment from time to time afterwards!

The class was the most mixed one I ever saw as to the basic knowledge of its members. Some of the students were recently appointed field artillery officers from training camps, some were regular army cavalry and coast artillery officers, who because of the shortage of Field Artillery had been transferred to the arm for the period of the emergency; some were National Guard officers; and thirty-three were noncommissioned officers. Few of them knew anything about field artillery. However, we made a start, and felt our way along. I held daily meetings of the instructors, and based on the reports they made each day as to how the students had or had not absorbed that day's instruction we planned the next day's work. I do not think that we were ever able to plan, even tentatively, more than three days' work in advance until we got the class well grounded. After this was once accomplished we made remarkable progress.

I have always felt deeply grateful to the small group of regular field artillery officers who carried forward the work

of the School of Fire during this formative and critical period. Some of them were officers whom I found at Sill, some were those sent there in the same order with me, and some were those for whom I had especially asked when I passed through Washington en route to Sill. Though all these officers would have greatly preferred belonging to some field artillery brigade then under training for France, rather than being tied up as instructors at a school in the middle of the continental United States, yet they made no complaint and threw themselves wholeheartedly into the school work, determined to make it a success. It is a pleasure for me to state that particular credit is due the following:

Captain Ralph McT. Pennell, Secretary of the School; Captain Truby C. Martin, Supply Officer; Instructors: Lieut. Col. Fred T. Austin, Major L. L. Lawson, Major J. W. Kilbreth, Major J. J. Bryson, Major W. S. Browning, Major D. H. Currie, Captain F. W. Honeycutt, Captain R. M. Danford, Captain E. L. Gruber, Captain W. H. Rucker, Captain H. D. Higley, Captain E. P. King, Jr., Captain L. C. Sparks, Captain S. R. Hopkins, Captain C. Andrus, and Captain O. Moretti.

These officers remained at Sill for varying lengths of time, a few for even less than a month and some for many months. But irrespective of their length of stay, they contributed of their best to the school and gave it a start along sound lines.

My orders sending me to Sill made me Commandant of the School of Fire and post commander. The Infantry School, under command of Colonel Farnsworth, who after the War became Chief of Infantry, was also located at Sill. Prior to my arrival he had been in command of all activities at Sill. He graduated three years ahead of me at West Point, but as a Colonel I was senior to him. Later in the summer and as of the same date, we were both made Brigadier Generals, National Army, and then by virtue of his longer service he became my senior. Some infantry officers, not knowing that he had now become my senior, called upon me and asked that I telegraph the War Department requesting that Farnsworth remain at Sill. I explained to them the change in seniority that had occurred and said that such a telegram from me would be the admission of an inferiority complex which I did not feel. I was amused at their confusion. I then told them that, if orders were not received from the War Department in a few days, I would ask to be sent elsewhere. They withdrew in some embarrassment. General Farnsworth, however, was ordered away at once, so no complications occurred. Farnsworth and I used our best efforts to coordinate the use of the reservation between our two schools, so that each would get an appropriate and satisfactory part of it from day to day. We had a joint board of infantry and field artillery officers allotting the ground to us daily, but there simply was not enough room for the two schools, and try as we would we were continually stepping on each other's toes, and this in spite of the fact that we were good friends, that each was sincere and earnest and exercised a spirit of give and take. Another complication about ground soon arose when the 35th Division arrived and took up its encampment on the reservation. There were then entirely too many activities for the place; sufficient capacity for all simply did not exist.

The 35th Division occupied Camp Doniphan. Upon my arrival at Sill I found that camp under construction. Its location had been assigned by General Blatchford and it could not have been placed where it would have handicapped the Field Artillery School more than it did. It actually included, within the camp site, some bomb-proof range towers that were used in the firing. Of course we had to select different firing ranges, change our communications, and other arrangements, and all this when time was of the utmost importance. Even had there been no field artillery at the post, the selection was poor from an infantry standpoint alone. I sent for the contractor and engineer and discussed the question of relocating the

camp, but affairs had gone too far. The camp continued to be a nuisance until removed after the war.

Shortly after my arrival, I was directed to locate an aviation field which I did and which is now Post Field. Then I was directed at various times to locate a base hospital and a remount depot, and, of course, I was in general charge of all this construction. At the same time the supplies for the 35th Division were being received. Colonel Guyer, the quartermaster at Sill, did excellent work in all this confusion, and carried a heavy load. I have nothing but praise for him.

From the time of my appointment as Commandant it had been apparent to me that if the field artillery was to play its part in the war, the School must be expanded to far beyond anything contemplated before. Accordingly, immediately upon my arrival at Sill and while working out the daily course of instruction for the class then there, I began to work on the idea of an enlarged School of Fire. The only time I could really consider this matter was after going to bed at night. Sill is not a summer resort, and to secure as much relief from the heat as possible, I slept on the northwest corner of the upper porch of the Commanding General's quarters. Here, every night until I fell asleep, I turned this enlarged school project over in my mind, gradually working out the details. After I had been thus engaged for several weeks I mentioned the fact that one day at our meeting of instructors, and was delighted to find that Captains Honeycutt and Danford had been working on the same idea. Thereafter we worked together and soon had it reduced to writing and were just putting it in final shape to send to the War Department, when telegrams arrived ordering away several of my instructors. The whole thing was about to vanish in smoke. I placed all the papers in my grip, gave myself a leave of absence, and hastened to Washington where I arrived about August 15th. There I learned of the remarkable view of the then Chief of Staff that there should be no schools during this war, and that the proper way to learn war was in



First War Class (1917) at 155-mm. howitzer drill



Commandant, staff, and faculty, 1917

fighting the enemy! It is difficult, even now after the lapse of so many years, to discuss this subject with patience. I think Mr. Bryan made the most foolish remark ever accredited to a presumably sensible man familiar with public affairs and presumably with history, that "a million men would spring to arms between sunrise and sunset." Next to this remark, I think the most foolish one I ever heard was the one just mentioned as having been made by the then Chief of Staff. Imagine pitting a raw, untrained, undisciplined army against the Germans, with their most efficient army in the world! With these views in mind, the Chief of Staff was not oversympathetic with my visit. However, I worked with some Infantry officers still at the War College, where Colonels Reese and Brown went over everything with me and promised to do what they could. They kept their promise right royally, and about a month after my return to Sill the plan for the School was approved, and \$750,000 allotted to carry it out. At that time, before we had become accustomed to talking in millions and even billions, the sum I wanted and obtained seemed like all the money in the Treasury!

During my visit to Washington I learned that I had but a short time to remain at Sill, and as my heart was set upon this enlarged school project I became very impatient, after my return, at the apparently dilatory tactics of the War Department. Accordingly, every two or three days I sent a telegram to the Chief of Staff urging action. I was overjoyed when final approval arrived.

The three-quarters of a million dollars for enlarging the School was to put in a plant—buildings, really. I had no architects or builders to assist me in this, and as time was important I looked over the Air Service plant then under construction, selected the blueprints of such buildings as had a suitable ground plan, and put an additional story on each one. I then turned the further details of the construction over to Colonel A. S. Fleming. He did very well at this, and later when I left Sill in October he was, upon my recommendation, appointed Commandant.

While in Washington I learned of my appointment as a Brigadier General in the National Army. This introduced a new complication, as the Chief of Staff was of the opinion that all officers holding a National Army commission should be on duty with that Army. I believe he thought it would be illegal to detach them from such duty, even temporarily. For a few days it was uncertain what would happen to me, whether I could go back to Sill and start the enlarged program or go direct from Washington to my new assignment as Commander of the Field Artillery Brigade at Camp Beauregard, Louisiana. Affairs came to such a point, finally, that I had to leave Washington by midnight, and at 4:00 PM I did not know to which place I was to go. If I were not to be absent without leave from Sill, midnight was the latest I could leave. Therefore I determined to go to Sill, and accordingly arranged for my ticket and sleeper. Fortunately about 10:00 PM I received word from the War Department that I had been transferred to the 156th Field Artillery Brigade, 81st Division, Camp Jackson, South Carolina, and should join there on October 1st. This stay of procedure the Chief of Staff worked out on the basis that the Beauregard brigade was a National Guard Brigade and was already in camp, while the Camp Jackson Brigade to which I was assigned was a National Army brigade and was not yet actually in being.

The chaos in the War Department at that time was shown by the fact that although I was in Washington at 2011 F Street, N. W., and had so informed the Department, the telegraphic instructions to me were sent to Fort Sill and repeated back from there by Mrs. Snow to me in Washington, three blocks from the War Department building. When she read the telegram addressed to me from Washington, knowing I was in that city and presuming that the sender of the telegram also knew it, she was naturally somewhat confused, but she called in several officers and asked them what to do, and they, realizing there had been a slip-up in the War Department,

advised quoting the telegram to me at my Washington address.

About that time another amusing incident occurred, illustrating the confusion then existing in the War Department. Captain L. A. Beard had been my adjutant at Schofield Barracks, Hawaii, and I had asked that he be sent to me at Sill. General Strong, whose aide Beard had been and who was then in command at Camp Kearney, California, also asked for him. Beard, accordingly, received orders to report to me at Fort Sill, Oklahoma, and other orders to report to General Strong in California! He came to Sill and then, in order to clear up his status, telegraphed a statement of the facts to the War Department and asked which of the two conflicting orders governed. He received the remarkable telegraphic reply: "Where did you get the other telegram?"

Shortly after my arrival at Sill a number of 3-inch guns and some ammunition arrived. I picked out the best captains and told them to get their batteries ready for firing in the least possible time. As an aid toward quick results I told them not to make men all-around cannoners, but to concentrate each man on one job—i.e., teach some men the duties of No. 1 only, another group the duties of No. 2 only, and so on. The result was remarkable. In eight days the batteries on duty with the School were doing very accurate shooting. Of course if an Executive had chanced to give the command "Change Post," battery efficiency would have

collapsed. Gradually, as time permitted, the training was broadened, so that men became all-around cannoners.

It was very much of a problem for me as well as for all the instructors to know just what to teach. We knew our own drill regulations, and the principles that had been previously taught in the School of Fire before its close. We knew the American doctrine of open warfare. However, at this particular time trench warfare was at its height on the Western Front, and literature on this subject was being poured out in countless documents and translations from Washington. Letters from officers in France all indicated that this type of warfare had superseded our own "open warfare," and that our prewar teaching was obsolete. In addition, four French field artillery officers, just from France, arrived at Sill for our use as assistant instructors, and as three of them had come into the Army since the war they knew practically nothing about field artillery methods except those of trench warfare. Pressure on me was, therefore, powerful and continuous to abandon our own principles and to adopt those that were said to be new and up-to-date. In fact, this pressure was continued during the entire war. I could not bring myself, however, either then or later, to the conviction that our principles governing the use of field artillery were wrong or out of date, although I was perfectly willing to concede that the application of these principles might take on a new form under the changed conditions. Therefore, I



Students ready to ride to firing points, and marching to Snow Hall, 1918

concluded to adhere to our old teachings, try to lay a sound foundation for the students, instruct them in open warfare, and teach to a very limited extent the slower and more cumbersome methods of trench warfare. In the end, this proved to be a very wise decision. And from the beginning to the end of the war, we wrote and printed our own texts instead of using the countless British and French ones sent us officially from abroad.

An amusing incident occurs to me. The School had at this time a small printing plant and shortly after my arrival Capt. Pennell, the School Secretary, brought to my attention the fact that his requisition to Department Headquarters at San Antonio for \$200 with which to buy printing paper had been reduced there to \$100. I told him to write a telegram to the Quartermaster General at Washington, prepared for my signature, make no mention in it about the Department Headquarters allotment of \$100, but ask for \$10,000 for paper. Pennell, being a good soldier, simply gave me a long, hard look; then he suggested that we add the words in the telegram "and other necessary printing supplies." Of course I accepted this improved wording. We sent the telegram and got the money. Requisitions continued to come back from Department Headquarters, either giving us reduced amounts or asking for further data. Finally when one for horseshoes came back for me to state how many horseshoes had been used the previous year, I rebelled; we had no time to answer irrelevant inquiries. For Department Headquarters knew that the previous year there had been merely a caretaking detachment at Sill, while now we had over 2,000 horses. So I sent the requisition back with a personal letter, all directed to the Department Commander personally, telling him of the magnitude of my task and asking him to direct his staff to quit harassing me, as I really knew what I was doing. He was an old friend of mine—General James Parker—and he sent me the finest kind of a reply; and thereafter I think that had I asked for the moon, the requisition would have been approved. But I strongly suspect that some of his old clerks heard some unpleasant and forceful remarks from him.

Referring again to the matter of printing, we later got much more money, put up a separate building equipped with an elaborate printing plant, without which we could not have carried on our work.

The enlarged plan, which the Field Artillery officers and I had jointly gotten up, and which in September had been approved, and to execute which I had been given \$750,000, was briefly as follows:

- (a) Enlarge the School to accommodate 1,200 students, with the necessary instructor personnel.
- (b) The course of instruction to cover 12 weeks, with 100 students entering weekly.
- (c) The School to be organized into 6 general departments as follows: Artillery tactics (firing), liaison, engineering, practical ballistics, artillery matériel, and

artillery transport. That the course should include the following subjects, both theoretically and practically: Field Artillery Drill Regulations, tractors, motors, Field Artillery matériel, the use of range tables, probabilities, Field Artillery sketching, topography, the use of maps in the war zones, fuzes, ammunition and ammunition supply, hippology, optics, plotting board, map firing, means of communication, artillery engineering, functions of different calibers of ordnance, open warfare, close shooting, firing and observation of fire, interior economy of organizations, artillery battle tactics and service firing.

(d) Construction of necessary housing.

(e) Necessary School troops and detachments.

It must be remembered that at this time, when the Field Artillery School of Fire was being enlarged and its course of instruction revamped, it was the only school in this country where the hundreds of newly appointed field artillery officers could learn their business as field artillerymen. The other (division) schools merely transformed civilians into officers with insufficient time in their curricula to present more than a smattering of field artillery requirements.

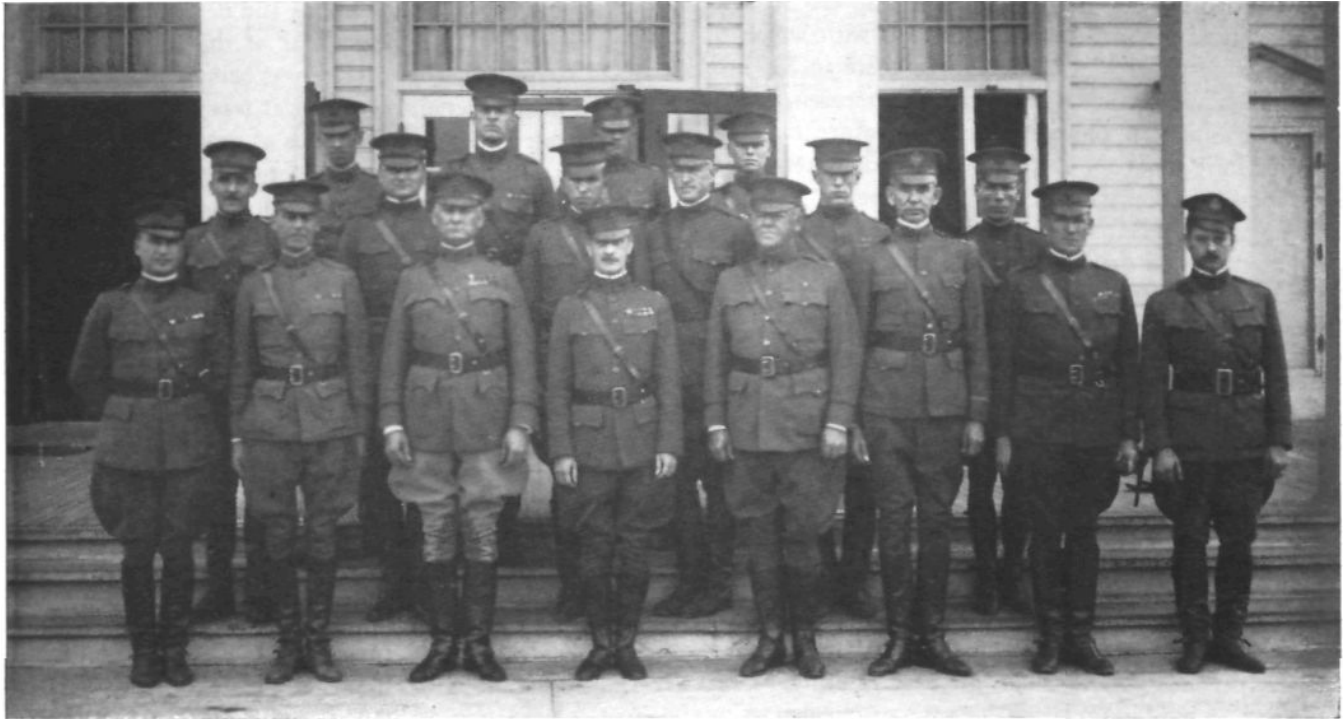
There was no Chief of Field Artillery nor any other authority to tell me, as Commandant of the School, just what was wanted, what place the School would occupy in the military scheme. On the contrary, the only ideas I had gained from higher authority were those quoted from the Chief of Staff, who thought there should be no schools at all! I determined, therefore, to place in the course those subjects which as an old field artilleryman I knew were essential to an effective exercise of command of a field artillery unit, and to add to these a few new ideas with which we were being bombarded from France. These latter I selected from a paper which a short time before had been prepared by General Summerall after he had visited some French Field Artillery Schools.

Naturally, the schedule which I blocked out at that time for the enlarged School of Fire was regarded by me as tentative. My knowledge of what was happening in France, and what was being taught in the schools there was very limited. How much knowledge of field artillery the students would have upon their arrival at the School was unknown. How much the authorities in Washington expected the students to know when they left the School was also unknown. I could only use my best judgment in formulating the course and the detailed schedules, expecting to make such changes as time and experience dictated. However, after I left (which occurred before even a single class had started the new course), only a few changes were made, and except for minor alterations and adjustments the course I had laid out as tentative continued to the end of the war. This has always been a source of great satisfaction to me. I "builided better than I knew."

After I left Sill on September 26 to join my brigade at Camp Jackson, South Carolina, Colonel A. S. Fleming

succeeded me as Commandant at Sill, and the work of putting the enlarged School plans into effect fell on his shoulders. There was no Chief of Field Artillery to assist him in removing obstacles or to help him in any way, and his task was huge and his troubles many. He deserves more

students per week, we began work in the Office of the Chief of Field Artillery on a plan to further enlarge the school to an intake of 300 officers per week, but the armistice intervened before we could discover where the equipment and other facilities could be found to operate a



Gen. Snow with Command, Staff, and Faculty in 1919

1st row, left to right: Maj. H. J. Malony, Maj. R. S. Parrott, Maj. Gen. E. Hinds, Comdt., Maj. Gen. W. J. Snow, Ch. of FA., Col. Henry Butner, Asst. Cmdt., Lt. Col. F. T. Austin, Lt. Col. D. F. Craig, Maj. R. Paddock. 2d row, left to right: Maj. A. C. McBride, Maj. D. E. Cain, Maj. R. C. Scott, Capt. C. W. Gallaher, Lt. J. B. Hunt, Maj. M. Proctor, 3d row, left to right: Maj. H. H. R. O'Dell, Maj. V. Meyer, Capt. A. Fitzhugh, Capt. J. W. Loeff.

credit than he has ever been given for the work he then accomplished. Yet the fact remains that when I became Chief early the following February the proposed weekly flow of classes of 100 students had not gotten under way. One such class had entered in October, another in November, and others at irregular intervals, but only about one-third as many classes had entered as I had anticipated. This delay was intolerable, and I started the regular flow at once, beginning with the class reporting on March 4th. This is merely another illustration of the necessity of a Chief of Arm. He can *act*, while General Staff Committees merely grope and talk. In March I began to work on plans for doubling the output of the School, although it had just started with its classes of 100 students. The General Training Scheme shows the again enlarged School of Fire as being its fourth essential feature. Ultimately, we got the School capacity worked up to the point where it was enrolling 200 field artillery officers and 100 artillery air observers per week. This was in the late summer or early fall of 1918. With the entry of the first class of 200

school of that size and at the same time complete the equipment of the four firing centers still short a considerable amount of necessary training material.

In March when I put this first of the weekly classes of 100 students in Sill, I had to provide the Commandant with more equipment, as he was sadly in need of almost everything. This equipment I reluctantly took from some that was earmarked for General Pershing. Before doing so, however, I ascertained that he could get along without it temporarily, or until we could replace it. Our attitude then and during the entire period of the war, was to give him preference in everything and to send him whatever he wanted if we could get it and could get the ships to transport it. By various means we managed to get together by the time the enlarged classes needed them, 12 batteries of 3-inch guns, 3 batteries of French 75-millimeter guns, 2 batteries of 4.7-inch guns, 2 batteries of 6-inch howitzers, 1 battery of French 155-millimeter howitzers, and, I think, 1 155-millimeter gun. This was a very respectable number of guns and howitzers, the French ones being largely those I had requested when I

opened the School the previous summer. We also secured sufficient fire control and other instruments to carry on the instruction of the enlarged classes. The class which entered the School upon its re-opening in the summer of 1917 when I was Commandant, graduated 108 students, but they were not given certificates. It will be recalled that with this first class we had to feel our way day by day because we did not know just what to teach. The course was to be one of two months, but the class was so mixed it was difficult to get its members to a satisfactory plane of common understanding. Consequently, their instruction compared with that of succeeding classes under the three months' course, which I blocked out for the enlarged School, was quite incomplete. This first class, therefore, became, and has always since been known, as the zero class.

I think I should mention here that while we started the School with only the newly created 14th Regiment of Field Artillery, yet to put our enlarged program into effect it became necessary to bring the 1st and 9th Regiments of Field Artillery from Hawaii. These three regiments, together with a School Detachment of 250 men, constituted our School Troops during the war. I insisted on their not being brigaded with any division, but remaining as School Troops pure and simple; this was a large factor in the success of the School. They became by far the best, if not the only thoroughly trained, Field Artillery troops in continental United States. This subject is mentioned again later.

From this start in 1917 up to the Armistice, 3,425 students entered and 2,158 graduated. Because only about two-thirds of these officers who entered were graduated, it must not be thought that the other third were found deficient. Although a considerable number did fail in the course, most of those who did not graduate were officers who had to be relieved in order to go abroad with their regiments.¹ I had to follow this policy in order to secure the attendance of good men, as otherwise such men would have dodged the School in the fear of being left behind. Even as it was, some regimental commanders lacking sufficient backbone to purge their units of inefficient officers would recommend for attendance at the School only their poorest officers, hoping thus to get rid of them.

The Sill graduates, after either joining or rejoining their regiments, were used as instructors, thus spreading the gospel. The influence of the School, therefore, in leavening the mass of field artillery officers, was wide and extensive and impossible to calculate. I think it can be safely stated that no other Field Artillery activity in this country exerted continuously throughout the entire war such widely beneficial results as did the Sill School of Fire.

In response to one National Guard brigade

¹Up to midsummer of 1918, about 20 per cent of the National Guard students had been found deficient, and about 3 per cent of the National Army students. After that time the discrepancy diminished.

commander's request to me for help after I became Chief, I sent him three graduates and, sometime later, he wrote me of their great value and ended his letter by facetiously saying that, for providing a school that could turn out such graduates, there ought to be erected to me in Washington, at the end of the war, a monument "just one foot less high than that to G. Washington."² Other brigade commanders also applied to me for graduates. In one case where I sent several, the brigade commander made them a eulogistic speech of welcome upon their arrival. Then at the close, evidently thinking these young officers might become too egotistical over the warmth of his speech, he added, "But don't think you are any d Napoleons, because you ain't."

It will be recalled that the course in effect at Sill when I became Chief was the one I had planned with the aid of the field artillery instructors I had carefully selected when I was commandant in 1917, and that I had then regarded this course as more or less tentative. Therefore, when I became Chief, one of my early acts was to cable to France for an opinion of the course. The reply was to the effect that it was satisfactory and no change was suggested.

Shortly after I became Chief I realized that the matter of artillery observers, like all other field artillery matters, was in a far from satisfactory situation. The Air Corps, then a part of the Signal Corps, was not developing these men either in satisfactory numbers or in satisfactory training. After some discussion with the Air Corps it was finally agreed that I should give these air observers for the field artillery such field artillery training as I considered satisfactory and, accordingly, I instituted for them a 7-week course (called the Aerial Observation Course) at Sill. In order to get candidates I sent officers to Camp Dick and other Air Corps training centers to see if cadets there who had completed Air Corps ground course would transfer to the Field Artillery as Aerial Observers upon completion of our 7-week course at Sill and be commissioned in the Field Artillery.

In the development of Sill for the School and as a Firing Center during the spring and early summer of 1918, I discovered, in addition to the troubles characteristic of all the other field artillery activities that were being pushed simultaneously and which largely centered around inadequate equipment and insufficient trained instructors, a most perplexing difficulty in a serious shortage of water. It had not rained to any extent in three years, the reservoir was very low, and for months it was a question of how long we could stay there. Many times before the war was over I made tentative plans to move all activities from Sill. Once a week I had a telegram informing me as to how many more days of water were left. The objections to moving were two: First, I had no other place to which to send the School; and, second, I figured that even if I had a place we would lose at least three months by moving, and three months cessation at that critical

²I have not yet gotten the monument.

stage of the war was not to be thought of except as a last desperate necessity. Not only did we have the guns, tractors, trucks, horses, ammunition, and other equipment, at Sill, but we also had the buildings and, more important, we had spent years in a geodetic survey of the reservation, starting in 1913, when Captain Leslie J. McNair accurately located over a hundred points by triangulation. Early in the war, we converted the coordinates of these into metric units on a true north grid and prepared Fire and Control maps. We had laid miles of underground cable and miles of overhead wires. We had constructed an elaborate trench system similar to that on the Western Front. To duplicate all these facilities at a new place would have taken months.

I sent a geologist to Sill to try and locate an additional supply of water, but the only thing he could find was a limited supply of contaminated water between the old and the new posts. In the meantime, I got rid of the Remount Depot and all other water consumers that could equally well be established elsewhere and which were not essential to the School. However, from the day I came in as Chief to near the end of the war, this water question worried me, except for the very slight and temporary relief occasioned once in a while by the cheerful news of a light rain, never enough to amount to anything but sometimes raising the reservoir level by two or three inches.

Another thing about the Sill School, that bothered me throughout the war but which was of course insignificant in comparison with the water shortage, was the Officers' Mess. Several thousand officers were there constantly and had to be fed. Fort Sill is an inaccessible place, and supplies were difficult to procure even though they came through in carload lots.³ The management of the Mess, however, seemed to me to become increasingly difficult. I tried to get Fred Harvey of the Harvey Chain of Restaurants to take it over. He said he really could not do so, as he had troubles of his own. He did, however, ultimately provide me with a hotel keeper who proved only fairly satisfactory.

Another thing that really disturbed me was the morale of the School of Fire. The summer of 1918 at Sill was exceptionally hot and dry. Vegetation was burned up. The water, dangerously limited in amount, was so highly chlorinated and so muddy as to be unpalatable. Everything and everybody were hot and uncomfortable. There were no amusements. There was no city within a reasonable distance for diversion. The work was hard and grinding. Many men could not make the grade. The result of all this was a much less satisfactory state of morale than at any of the other field artillery activities.

There were at Sill none of the immediate rewards characteristic of all the other activities for doing good work on the part of the men undergoing training. Thus, at the Central Officers' Training School, in Kentucky,

successfully completing the course resulted in the student getting a commission. At the Firing Centers, completion of the course was shortly followed by going to France. At the Replacement Depots, the best officers and men were selected monthly to go to France or to go to newly organized brigades where there was prospect of early promotion or early sailing or both. At Sill, on the other hand, exceptional ability displayed by a student would probably result in his being retained at that place as an instructor, and failure to graduate would very likely result in his being eliminated from the service. All these facts and conditions were morale depressing. They were inherent in the School itself, considering only the student body. As to the faculty and instructors, while they were subject to many of the above enumerated depressing factors, yet they escaped some of them. The result was that their morale was of the highest. They prided themselves on their ability to accomplish the impossible, and they exerted themselves to the utmost to inculcate the same spirit among the students. I do not want to leave the impression that the morale among the latter was low; it was not; it was high. But it was below that of the students at the other Field Artillery School at Zachary Taylor where it was truly exuberant and with which I unconsciously compared it. When all is said and done, the fact remains that the School did a tremendous work, and did it well. Its success was a monument to all who labored there, under the most trying circumstances, and I am deeply grateful to every officer and enlisted man who so loyally contributed his part. The work of these enlisted men in the 1st, 9th, and 14th Regiments of Field Artillery will always remain in my mind as illustrative of the faithfulness, devotion to duty and high character of service of the trained American soldier. During the Summer of 1918, the day's work frequently began at 4 AM and ended after dark with the men almost exhausted. They served the guns, sometimes stripped to the waist and burned a dark brown by the blazing Oklahoma sun, all day long. As a reward I expected to send these regiments overseas in December and January; but up to the armistice, there were no regiments in this country trained highly enough to replace the Sill ones.

Colonel Fleming was promoted to the grade of brigadier general early in May and as a reward for his work I assigned him to a brigade sailing immediately overseas. Colonel L. L. Lawson, on May 11th, succeeded him as Commandant and continued the School along the same lines as his predecessor.

As an example of how closely we coordinated field artillery activities during the war, I may mention that one day in studying some Sill reports I suddenly discovered that most of the men who entered that institution and failed to graduate were found deficient because of mathematics. I had previously sent numerous letters to the Commandant, directing him to nurse as many officers as he could through the course. I was desperately short of

³We even bought a herd of cattle in Wisconsin, and established a dairy at Sill.

officers, and did not want to lose a single one who possessed real merit. I was, accordingly, analyzing the reports to determine *why* they failed to graduate, when I made this discovery about mathematics. I at once telegraphed the President of Yale University asking him to send me a man qualified to make an investigation as to the School's requirements in mathematics. He replied he had none to spare, but suggested that Professor Lester R. Ford, of Harvard, a mathematician of international repute, was well qualified. I communicated with Harvard University and found that Professor Ford had been drafted. I had a search of the draft made and located the professor as a private in some Depot Brigade. I had him brought to Washington and told him I was going to send him to Sill to determine, by investigation, exactly how much mathematics a man must know in order to complete the Sill course successfully. As I knew he would get nowhere in this investigation as a private. I put him in civilian clothes and gave to him for the Commandant a letter of introduction as "Professor Ford, of Harvard." In this letter, I directed the Commandant to facilitate the investigation in every possible way. As far as I know, the Commandant still does not know that this investigator was a private. A short time later Professor Ford returned to Washington and delivered to me a very satisfactory report. I then told him that I proposed to commission him and send him to the Field Artillery Central Officers' Training School at Camp Zachary Taylor, Kentucky, and place him at the head of a Department to teach the exact amount of mathematics required of a Field Artillery officer at Sill. I impressed upon him the fact that I wanted not a single day wasted in instruction beyond that which was absolutely essential. I gave him several assistants, mathematicians whom I found among men unfitted for full military duty. I commissioned them also. He wrote, for his work at Zachary Taylor, a text book which is the queerest text on mathematics that I have ever seen, in that it takes up so many different subjects and then drops them just as they begin to get interesting. His work was eminently successful, as was proved by the fact that the graduates of this school when they later went to Sill were never found deficient in mathematics. I had plugged one leak.

No account of the School would be complete that failed to especially mention Colonel R. E. D. Hoyle. He was continuously on duty there from November, 1917, to the end of the war, serving ably in the positions of Instructor, Secretary, Disbursing Officer, Administrative Officer, and Assistant Commandant.

At the time of the signing of the Armistice there were 250 officers on duty at Sill as faculty and instructors. Some of these officers had been on duty there for a long time and others for much shorter periods; some were more efficient than others; though all were good, for every one of them had been carefully picked for his particular specialty. Under these conditions, it is difficult

to select a few as entitled to special commendation for their work, but there were a small number who were really the wheel horses and carried the school farther and farther along the road to success and higher and higher in efficiency. Among this group may be mentioned the following:

Colonel D. W. Hand, Director Gunnery Department, and Coordinator Firing Instruction; Colonel William P. Ennis, Director Materiel Department; Colonel W. S. Wood, Director Reconnaissance Department; Colonel Wm. Bryden, Department of Gunnery and Assistant Commandant; Colonel R. E. DeR. Hoyle, Instructor, Secretary, Disbursing Officer, Administration Officer, Assistant Commandant; Colonel L. P. Collins, Instructor Tactics Department; Colonel Wm. Rucker, Range Officer; Colonel E. P. King, Jr., Instructor, Statistical Officer, Director of Instruction; Colonel Harold E. Marr, Instructor; Colonel Charles D. Daly, Director Materiel Department; Colonel H. E. Miner, Director of Gunnery; Colonel J. L. Devers, Instructor and later Post Executive; Colonel Louie A. Beard, Secretary; Colonel Charles E. Ide, Instructor; Colonel William H. Williams, Statistical Officer, Director of Instruction; Colonel J. Craig McLenihan, Instructor; Lt. Col. Mert Proctor, Instructor; Lt. Col. H. H. Cole, Instructor; Major Robert Bathurst, Instructor; Major H. C. Jones, Instructor, Materiel, and Mess Officer; Major F. W. Bryant, Secretary; Major H. C. Jackson, Instructor, Topographer; Major J. W. Keller, Instructor; Major Richard C. Scott, Range Officer; Major Thomas Stokes, Instructor; Major E. Durette, a fine French soldier of the old school with important battle experience. He, with two of his assistants, Captain C. P. F. Pierret and Lieutenant Negre, rendered valuable assistance. 1st Lt. Albert Kleinert, Mess Officer.

I know of no group of officers the mention of whose names gives me more pleasure than these. Merely to have existed at Sill under the uncomfortable physical and mental conditions prevailing there during the summer of 1918 was no small task; to have, in addition, worked day and night under a highly nervous strain, to have labored at the highly uncongenial task of running a school thousands of miles away from the battle-lines; and to have done this wholeheartedly and enthusiastically, month in and month out, with no hope of reward, puts these men in an outstanding class all by themselves. At no other activity in the field artillery were conditions under which men worked so harassing as they were at Sill.

In connection with General Snow's article on the Field Artillery Brigade Firing Center at Fort Sill, our attention has been called to the omission, on page 259, of the July-August, 1940, number. THE FIELD ARTILLERY JOURNAL, of the name of Captain (now Colonel, FA-Res.) George W. Langdon, Jr., who so ably assisted Colonel E. L. Gruber in the conduct of the Firing Center. Colonel Langdon is now in command of the 389th Field Artillery, O.R., at Haverhill, Massachusetts.—Editor.

GUERRILLA



WARFARE

By Captain George Haig, FA-Res.

A guerrilla is defined as "one who engages in irregular, though often legitimate, warfare in connection with a regular war." It is commonly believed that an army will only resort to guerrilla fighting when all is lost, and when all hope for victory in formal warfare has passed. This is by no means the case, and Lawrence's Arabian campaign is evidence to that effect. There are many situations and special theaters of war in which it would be advantageous for a modern army to organize guerrilla units and operate them in conjunction with the main body. Properly supplied, equipped and supported, these guerrilla units would be able to make a very considerable contribution to the final victory.

The first victory won by an American force was fought upon principles of guerrilla warfare, although doubtless most of the participants would not have understood the meaning of such an important sounding phrase. Yet, in impeding the British retreat from Lexington in the action at Concord the New England militiamen were giving an excellent demonstration of guerrilla tactics. With the possible exception of the British Army, the United States Army has had more experience with guerrilla fighting than the military organization of any other major power. This experience has extended through the long struggle with the Indians, the fighting with raiders like Mosby in the Civil War, and the suppression of the Philippine insurrectionaries. This varied experience gave

In the September issue THE FIELD ARTILLERY JOURNAL carried an article by Lieutenant Colonel Charles D. Griffiths which emphasized the important part which jungle and mountain warfare might play in the defense of the western hemisphere. While extremely valuable lessons are to be obtained from the more formal fighting on the European continent, it should not be forgotten that American troops, as in many past conflicts, may be called upon to serve in far more unfavorable regions than the flat, highway-traversed plains of Flanders, and against troops which do not employ conventional tactics.

Captain Haig is particularly fitted to write an article on the subject of guerrilla warfare, inasmuch as he served in one of the most sensationally successful guerrilla campaigns of modern times, with Lawrence in Arabia. When a young man in his 'teens, in 1915, Haig was exiled into Syria from his home in Aintab, Turkey, in order to escape the oppressive measures the Turks were then putting into effect against the Armenians. One day, after roaming the country for three years, Haig arrived at the headquarters of Ameer Faisal and Lawrence at the Oasis of Azrak in the heart of the Arabian desert. Lawrence personally welcomed Haig, for he brought with him news of Turkish troop movements. Haig then joined Lawrence's staff, and was often sent on secret missions to contact Arab leaders within the Turkish lines. For the remainder of the war Haig continued to serve with Lawrence, not only in the many raiding expeditions but also in Allenby's final victorious campaign in September, 1918.

the army a vast knowledge of guerrilla methods, and it would seem that this knowledge might be profitably refreshed at the present time.

Napoleon got together one of the most impressive military machines ever to be organized. Nevertheless, in two of the outstanding defeats which Napoleon suffered, guerrilla tactics played a major role. In the Russian campaign, Napoleon vanquished the Russian regular armies without too much difficulty. But in the long retreat the great French army was almost annihilated. Under the leadership of well-trained army officers and French Royalist emigrés the Cossacks relentlessly harassed the long French columns. The Cossack tactics

were those of guerrillas. Their object was not to give battle to the French, but to cut their lines of communication, destroy their supply depots, demolish bridges, cut off small detachments, and in general to keep the French in a constant state of alarm. These tactics had their reward, for in the end French morale broke down, leaving the Russians with a victory won over an army which originally had been much superior to their own.

The French had a similar experience in the Spanish campaign. After easily dispersing the Spanish regular army the French Marshals found themselves confronted with a problem for which they were never able to devise a satisfactory solution, and which contributed heavily to



The Italo-Ethiopian campaign offered excellent opportunities for guerrilla warfare, but Italy's supply line shown here was not cut because the Ethiopians lacked trained leaders.

their ultimate downfall. Encouraged and often directed by British officers, the Spanish irregulars finally became so formidable that it was sometimes necessary to detach a squadron or even a regiment to act as escorts for messengers. Communication and cooperation between the Marshals was thus made extremely difficult, to Wellington's great advantage. The British derived a further advantage from the Spanish guerrillas, for the latter furnished their English allies with a steady supply of invaluable information concerning the movements of the French.

A more recent example of guerrilla warfare is the successful campaign waged by Colonel Lawrence in Arabia. Only a guerrilla force could have achieved the results accomplished by Lawrence, and if we examine the campaign closely we shall discover that the backbone of Turkish resistance was broken by Lawrence's guerrillas.

After the British failure at the Dardanelles they decided to try another route, and began pushing northward from the Suez Canal across the Sinai desert. When they took Gaza in southern Palestine they observed that as they moved northward the line of battle became longer. The Turks were not only occupying Palestine (west of the Jordan - Dead Sea - Arabah line) but also the territory east of the Jordan as well. In

order to advance farther to the north the British army had to occupy Transjordan as well as Palestine.

It would have been quite easy to take the coastal region with land troops supported by the navy. The British might even have been able to go as far north as Beyrouth or Alexandretta in a short time, but that would have left them with their right flank exposed and vulnerable. It would have been folly to move north without securing the territory to the east as far as the edge of the Arabian desert beyond the Jordan. In 1799 Napoleon had made such a mistake, and had paid the penalty of defeat. He had advanced northward from Suez through the Sinai desert, and had laid siege to Acre. But Napoleon's flank was exposed to the east, and the Turkish guerrillas were so persistent that he had had to abandon the siege and retreat to Egypt.

A campaign east of the Jordan was bound to be difficult. Although the Turks did not have a great number of troops in Transjordan at that time, they could have easily brought up reinforcements by means of the Pilgrim

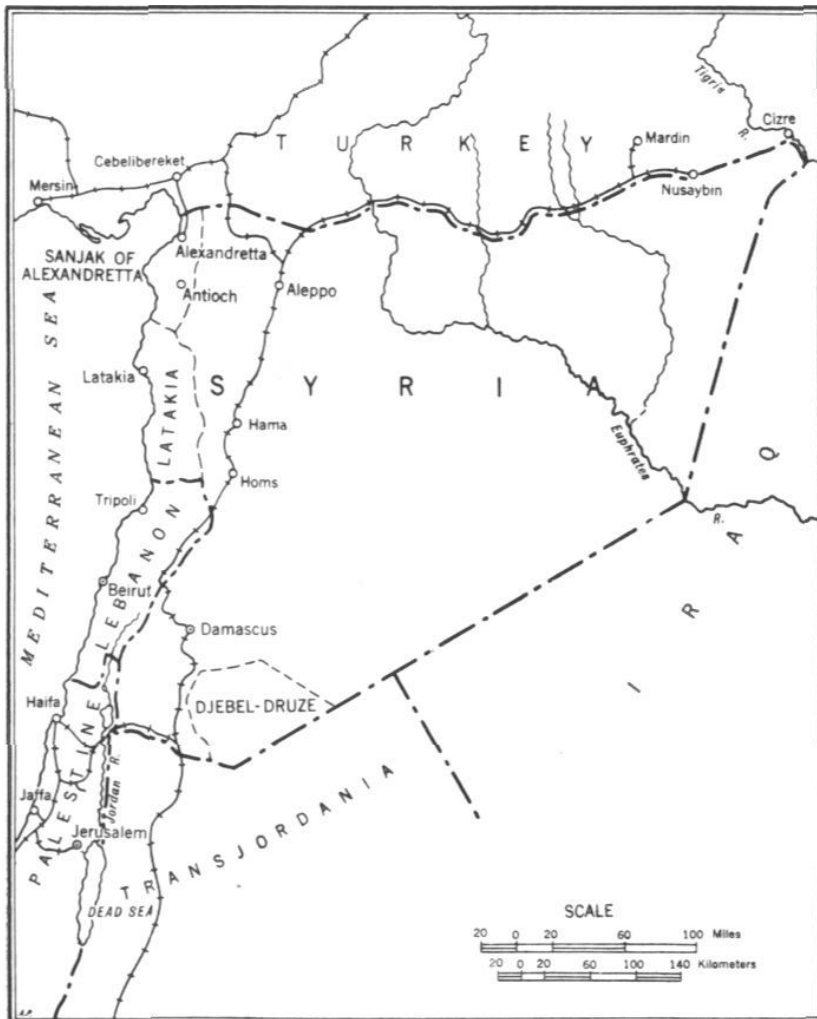


Moorish guerrillas in the Spanish Civil War.

railway, which ran from Damascus to the holy city of Medina in Hejaz. The greatest difficulty, however, was the arid Arabian desert with its unbearable heat. Furthermore, in order to campaign in Transjordan Great Britain would have had to transport a vast number of men to the east through the Arabah only, because it is almost impossible to move troops from Gaza directly east into Transjordan. The Arabah Valley (just south of the Dead Sea) is wide and deep, and below sea level there is no relief from the heat even after the valley is crossed. And even if they had transported troops through the Arabah the difficulties of the desert would remain to be overcome. Merely in order to occupy Gaza it was found necessary to build a water



Lawrence's Irregulars



pipe line from the Nile, and a railway for supplies. Yet it was imperative that the territory east of the Jordan should be occupied in order that the northward advance might continue west of the Jordan. But at the same time it was obviously impossible to wage war with an organized regular army in Transjordan without a great sacrifice in men and materiel.

It was at this point that the British military authorities decided that only guerrillas could secure their right flank. The guerrilla operations were to be synchronized with the advance of the main army.

The story of how the task of organizing the Arabs to fight a guerrilla war was done has been well told by T. E. Lawrence in his *Seven Pillars of Wisdom*. One aspect of it is worth noting to those who are interested in the organization of guerrilla units. Arabs are fearless fighters. Their endurance and patience under hardships is amazing. One would think that these Arab qualities would be immensely valuable for military purposes, especially in a desert country. And indeed they were of great value to Lawrence, but at the same time they were somewhat of a handicap. The Arabs like to carry a fight to the finish, either theirs or the enemy's. After the most perfunctory

rifle fire at the opening of an engagement the Arabs love to discard their rifles and rush upon the enemy with bare blades. Perhaps such tactics are excusable, for the Arabs are poor shots, and doubtless they feel that while a man may miss with a rifle he never will with a scimitar.

However, Lawrence realized that the purpose of the campaign in Arabia was not to match swords with the Turks, but to *engage* a greater number of the enemy, and thus guard the British right flank. Therefore his first move was to search for trained Arab officers. There were many Arab officers and soldiers in the Turkish army who had been taken prisoners by the British. Lawrence organized a "regular army" from those prisoners who were willing to serve against their ancient enemies, the Turks. With these trained men as the leaders Lawrence was able to check the impulsive Arab attacks during his campaigns. There were very few pitched battles in Lawrence's operations, and these occurred only when it was necessary to occupy certain localities which were strategically important. Most of Lawrence's operations were highly informal, and were based upon the tactics of guerrilla warfare. He operated along the Pilgrim railway, raiding and burning stations, derailing trains, destroying bridges, ambushing Turkish columns and encampments, and so on. After each foray Lawrence and his Arabs quickly vanished into the desert from which they had come.

General Liman von Sanders, commander of the Turkish and German troops in southern Syria during the war, admitted in his memoirs that Lawrence's guerrillas were really responsible for the collapse of Turkish resistance. In fact, in 1917 and 1918 there were more Turkish soldiers

fighting the Arabs under Colonel Lawrence in Transjordan than there were facing the British in Palestine.

The campaign of Lawrence in Arabia is the best example in modern times of the achievement of victory as the result of systematic guerrilla warfare. If the campaign is examined closely the student will note that the British dug themselves in in southern Palestine, and let Lawrence and his guerrillas annoy the enemy into a state of complete exhaustion. The Turks wore out their main forces by using

them to chase Lawrence up and down the Pilgrim railway. At last, when in September, 1918, Allenby was ready for his final push, Lawrence cut the railroads to the north, which resulted in the trapping of eighty thousand Turks in one day.

Guerrillas are not always so successful against regular troops as those under Lawrence were. In the first place, guerrillas are most effective when they operate under trained military leaders, and when their efforts are directed toward military objectives. Guerrillas are most ineffective when they indulge in what may be best described as "mad" fighting—that is, when they launch reckless, headlong mass frontal attacks upon regular troops, as the Arabs were

THE FIRING OF BALIEMEZ

*Draw near, you field artillerymen, and hear my yarn begun,
Of how in that long-distant year of 1531,
When Turks and Germans fought a war, a lady manned a gun.*

*Upon the walls of Buda—that's the other half of Pesth—
The Turks emplaced a heavy gun in an embrasure's rest.
They called it Baliemez. So we still name our guns with zest.*

*When Turks invaded Christian lands, they brought the gun from Turkey
Upon a cart behind a team of oxen, slow and jerky.
The cannon held a monster charge within its barrel murky.*

*The Germans smote the outer guard who beat it for the gate,
Retreating at their highest speed without the slightest wait,
And yet it seemed they started home a little bit too late.*

*The gunners doing bunk fatigue on barrack divans sprawl,
And Baliemez frowns down alone from Buda's ancient wall.
But no! A Jewish girl is near and hears the rescue call.*

*Alas! no powder squib is placed in Baliemez's vent.
Without a train, her torch's fire is highly impotent.
And so the lady grasps her shift. There is a rip, a rent.*

*She rolls her own, a squib of cloth, this one-girl gun squad wonder,
And Baliemez hurls hardware with a voice of roaring thunder.
The German shock troops get the works and can't get out from under.*

*The Turkish Sultan Suleyman decreed a silver band
For Baliemez, and freed the girl and kin from tax demand.
And all of Turkey gladly gave the little girl a hand.*

—FAIRFAX DOWNEY

inclined to do unless restrained.

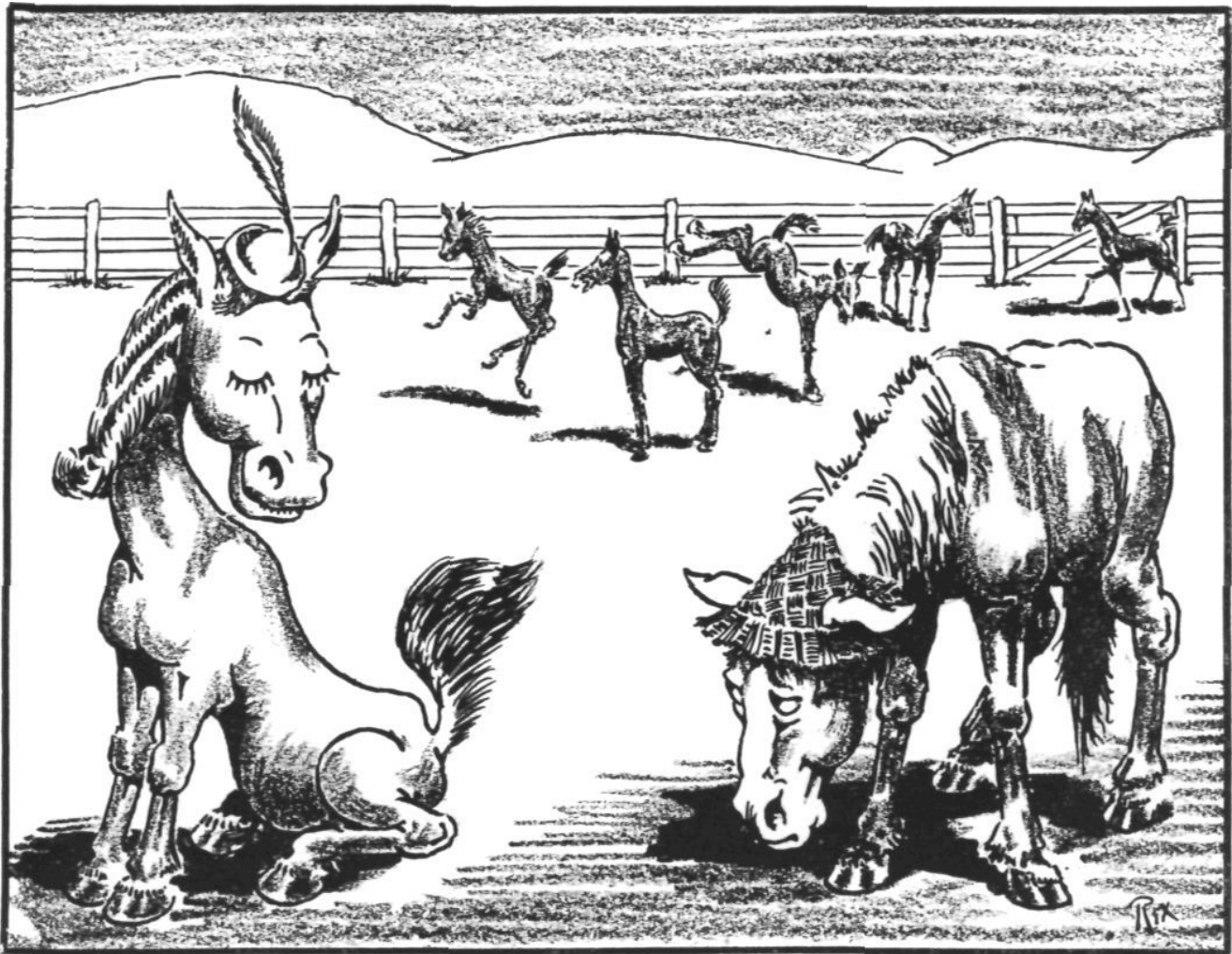
The best example of failure in guerrilla warfare was the Italo-Ethiopian War. The terrain was ideal for guerrilla tactics, and the Ethiopians were fighting on familiar territory which was strange to the Italians. Nevertheless, the Ethiopians were easily beaten. Their defeat was largely the result of the fact that the Ethiopian guerrillas were not led by trained military leaders, and also because the Ethiopians did not concentrate upon the destruction of military objectives, but instead

indulged in a great deal of "mad" fighting.

Therefore, the following conclusions regarding guerrilla warfare would appear to be admissible:

1. Guerrilla units can be an important factor in bringing defeat to the enemy, given a favorable situation and terrain.
2. If possible, guerrilla units should be used in conjunction with a regular force, and the operations of the two should be coordinated.
3. Guerrilla units should be commanded by trained officers, who will restrain them from "mad" fighting, and who will confine their energies to the destruction of military objectives.
4. Guerrilla units should be small in number and highly mobile.
5. When attacked by guerrilla units regular troops should refrain from attempting to launch a formal counter-offensive. Instead, the regular troops should organize irregular units of their own, and let the opposing guerrillas match wits with each other. After all, in guerrilla warfare it is not might that counts, but the cleverness and unusual strategy of the guerrilla leader.

Oh Mr. Knudsen! Plane Production May Be Falling Behind. But—



War Department Press Release, January 9: "Army Remount Service Ahead of Schedule."

A new Technical Manual, 6-210, *Air Observation and Adjustment of Artillery Fire*, has been sent to the Adjutant General for publication and doubtless will presently be in the hands of troops. This manual, the result of an intensive

study conducted at the Field Artillery School, aims at simplification of procedure. It is hoped that it will go far in speeding up air-ground shoots which in the past have been painfully slow and have led some artillerymen to despair of ever attaining efficient combat results. The methods are, however, predicated upon the theory that close cooperation between the aerial observer and the firing battery will be a reality, i.e., that the plane will be available when and where needed, and that the aviator-observer will be in close liaison and harmony with the artillery before, during, and after the time that the shoot takes place.

Those of us (in the field artillery) who have been closely concerned in this matter are certain that we shall not have this close cooperation until we have our own planes and our own observers. We never have had it under the present set up.

Observation is as vital to effective artillery fire as eyes are to an individual. To permit observation of defiladed areas, air observation is essential. Enemy batteries will usually be emplaced in defiladed positions, therefore for effective counterbattery fire, air observation is a necessity. The experiences of those who fought in Europe last summer bear this out absolutely. Furthermore, those of us who are serving with armored units are convinced that air observation is essential to effective support of tanks; and here again reports from Europe strengthen this belief.

An artillery observation post on the ground is always manned by a field artilleryman. An artillery observation post in the air is manned by anyone but an artilleryman, usually by some young pilot who has no conception of the problem. It just doesn't add up.

The reasons for establishing ground OPs are fundamental. The reasons for establishing air OPs are equally so. Unless air observation is immediately available when needed, it will be useless. Artillery cannot depend on battle reconnaissance planes which, to quote a Corps Air Officer, "should be used *whenever possible* for a few minutes either on the artillery or the air-ground frequency." This arrangement has been a miserable failure in the past and there is nothing to indicate its success in the future.

The artillery handles its own communications and its own supply of ammunition, but for some unfathomable reason it must keep hands off its air observation which is just as vital to its proper functioning as are its communications and ammunition. The problem of air

AIR OBSERVATION OF ARTILLERY FIRE

By Lieut. Col. John B. Wogan, 68th FA

observation will never be solved until the artillery is assigned observation planes as an organic part of its units. The artillery is not asking for these planes as a favor to itself, it is simply stating an indisputable fact that unless air

observation is made available and trained observers used, it will not be able fully to accomplish its mission "to support other arms by fire."

On a pure cost basis, the introduction of air observation in the Field Artillery would represent an eventual saving. Artillery ammunition is expensive. One *day of fire* of ammunition for the organic Field Artillery of a corps of three divisions costs approximately \$1,135,000; for one division, \$292,000. Experience tables of the last World War conservatively estimate that 80 per cent of the fires of Field Artillery were unobserved. If 10 per cent of the unobserved fires of the division artillery can be saved by providing adequate observation, the aircraft will have paid for themselves in a very short time. To illustrate: It takes 24 rounds of 105-mm. howitzer ammunition to neutralize a target when the fire for adjustment can be observed and the center of impact of the fire can be placed within 50 yards of the target. When the location of the target can be reported only to within 200 yards, and map firing used, 264 rounds are required. Therefore, if adequate air observation can increase by only 10 per cent the amount of observed fires of the artillery of the division, in one day the saving

will amount to $\$292,000 \times .80 \times \frac{264 - 24}{264} \times .10 = \$21,235$.

If each of the seven observation airplanes recommended by the Chief of Field Artillery for the artillery of the division costs \$21,235, the flight will have paid for itself in one week of operation.

The observer and the plane (and some day perhaps even the pilot) should be a part of the artillery and be attached to the unit for which they are observing, and as such, accountable to its commanding officer for the effectiveness of the fire which they observe and the efficiency with which the mission is performed. The advantage of such a plan cannot be overemphasized. If the pilot and observer have to sit at the mess table with their commanding officer and explain the success or failure of the air missions, they will be more apt to feel a personal responsibility for success. Whereas if they take off from and return to an air base 60 miles from the unit, it will be far easier to pass off any failure by attaching the fault to equipment, artillery personnel, or other causes. And who can or has the time to fix the blame? The observer blames the artillery, the artillery blames the observer, the result is mutual recrimination.

If the operation and maintenance of the ground station and airplane radio installations are the responsibility of one unit, their successful operation is more likely to be assured. It is the easiest thing on earth to explain the failure of radio communication on the other station, and there are few officers with the technical training to deny the failure or understand the cause. I have yet to find a radio operator who did not have a perfectly plausible answer as to why the other radio set or operator was at fault. When the air observer and ground station operators are from the same organization, have trained together, understand their equipment, and can check their sets before the plane takes off, communication failures will be infrequent.

No special training is required of an artillery officer to make him an excellent and, after a few missions, an experienced air observer. Having been trained to adjust artillery fire from a terrestrial observation post, shooting a battery of artillery from the air is like shooting birds off a fence post after having been trained at skeet.

Under the scheme proposed here, the Air Corps would be relieved of the responsibility of training air observers in the adjustment and surveillance of artillery fires and would be able to use the time thus saved in turning out more observers for Corps, Army, and GHQ intelligence work. It is inconceivable that the Air Corps can train the inexperienced officers they receive to execute efficiently all types of missions that a general observer will be called upon to perform. Even when officers are detailed from the various ground Arms, it seems unlikely that an artilleryman will be available for artillery missions or a cavalry officer available for cavalry missions when they are needed.

Under the scheme proposed the necessity for expensive and elaborate radio installations in the observation airplanes would be eliminated. Very simple, light weight, and inexpensive radio equipment could be utilized because:

- a. An air-to-ground range of not more than 25 miles would be required.
- b. The airplane set would not be required to operate in widely separated frequency bands of the several ground arms.
- c. There would be no necessity for the airplane carrying a radio set for aviation purposes in returning to and from a distant airdrome.

It has been stated by competent military observers of the European War that flights over the hostile lines at altitudes

below 5,000 feet were almost suicidal. As a corollary to such a statement, it may be inferred that within these altitudes and over our own lines, friendly observation aircraft would be relatively safe. It is within that air space that the Field Artillery would use the bulk of the observation aircraft assigned.

Having its own observation aviation would permit the field artillery to:

- a. Have available, and be responsible for having available, adequate air-observation when needed. The immediate availability of observation airplanes is of great importance.
- b. Follow the course of battle from elevated observation posts from positions over our own front lines.
- c. By means of oblique photos obtain means for locating targets.

Many of the Civil Aeronautics Authority pilots lack the educational qualifications set up for Air Corps pilots. Lowering the educational requirements would permit a great many high school graduates who have been trained by the CAA and qualified as pilots to be used to an advantage in the simpler work required of field artillery air-observation pilots.

Speed of movement may exceed our best efforts in map and photo production. It is reasonable to expect that in such a contingency the bulk of observation airplanes assigned to the corps and divisions would be engaged in intelligence and mapping missions, with none available for artillery observation. Airplanes organically assigned to the artillery is the only solution.

A light plane with short landing and take-off ability can be used to furnish observation and liaison with the infantry in lieu of the balloon. These planes are simple to maintain in service, relatively easy to fly, are vital to effective artillery fire and will have no mission other than liaison and observation over our own troops. They can be kept fully occupied on these missions. They should be manned by artillery men and maintained by the artillery to include first and second echelon maintenance. Third and fourth echelon maintenance should be the function of the Air Corps or Ordnance.

It has been repeatedly and emphatically stated by many field artillery officers that they did not witness or hear of a successful air-ground artillery mission throughout all the maneuvers of the past years. This condition will not change as long as we must depend on another agency for air observers and observation planes.

In the British Army, all officers up to the rank of Brigadier must now learn to master the mysteries of riding a motorcycle. Evidently modern war holds horrors not even dreamed of by Sherman.



FIELD ARTILLERY ABROAD

Extract from a review by Major General von Lerch, German Army, of a book entitled *JAPAN'S STRATEGICAL POSITION*, by Herman Lufft, published in Berlin, 1940. 12.00 RM. (Translated by C. H. L.)

The chapter "Japan's military and strategical position on the Sea" devotes special attention to the situation in

the Pacific Ocean. The coral islands, the atolls, considered as air bases and/or observation points are of particular importance in case of war (Midway, Wake and other islands for the United States). Japanese sea strength is based on the home islands, whereas for the U. S. A., the Hawaiian Islands are being continuously strengthened as its naval strategical center. The chances



Japan's misconception of the United States dates from the visit of Commodore Perry. At that time this print appeared in Japan—A translation of the material in box, upper right corner, is: "Portrait of a man of the Great United States of North America; he wears a black coat, carries a sword on his back and holds a gun with bayonet." The translation of material in box, lower left corner: "A large vessel without paddle wheels is called a 'Shusukehand' (Susquehanna, name of one of Perry's ships) boat; it is 65 ken long with a crew of 500. It is painted black all over. That steamer ('Shusukehana' presumably) makes a striking picture when it steams toward the sun." The translation of material on middle left, adjacent to title box: The boat (the one pictured) is 35 ken long, 15 ken wide at the broadest point; it has a smokestack 1 jo and 8 shaku (about 18 feet); three sailing masts, each of which has three cross-ties for the sails; main battery consists of six cannon and secondary battery of 18 guns. The steel paddles and 5.5 ken in diameter and 2 ken thick. The part of the paddle below the surface of the water is four shaku. Total crew about 400 men."

of Japan, in the opinion of the author, improve as operations at sea come closer to Japan. The home dependence of its fleet would decrease with increase of distance from the home land.

The existing relation of sea power of England, Japan and the United States should not be materially changed through new construction. (Note by reviewer: At date of writing the author did not have at his disposition the latest American reports on new construction.)

Very interesting is the discussion on a marine war, based on the Japanese Pacific Islands of Bonin; the Carolines; and Marshall; and the American Islands—Midway, Wake, Guam, Philippines. The Japanese occupation of South China, Hainan Island, and Spratley Island are included in the remarks. The importance of Hong Kong, of Taiwan Island, and of the Philippines (296,000 sq. km. and 13.4 million people) receives separate attention.

Singapore, which has been greatly strengthened in recent years, has material weaknesses, especially the absence of depth. It appears to serve as a depot for materiel and a fleet maintenance base. The author, however, does not think that Japan could capture Singapore.

The possibility of defending French Indo-China by sea is considered as very doubtful. France places its defense on land forces, which including reserves are estimated as about eight divisions.

The Hawaiian Islands are the center point of a net which, at this date, the United States has spread over Japanese interests, and which in war is to be extended. A major Japanese offensive across the Pacific must consider this strategic center. Before Hawaii could be attacked, Guam, Wake and Midway would first have to be taken. Pearl Harbor, in the Hawaiian Island of Oahu, is one of the most strongly defended harbors in the world. An attack on it by Japan would be a very hazardous undertaking—especially in view of the distance from Japan (Yokohama to Pearl Harbor is around 6,000 kilometers). In the opinion of an American naval expert, a Japanese attack on Hawaii is exactly what the United States Navy would like.

In his comments, the author believes that Japan, while remaining a sea power, must depend primarily on its Army. The old antagonism between the Army and the Navy, on which the future destiny of Japan depends, is apparently through the war in China being decided in favor of the Army. Japanese power is going to rest in the Army, and not in the Navy.

THE ARTILLERY SURVEY SECTION OF A GERMAN MOTORIZED HEAVY BATTALION. By Captain Thieme. Digested from Artilleristische Rundschau, August, 1940, by T. N.

This is an interesting and detailed discussion of a subject which is going to become more and more alive in our own service. The German artillery survey section of a heavy

motorized battalion consists of 1 officer, 2 survey parties of 2 men each, 2 motorcycles, and the necessary trucks; command of such a small unit by an officer indicates the importance in which the unit is held. In order that replacements might be readily available, the truck and motorcycle drivers of the section were trained, during the first year of their peacetime service, in the duties of the survey section.

The author insists upon accuracy of work and verification of results. He discusses at some length the relative merits of traverse and triangulation.

Traverse procedure is laid down specifically in German regulations. Captain Thieme remarks that one great advantage of traverse is the relatively brief reconnaissance required; computing is a relatively simple and rapid task, hence the results of the survey may be made promptly available. However, it is often impossible to give the work a thorough check, particularly if there is not time to plot it graphically. If the traverse ends at an identifiable control point, of course it is possible to adjust it. German regulations require that wherever possible all traverse must end at such a point; the author believes that in order to be sure of the accuracy of the traverse it should be carried beyond the final point, if necessary, and "tied" to a control point if such can be found.

Triangulation almost always demands a thorough and time-consuming reconnaissance, but few measurements; in particular, there are no distance measurements and therefore not much more actual time is required for the computations. The final results of the survey take a little longer to announce since the computations must be performed at a central point and must be more or less completed before any data can be given out. In general, the author prefers triangulation to traverse because of its superior accuracy.

He discusses a maneuver in which his unit participated. The task was the location of three battery positions, three alternative positions, and reconnaissance for withdrawal provisions. Off hand, it would have appeared that the simpler solution would lie in traversing through the battery and alternative positions, but this would have the drawback of ending "in the air"; it could not be tied to any point because of the difficulty of the terrain. The solution consisted mainly in triangulation, with a short traverse to locate one battery. This was possible because nearly all of the positions were visible from an existing control point and from at least one other battery position. Such a discussion seems to be somewhat academic from our point of view; experience in the flat wooded plains where so much of the maneuvers of our own army have been held has left no room for choice—the answer was traverse because you could not see to triangulate, there was no map worthy of the name, and probably no control.

The orders which were given by the leader of the survey section are noteworthy for their clarity and completeness—

12:10 P.M.: The artillery survey section was attached to the forward echelon. *Order No. 1.* Battery positions (indicated on the map and on the ground) will be located by triangulation. Order: 15th, 14th, 13th Batteries. Party A: To battery positions. Party B: To control point 255.4. Read additional angles to stations at Church N and Church O. Drivers are responsible for proper concealment of their vehicles. Motorcyclist H will drive me. I am going first to control point 255.4 in order to determine how far the valley of stream L, in which alternative positions are to be located, may be seen westwards from N. I shall indicate an additional point P which is also to be located.

Computation at our bivouac upon completion of observations.

Written report of coordinates will be given to the battalion through me. Upon completion of the work the artillery survey detachment will assemble at battery position 15th Battery.

Order No. 2. Point P will be located by triangulation after location of base piece of the 13th Battery.

1:10 P.M.

Order No. 3. Alternative positions will be here (shown on the map and the ground). Party A will locate the alternative positions for the 14th Battery by traverse from the base piece of the 14th Battery, after completing location of the base piece of the 13th Battery; they will measure additional angles to Church N and will end the traverse at Church O.

Party B will locate by triangulation from point P the alternative position of the 15th Battery; additional angle to Church N.

Report provisional coordinates to actual battery positions and to battalion as soon as possible by wire or radio.

Drivers are responsible for the concealment of their vehicles.

Motorcyclist H will drive me. I am going to reconnoiter the survey possibilities for the alternative position of the 13th Battery.

Order No. 4. Alternative position of the 13th Battery will be located by triangulation.

Read an additional angle to church O.

Party B to control point 259.4. Party A to the alternative position. Upon completion of the survey the parties will assemble at road fork 176.2 at the western exit of O; they will complete their computations and await further orders.

Written report of the exact results of the survey will be made to the battalion through me.

I am going to reconnoiter the survey possibilities for new battery positions to the east of W and will return to the rendezvous.

These orders exemplify the desirability of planning the work and distributing the tasks to meet the needs of the situation. The author makes this sound observation: The shorter the time from the beginning of training to the first

duty with the troops, the greater is the danger that the commander and his assistants will lose themselves in detail and overlook the essentials.

Of course the commander of the section must keep in close touch with all details of his work; he must indicate the manner in which the survey is to be computed and must make sufficient checks of this part of the work to insure its correctness.

The author discusses the matter of geodetic control, and of available maps. "An indispensable condition for work by the artillery survey section which is to be free from error is exact control data. This assertion appears in every publication concerning the artillery survey section and is repeated here because you are continually running into this fact. During peace, in the large maneuvers, only the 1/100,000-scale map without grid is usually available outside of military reservations and maneuver areas. It is forbidden to survey from this map!" The author continues with the statement that serviceable 1/25,000 and 1/50,000 scale maps are usually issued in insufficient numbers in the less frequented maneuver areas. He feels that such economy is not justified.

These last observations emphasize the difference between the conditions under which the employment of the field artillery of the German army and that of our own is visualized. Apparently, the accurate map is expected wherever the German Army will operate, or at least there will be adequate geodetic control such as to enable the artillery to produce by its own means far more accurate charts than the 1:100,000 map. We must solve our own problem as we find it.

ARGENTINE REPUBLIC. COMPOSITION OF THE ARTILLERY. From Revue d'Artillerie, August, 1939.

The Argentine Army comprises 6 infantry divisions, 2 divisions and 1 brigade of cavalry, and 2 mountain detachments.

The artillery of an infantry division is composed of a field artillery regiment containing two groups, or 5 batteries. Each of the 5 cavalry brigades has 1 group of horse artillery composed of 2 batteries, and each mountain detachment has a regiment containing 2 mountain groups, or 5 batteries.

Among other materiel, the Argentine artillery has at its disposal a modern 10.2-cm gun, drawn by a 90-HP tractor-truck. The artillery ammunition columns are partly motorized.

The 7.5-cm L/60 (length, 60 calibers) Bofors is used as a heavy gun, and the 2-cm Madsen automatic is said to be used as a light AA gun.

Efforts have been made to develop the domestic manufacture of armaments, particularly of small arms, ammunition, and explosives. Factories are in operation at Villa Maria, Rio Tercero. The industries of Argentina can supply the Army's ammunition requirements.

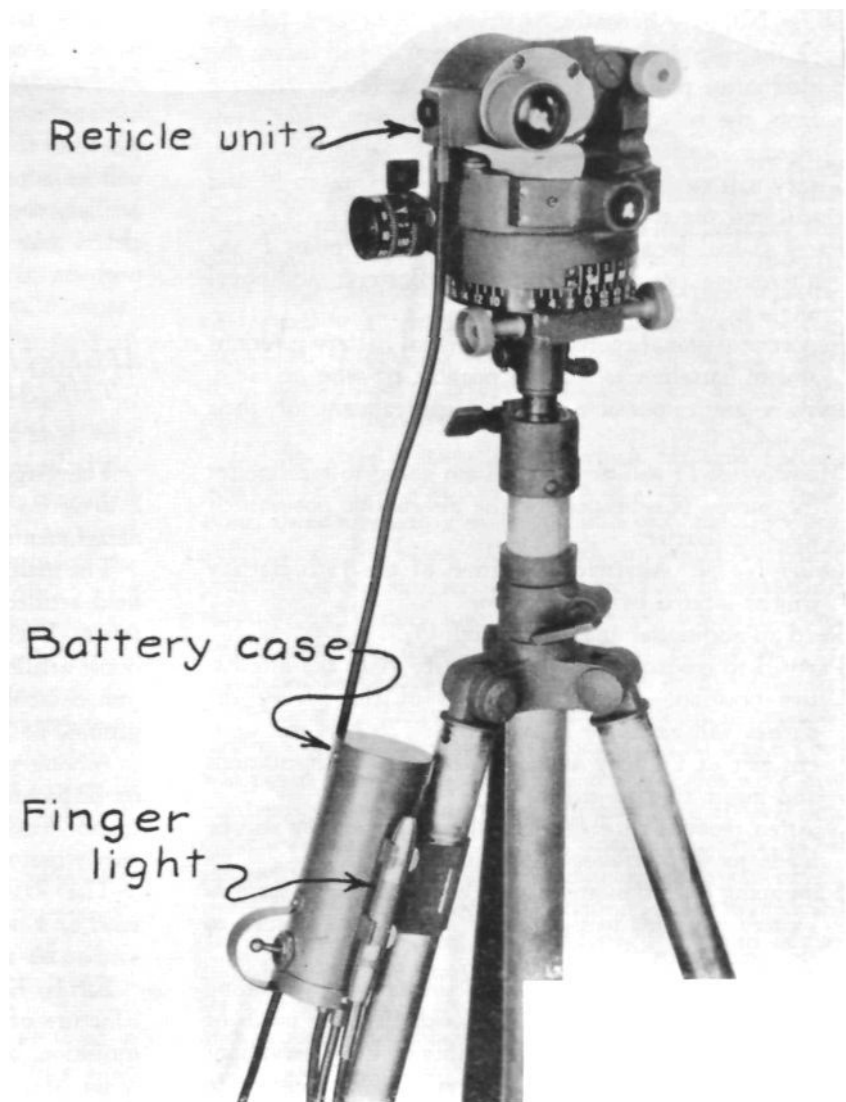
FROM THE CHIEF'S OFFICE

MOTOR VEHICLES In an effort to secure prime movers for heavy artillery, of greater speed than the tractors now being used, the War Department has secured for test, by the Field Artillery Board, three different experimental prime movers of the wheel type. One is a short-wheel base, wheel tractor powered with a diesel engine; another is of somewhat similar design but of different manufacture; the third is a specially-designed heavy truck. The tests will include towing heavy artillery both as a single-axle and a two-axle load. These vehicles are now at Fort Bragg undergoing test.

The Field Artillery Board is now testing ten light (1¼-ton) 4×4 command and reconnaissance vehicles to determine their suitability to replace motorcycles with side cars and motor tricycles. This is a specially-designed vehicle of low silhouette, with folding top. It is capable of transporting three men and a machine gun. A considerable number of these vehicles are under manufacture.

Examination of the motor transportation provided in the new Tables of Basic Allowances for Field Artillery, T/BA No. 6-1, November 1, 1940, shows that the standard prime mover for light artillery is a 2½-ton, 6×6 truck in lieu of the 1½-ton 4×4, heretofore provided. All standard trucks of this type are of the short (145-inch) wheel base type with an 80 × 103 inch body. When the change to this type of prime mover was made, sufficient vehicles of the short wheel base type were not under procurement to provide for the total requirements. All short wheel base type vehicles available are being distributed to Field Artillery units. In addition, a considerable number of the long wheel base type, 2½ ton, are being supplied pending availability of the prime mover (short wheel base) type.

NIGHT LIGHTING EQUIPMENT Night lighting devices of a simple, rugged type have been developed for all fire-control instruments and sights, and their provision at a reasonably early date is expected. All are of the same general type. They consist, in general, of two separate units connected by flexibly shielded wires to a common battery case. The reticle unit provides light direct to the instrument reticle; a finger light is used to illuminate



level bubbles and scales. Ordinary flashlight batteries are employed. The light for the Aiming Circle M1 is shown in the illustration.

A new type of black-out light to mark the front and rear of motor vehicles has been developed by the Holabird Quartermaster Depot. Tests have indicated it to be markedly superior to the louvered light now being provided on motor vehicles. Its chief advantages are that it provides a direct-beam light, a definite driving range for the driver following a vehicle ahead, and is of such character that the modification of present lights to the new type will be relatively inexpensive.

FIRE CONTROL

A direct-fire elbow telescope with range lines for application on the right side of the 75-mm. gun, M2, is under manufacture. Many inquiries have come to the Chief of Field Artillery's office regarding additional survey equipment. Examination of the new Tables of Basic Allowances will show three types of topographical equipment sets instead of the two formerly supplied. The most significant changes in topographical equipment, Field Artillery, set "A" are: The substitution of a Philadelphia Level Rod for the 12-foot folding stadia rod; and the inclusion of a 300-foot band chain and an engineer's transit.

RADIO EQUIPMENT

The Field Artillery Board has completed the comparative test of eight frequency-modulated radio sets and eight amplitude-modulated radio sets of commercial types. The results of the test are summarized in the following sub-paragraphs.

a. Under identical operating conditions, the range of frequency-modulated equipment was greater than that of amplitude-modulated equipment in the ratio of about 3 to 2, for the same power input, weight, and size.

b. The frequency-modulated equipment invariably produced stronger and more readable signals under identical operating conditions.

c. Communication between frequency-modulated sets was superior to that between amplitude-modulated sets under conditions of severe radio interference from such sources as vehicle ignition systems, power lines and the like.

d. Frequency modulation materially reduced mutual interference, and it was the opinion of the Field Artillery Board that it would reduce the possibility of hostile interference.

e. Frequency modulation appears to offer sufficient advantages over amplitude modulation to warrant its inclusion in the development of future field artillery radio equipment.

f. The principal disadvantage of these sets appears to be their single-frequency operation, fixed by crystal-

controlled transmitters and crystal-controlled receivers. The field artillery has had no experience with modern, fixed-frequency equipment upon which to base a serious objection to the sets because of this disadvantage. Heretofore, military characteristics of field artillery radio sets have called for continuously variable tuning to provide for multichannel operation throughout the band covered by the set. The single-frequency feature of this equipment may be a serious objection; however, police radio sets of an entire State, comprising several hundred cars and control stations, are successfully operated on a single frequency. The net is used for local and state-wide warning and *control*. The police problem is as near that of the military problem as any civilian application of radio could be.

It is anticipated that more extensive tests and further development in connection with the whole project will be continued.

EXPANSION OF THE FIELD ARTILLERY

Since the summer of 1939, the number of Field Artillery units, and total enlisted personnel of the Field Artillery, were increased several times; additional increases will be made between the time this JOURNAL goes to press and June 15, 1941. In the tables printed below, the number of units, and the enlisted strength, as they are proposed for June 15, 1941, are compared with the numbers and strength as they were in the summer of 1939.

FIELD ARTILLERY UNITS

	<i>Regular Army</i>		<i>National Guard</i>	
	Summer 1939	June 1941	Summer 1939	June 1941
Regiments	16	22	65	77
Battalions (except observation)	45	103	149	155
Battalions, observation	1	6	.....	.....
Batteries, firing	122	332	389	531
Batteries, observation	2	12	.....	.....

FIELD ARTILLERY ENLISTED MEN

	<i>Regular Army</i>		<i>National Guard</i>	
	Summer 1939	June 1941	Summer 1939	June 1941
Total enlisted in units .....	.....	72,957	46,927	110,864
Total enlisted in units and War Department Overhead	22,131	.....	.....	.....
Enlisted in replacement center overhead.....	.....	4,077	.....	.....
Selectees in replacement center overhead.....	.....	25,707	.....	.....
Total.....	22,131	102,741	46,927	110,864



Notes from The Field Artillery School

The following consists of material which has been authorized for instructional purposes at the Field Artillery School. Some of the topics are in the form of brief notes handy for reference, and state the paragraphs in training literature which give a more complete exposition of the subject discussed.

ARTILLERY COMMANDER'S ESTIMATE OF THE SITUATION

1. MISSION.—State mission in general terms.
2. ELEMENTS AFFECTING YOUR MISSION.—
 - a. Plans of superior commander.
 - b. Plans of commander of supported unit.
 - c. Special missions.
 - (1) Statement of special missions assigned by higher commander.
 - (2) Statement of fires requested by commander of the supported unit.
 - d. Probable reaction of the enemy as stated by the commander of the superior or supported unit.
 3. ANALYSIS OF MISSION.—Indicate the various things that your unit must be able to do; that is, where, when and in what volume the fire of your unit will have to be delivered. It is the hypothesis upon which your plans will be based. The following are the various subheadings under which the analysis should be made:
 - a. The zone within which fire must be delivered. This to be deduced by considering:
 - (1) Minimum range line (percentage or units to reach).
 - (2) Distant range line (percentage or units to reach).
 - (3) Lateral lines (percentage or units to reach).
 - b. Special fire missions.—Consider the amount of ammunition and consequently the number of guns, batteries, or regiments necessary to accomplish each mission. Consider the following:

(1) Special missions assigned by higher authority or requested by commander of supported unit.

(2) Special missions, if any, deduced by you as a result of a consideration of the mission and plans outlined in paragraphs 1 and 2 above.

(a) For an attack (consider all phases, including defense against hostile counter attacks).

(b) For a defense (consider all phases, including support of counter attacks).

4. ARTILLERY AVAILABLE.—Consider the amount of ammunition and the amount of artillery available to you for the accomplishment of your mission.

5. PLANS OPEN TO YOU.—First, consider the various plans for assigning missions to subordinate units, and select the most suitable plan. Second, consider plans for positions and select plan most suitable.

6. DECISION.—Express decision in such form that it will serve as the basis of action of the command as a whole, or as a directive for the preparation of orders putting the plan into effect.

FIRING BATTERY

1. SUGGESTED SCHEDULE FOR ONE ONE-HOUR DRILL PERIOD IN SERVICE OF THE PIECE.
 - a. 15 minutes of individual training by chiefs of section and gunners.
 - b. 15 minutes of section training. Commands should be prepared by executive but given by chiefs of section.
 - c. 30 minutes of battery training. Commands should be prepared and given by executive.
 - d. A suitable form for prepared commands is given below. Initial Commands:

Deflection	Deflection Difference	Site	Corrector	Method of fire	Range	4	3	2	1

- e. The battery training (c above) should include:
 - (1) Laying parallel by one or more of the methods described in paragraphs 55-60, FM 6-40, and paragraph 2 following.
 - (2) Referring to aiming point and aiming stakes.
 - (3) Recording base deflection.
 - (4) Laying for direction using a common aiming point.
 - (5) Shifts from base deflection.
 - (6) Convergence. (Vary method of accomplishment; handled by Ex, ch of sec, or gunner.)
 - (7) Various charges and projectiles.
 - (8) Several methods of fire.
 - (9) Use of range scale, quadrant, and quadrant sight.

- f. Commands may include:
 - (1) Instrument direction.
 - (2) Schedule fires, with or without section data sheets.
 - (3) Direct laying.
 - (4) Sweeping fire.
 - (5) Adjusting sheaf parallel by high bursts.
- g. Drill period may include:
 - (1) Occupation of position.
 - (2) Placing aiming stakes.
 - (3) Measuring minimum elevation and minimum range.
 - (4) Erection of camouflage nets.
 - (5) Use of natural camouflage.
 - (6) Organization of position.
 - (7) Care of ammunition in the field.
 - (8) Use of prepared commands received by telephone and supposedly originating from the observation post.

2. DAYLIGHT OCCUPATION OF POSITION.

- a. Precede firing battery to position.
- b. Obtain instructions from Sc Corp No. 2.
- c. Decide best method of occupation (by section, by battery).
- d. Determine a route to truck or limber position which will avoid a turn-around at battery position.
- e. Lay battery parallel by one of the methods below:
 - (1) Compass.
 - (a) Subtract compass command from declination constant (adding 6400 if necessary).
 - (b) Set remainder on azimuth and micrometer scales of instrument.
 - (c) Release needle and center it with lower motion.
 - (d) Clamp needle and, with upper motion, direct instrument on the sight of each piece, commanding: AIMING POINT THIS INSTRUMENT: DEFLECTION, No. 1—, No. 2—, etc.
 - (e) Recheck until successive readings are the same.
 - (2) Base angle.
 - (a) Set instrument over place mark or on orienting line.

- (b) Set base angle on azimuth and micrometer scales of instrument.
- (c) Using lower motion, lay instrument along orienting line (either end).
- (d) Lay battery reciprocally as for laying by compass.
- (3) Aiming point visible to all pieces.
 - (a) Measure or estimate distance perpendicular to direction of aiming point between each piece and base piece.
 - (b) Divide by distance to aiming point in thousands of yards.
 - (c) Move piece *left* by this amount if aiming point is in front; *right* if in rear.
- (4) Aiming point not visible to all pieces.
 - (a) Command, to piece which can see aiming point (piece is first laid for direction), AIMING POINT THIS INSTRUMENT; MEASURE THE DEFLECTION.
 - (b) Set deflection announced by gunner on azimuth and micrometer scales of instrument.
 - (c) Lay back on gun sight with lower motion.
 - (d) Lay other pieces reciprocally as for laying with compass.

f. After laying by any of the methods described above, have pieces refer.

- g. Determine minimum range or elevation as follows:

Greatest elevation reported	_____
Elevation for piece-mask range	_____
(From firing tables for type amm. with lowest muzzle velocity)	
2 Forks at piece-mask range	_____
5 yds at piece-mask range	_____
Minimum elevation	_____

 Report minimum elevation to BC.

- h. Determine distance in yards between pieces, normal to direction of fire.
- i. Prepare convergence table.

3. NIGHT OCCUPATION OF POSITION.—Differs from daylight occupation as follows:

- a. Position occupied deliberately, usually by section.
- b. Guide leads each section to its position.
- c. When laying battery with instrument, it is better to lay one piece accurately before attempting to lay the next piece.
- d. Lighted aiming stakes must be used. Far light should be higher than near light.

4. SERVICE PRACTICE; DUTIES PRIOR TO LEAVING PARK.

- a. Check recoil mechanism for proper amount of liquid *for travel*.

- b. Make thorough inspection of materiel: Firing mechanism, sighting and laying devices, tire pressure, etc.
 - c. Check ammunition for amount, type, and condition.
 - d. Check declination of your aiming circle.
 - e. Check completeness of section tools, spare parts, and accessories.
(Note that items *a* to *e* may be completed day prior to service practice.)
 - f. Rearrange your personnel so as to equalize the numbers and abilities of the gun squads.
5. OCCUPATION OF POSITION FOR FIRING.—Paragraph 2 above (daylight occupation of position) applies. In addition, the following apply:
- a. Leave park early.
 - b. Level wheels.
 - c. Dig trail pits.
 - d. Bore sight pieces. (This is particularly important with the panoramic sight.)
 - e. Check recoil mechanism for proper amount of liquid for firing.
 - f. Check mechanisms and instruments used in laying for range and elevation.
 - g. Segregate ammunition according to lot numbers.
 - h. Lay battery parallel midway in the sector by one of the methods described in paragraphs 55-60, FM 6-40, and paragraph 2 above.
 - i. Determine (if not already known) compass on which battery is laid (*I* (2) below).
 - j. Check system of communication; see that there is plenty of slack wire.
 - k. Conduct short practice in service of piece.

DEFENSE AGAINST MECHANIZED FORCES

- 1. *Summary of defense organization.*
 - a. Establish a warning service at all times in all directions. Equip each observer with a signalling device. Arrange for frequent relief of such observers.
 - b. In selecting positions and bivouacs, utilize such natural tank obstacles as streams, swamps, rocky or stump-filled areas.
 - c. In position, assign each section a specific zone of fire in case of attack. Arrange in advance for movement of pieces by hand to close-defense firing positions.
 - d. Measure ranges to critical points in the fields of fire, and inform chiefs of section of them.
 - e. Prepare shelter trenches in the position for personnel.
 - f. In case of attack, utilize all small arms as well as the guns themselves.
 - g. Train the gun crews in fire on moving targets.
- 2. *References.*
 - a. General principles of defense: FM 100-5, Pars. 254-262.
 - b. Protection on the march: FM 25-10, Par. 96.
 - c. Protection in position and bivouacs: FA Book 224, Par. 280.
 - d. Keep abreast of new developments in current publications.

DEFENSE AGAINST AIRCRAFT

- 1. Small arms (amount available): T/O and T/BA for unit concerned.
- 2. Principles of anti-aircraft security: FM 100-5, Pars. 245-253.
- 3. Defense of units in position or bivouac: FA Book 204, Pars. 164-168.
- 4. Defense of units on the march: FM 25-10, Par. 95; FA Book 130, Par. 29.

CAMOUFLAGE

General references.—FM 5-20; FM 6-20; FM 6-130 (when published).

Frames.—Wire frames are needed for nets; nets are garnished with painted burlap or oznaburg.

Suitable type frames.

As shown in fig. 7, FM 5-20.

Same as above, but with radial wires jointed and joints or rings at supporting poles. This frame may be made up in advance and transported with btry, ready to set up.

Wire (telephone W 110 or similar) woven into net.

Methods of achieving different patterns in garnished nets.

As set forth in FM 6-20, Par. 11 *b* (2).

Fasten strips of burlap or oznaburg evenly throughout net without weaving, and clip at various lengths to produce pattern.

Precautions with trucks and paulins.

Covers should be rolled, removed, or covered.

Shiny surfaces must be obliterated by mud, dull paint, etc., or covered with appropriately colored materials.

Form and shadow of open back end of truck must be broken up.

Paulins used to protect ammunition or other supplies must be appropriately colored or covered, and regular shape of piles broken up.

Bare nets.—These furnish no concealment. Artificial materials used to garnish nets must be colored to match surroundings as seen from the air.

Camouflage paint.—Oil-base paints create a danger of spontaneous combustion when used on burlap or oznaburg; also likely to cause surface to be shiny. Such paints should not be used for camouflage.

CHECK LIST FOR INSPECTION OF THE BATTERY MESS

- 1. *Bulletin board:* Food handlers' certificates.
- 2. *Mess accounts:*
 - Add sales slips to check column 11.
 - Check arithmetic of the form.
 - Every 10 days:
 - Check column 2 against morning report.
 - Inventory; investigate any discrepancy.
- 3. *Menu:*
 - Posted near cook.
 - Foods listed being served?
 - Time of preparation.
- 4. *Serving of meals:*
 - Hot foods hot; cold foods cold.
 - Serving system carried out?
- 5. *Uniform and cleanliness of mess personnel.*
- 6. *Kitchen equipment and special points to observe:*
 - a. Cooking ranges.
 - b. Baking ovens.
 - c. Fryolator; any grease on inside?
 - d. Steam cookers; any food stains on insides?
 - e. Coffee percolators; any coffee stains on inside?
 - f. Mixer; any food particles on inside, or on attachments?
 - g. Meat block.
 - h. Pots and pans; examine edges and corners carefully.
 - i. Utensils; examine handles carefully, test cutting edges.
 - j. Refrigerator room; temperature (40 to 50).
 - k. Ice-cube freezer.
 - l. Storeroom and bread box.
 - m. GI cans for bulk foods; lids should fit tightly.
 - n. Sinks and dish washers.
 - o. Potato peeler; any potato fragments on inside?

7. *Dining room equipment:*
 - a. Steam table; examine corners and shelves carefully.
 - b. Dishes and cafeteria trays; any grease film?
 - c. Glasses; hold up to light to observe any spots.
 - d. Tables; any water streaks on top?
 - e. Silverware; any food particles or food stains?
8. *Floors:* Any grease spots?
9. *Garbage stand:*
Lids should fit tightly.
Any refuse on cans, stand, or on ground in vicinity of stand?
10. *Weekly schedule of cleaning:*
On Saturdays make complete inspection; on other days make list of the items you will inspect, always including inspection of mess accounts.
11. *References:*
Bulletin 27, "The Soldier's Mess."
TM 2100-152, "The Army Cook."
TM 10-205, "Mess Management."

COURTS-MARTIAL

Procedure prior to preparation of charges.—Although charges may be preferred by anyone subject to military law, it is customary in any case against an enlisted man to inform his BC of the offense in order that he may investigate the case and take such action as he considers appropriate. The information laid before the BC may originate with other officers, enlisted men, civil authorities, or others. The BC interviews such witnesses as have knowledge of the case. If he questions the accused, he should warn him that he is not required to answer any questions but that he may do so or make a statement subject to the risk of having what he says used against him (Par. 35 a).

Punishment under AW 104 (Pars. 105-109).—When the preliminary investigation convinces the BC that punishment under AW 104 (Par. 33) is appropriate, the BC fixes the punishment and informs the accused of the punishment and his right to appeal. The accused has the right to demand trial in lieu of battery punishment, in which case a statement to that effect should accompany the charges when submitted.

Record of battery punishments.—The BC should maintain a small filing case or a loose-leaf file of battery punishments administered. There is no AGO form for this. This following form is a satisfactory one.

RECORD OF BATTERY PUNISHMENT				
Btry B 109th FA				
Homer M. Dager		6817684		
Name		Serial No.		
Date	Offense	Punishment	Appeal	Initials of BC
8/7/40	Dirt under bunk	1 day extra fatigue	None	JJT

Arrest and confinement (Par. 19).—When the alleged offense is of a criminal or other serious nature, the accused is placed in arrest or confinement. Enlisted men may be placed in arrest or confinement by officers only, in person, through other persons subject to military law, or by oral or written orders or communications. For example, an enlisted man may be sent under guard to the guardhouse accompanied by a memorandum as follows:

Officer of the Guard:

Request you confine Pvt., ASN, Btry B, 109th FA, who will be charged with violation of the AW.

.....
1st Lt., 109th FA.

Preparation and submission of charges (Pars. 24-29).—In the event the BC prefers charges, he selects the wording of the specification from the examples given in Appendix 4, pages 236-257. This insures that the wording conforms to that of the AW whose violation is charged. When the offense is desertion or a felony, the charges are prepared in quadruplicate; and for offenses of less serious nature, in triplicate. The battery clerk types in the data to be entered on page 1 (of the charge sheet), the charge(s) and specification(s) on page 2, and usually prepares the affidavit, page 3, for the signature of the adjutant, striking out the inapplicable words of the affidavit. The BC causes the clerk to prepare a memorandum to the commanding officer containing a summary of the testimony to be expected from the various witnesses and a recommendation as to the type court (summary, special, or general) to try the case. After verifying the entries on the charge sheet, the BC signs all copies at the top of page 3 as the accuser and takes the charges and memorandum to the adjutant before whom he takes the oath shown in the affidavit.

Summary-court procedure.—When charges are referred for trial to a summary-court officer, that officer will interview the accused and ask him the names of the witnesses he desires present at the trial. After selecting the place, date, and hour for the trial, the summary-court officer summons the accused and witnesses by making requests to the immediate commanding officers concerned (guard authorities in case of the accused, if the latter is in confinement). At the trial he arraigns the accused (Par. 62) and examines the witnesses after having informed the accused of his right to question any witness. He next explains to the accused his rights as a witness (Par. 76) and gives him an opportunity to testify. The summary-court officer then considers the testimony and announces the findings and sentence, being guided in the latter by the provisions of Pars. 103 and 104. He then returns the charges to the appointing authority, having filled in the necessary data on page 4.

Investigation of charges. — An impartial investigation of charges is required before they can be referred to a general court-martial for trial. When charges are referred to an officer for investigation, he follows the instructions contained in Par. 35 a and AW 70.

NOTATION ON SERVICE RECORD OF THE ACCUSED AFTER CONVICTION BY COURT-MARTIAL (Par. 21, AR 345-125).

Summary court. — The reviewing authority, after having noted his actions on page 4 of the charge sheet, transmits the 3 copies of the charge sheet to the BC. The latter enters the record of trial on page 8 of the accused's Service Record and makes the necessary entries on the battery pay rolls. After initialing the last entry on page 4 of the charge sheet and certifying the duplicate and triplicate copies of the charge sheets as true copies, the BC returns the charges to the adjutant who retains the original in the regimental file, sends the duplicate to the AGO, and the triplicate to the Corps Area Commander.

Special and general court.—Copies of the orders promulgating trial and sentence are sent to the BC who makes service record and pay roll entries.

Duties of TJA.—(Pars. 41, 42, and 75 b.)

Duties of defense Counsel.—(Pars. 43, 44, and 75 c.)

AW's to be read periodically.—(AW 110.)

Maximum punishments.—(Pats. 102-104.)



Letters to the Editor

TO THE EDITOR:

Under the present regulation (AR 210-65), shares are owned by organizations participating in Post Exchanges. When new organizations are formed or old ones expanded to war strength new shares are purchased, either by paying cash or by having 50% of the dividend deducted to pay for them. It is obvious that the former is the best method of purchasing shares; but new organizations do not ordinarily have the cash to pay for a large number of new shares. As a matter of fact most old organizations are reluctant to pay cash for new shares in the Post Exchange. Take the case of men selected for 1 year service; unless the Regulations are changed, their shares in the Post Exchanges will not be paid for by the time they are ready to leave the Service.

For example, if a share in a Post Exchange is worth \$30.00 (as many of them are), and the Post Exchange pays a dividend of \$1.00 per month per share, 50c per month is set aside for the purchase of the new shares. It is apparent that it will take 5 years to pay for the full value of the share. If the Post Exchange does not average \$1.00 per month dividend per share it will take even longer.

Why not make it legal for the soldier to own his own share in the Post Exchange for the duration of his enlistment? If from the time of his induction into the Service he paid \$5.00 per month toward the purchase of this share and all shares were given a common value of \$30.00, he would own his share in 6 months. The dividend would be paid to his organization as has been the practice. He will benefit collectively in his organization from the dividends. When he leaves the service he would get his \$30.00 back plus the last dividend paid by the Post Exchange.

If he is transferred, the cash value of his share would be transferred with him to the Post Exchange at his new station. If he dies in service his estate would receive the \$30.00.

Officers too could own one share each in the Exchange by paying \$30.00. The dividend could be deducted from their monthly bill at the Exchange or taken in cash. It would be similar to the Army & Navy Store idea. When an officer is transferred he could be paid the price of his share and could buy into the Exchange at his new station.

There are many advantages to this system. In the first place it will give the Post Exchange much more working capital. It will no longer carry on its books assets represented by unpaid shares from which it can not derive

any cash. Another advantage will be that organizations will get much larger dividends and will be able to provide more recreation and comforts for the men. It is reasonable to expect that new men will enter the service at about the same rate as the old men leave; so that there should not be any run on the Exchange to pay off shares of men leaving the service. There never would be any question as to how many shares an organization should have. Each man carried on the roster of a battery, company, troop or detachment would own one share in the Post Exchange or be paying for one. Under such a system new exchanges would have working capital from the start.

Of course there would be some complications in this system in the cases of men who can not for some reason pay for their share; but, I believe it would be a great improvement over the present system for the large majority in the Service today and those who are due to come in the next few years.

JAMES V. CARROLL,
Major, 349th Field Artillery.

I wish you would suggest to whoever is responsible for the cute little hat, especially if he wears glasses, that he select a nice rainy day and spend it in the open. We certainly need a well-designed service headgear. I saw a neat field cap a Chinese visitor had and it makes ours look silly. Our cap was never meant to be an article to wear in the bright sunlight or rain for any long period.

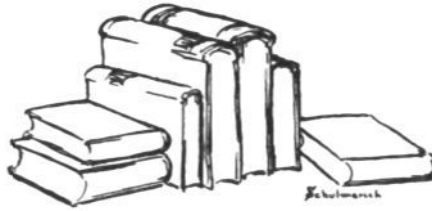
—*Letter to Chief of FA.*

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BOOK REVIEWS



"It will further assist you to keep on the right lines if at all times you remember to study with the definite aim of obtaining guidance for future use in war."—
FIELD MARSHAL SIR WILLIAM ROBERTSON.

Review of the Month

SEVEN MYSTERIES OF EUROPE. By Jules Romains. Alfred A. Knopf, Inc., New York, 1940. \$2.50.

The military historians of a generation ago would probably be somewhat surprised by the type of history that interests us today. Nowadays it is the experience of the battery or company commander—the combat narratives of small units—which attracts our attention. As General Bullard has written, there has been too much of the "headquarters viewpoint" in the accounts of past wars, and the small unit histories are invaluable for training purposes. Nevertheless, it is well to remember that there is a "headquarters viewpoint," and that the mistakes of GHQ sometimes offset all that has been accomplished by exhaustive training programs. In this book M. Romains offers some "headquarters viewpoint" suggestions as to the reasons for the French defeat in the summer of 1940.

By virtue of his great prestige as a distinguished novelist, Romains enjoyed a unique intimacy with the influential men of pre-war Europe, and his opinions therefore are of considerable importance. To single out perhaps the most interesting section, we may quote from Romains' last interview with General Gamelin in mid-December, 1939. Gamelin spoke contemptuously of "the kind of people who always think the last war is going to start over again—the everlasting error," and he added that "this war and the last have nothing in common." In reply to Romains' request for a forecast of the future, Gamelin answered: "I think that a period of apparently complete immobility will be followed abruptly by an action into which every resource will be flung all at once, and in which the decision will come much more rapidly than people think." As to when this battle would take place, Gamelin replied: "The end of January isn't out of the question. But I hardly think so . . . March, a good deal more probable . . . May—yes, May, almost certainly." The attack would come, thought Gamelin, in an invasion of the Low Countries, accompanied by a thrust all along the frontier.

A question immediately arises, and Romains propounds it—how could a man who foresaw the future with such startling clarity and accuracy go down to such a crushing defeat? Romains admits his inability to answer this vital question—as he says, it is a "mystery." But Romains has a suggestion: in his opinion, Gamelin was a man of

tremendous intellectual ability who was also a "dreamer"—one of those men, in Romains' words, "whose intellectual forces are badly coordinated with their forces of action." Therefore, although Gamelin was able to see what would happen, he was unable to take effective steps to prevent it. To many this explanation will seem inadequate, but it will have to stand until more evidence is forthcoming. In any event, it is a powerful illustration of the influence of personality on war.

—H. S. F.

Shorter Notices

JUGGERNAUT OVER HOLLAND. By E. N. van Kleffens. Columbia University Press, New York, 1941. \$2.00.

The author of this book is the Minister of Foreign Affairs for the Netherlands. The same day that the Germans commenced the invasion of Holland—May 10, 1940—Mr. van Kleffens escaped by plane to England. Much of the book describes the Dutch effort to stay out of the war, and van Kleffens obviously has attempted to be impartial, for he discusses the Dutch grievances against England as well as against Germany. Occasionally the author strains our credulity: for example, he describes (p. 56) the discovery by the Dutch police of a parcel containing detailed information concerning the operations of the German espionage agents in Holland. These invaluable documents, it seems, were found carelessly abandoned in the grounds adjoining the German legation!

One of the author's principle contentions is that co-operation between the Dutch and British previous to May 10 would have served only to precipitate the downfall of Holland, and would not have saved the country. This is true, he maintains, because the geographical location of Holland is such that the Germans would always be able to arrive in force long before any considerable aid could come from England. In conclusion, it seems apparent that of all the nations now engaged in the war, the Dutch deserve the most sympathy, for they made the most honest effort to stay out.

—H. S. F.

EXTERIOR BALLISTICS. Prepared under direction of Lt. Col. Thomas J. Hayes. John Wiley and Sons, 1938, 98 pages, paper, \$1.00.

This pamphlet is a reprint of Chapters X and XII of *Elements of Ordnance*, prepared under the direction of

Col. Hayes, formerly Professor of Ordnance and Gunnery, U. S. Military Academy. While a bit advanced for the casual reader, it is interesting and valuable to one who has not entirely forgotten his college physics and calculus. It deals with the behavior of projectiles fired from cannon and bombs dropped from planes. The chapter on bombing also discusses bomb sights and dive bombing. The portions on the gyroscopic action of projectiles are particularly interesting.

—W. S. N.

CAPITAN. THE STORY OF AN ARMY MULE. Written and illustrated by Lucy Herndon Crockett. Henry Holt and Company, New York, 1940. \$2.00.

This is the third of Miss Crockett's books to be issued in less than two years. The daughter of Colonel Cary I. Crockett, the author has drawn upon her personal contacts with army life in writing this book. *Capitan* is the story of an army mule, told by the mule himself, and it relates the mule's adventures in China, the Philippines, and France. The background is realistically portrayed, and the story is told with abundant humor.

—L. P.

CIVIL-MILITARY RELATIONS. BIBLIOGRAPHICAL NOTES ON ADMINISTRATIVE PROBLEMS OF CIVILIAN MOBILIZATION. Public Administration Service, Chicago, 1940. \$1.00.

We are all coming to realize that the maintenance of a cooperative attitude between the civil and military authorities is essential to national defense, and this bibliography presents a comprehensive list of books and articles dealing with the topic. The book is divided into four sections, wherein are considered civil-military relations in the United States, Great Britain (and Canada), Germany, and France. It was prepared under the direction of Pendleton Herring of Harvard, and its publication was facilitated by the Social Science Research Council; the authors are Louis Hartz, Charles M. Hardin, and William S. McCauley of Harvard, and George F. Rohrlich of the University of Vienna.

—H. S. F.

YELLOW WOLF: HIS OWN STORY. By L. V. McWhorter. The Caxton Printers, Ltd., Caldwell, Idaho, 1940. \$3.50.

The almost forgotten incident of our history known as the Nez Perce War began in February, 1877, and had its origins, as usual, in a dispute with the Indians over land. The Indians won the opening skirmish, and one-armed General Howard was forced to take the field against them. Under the leadership of Chief Joseph the Indians fled east, and a long and arduous campaign ensued, during which the

Nez Perces were pursued through Idaho, Wyoming and into Montana. On October 5, 1877, Chief Joseph surrendered in the Bear Paw Mountains of northern Montana.

Yellow Wolf was a cousin of Chief Joseph's and he followed that leader throughout the war. He was born in 1855, and died on August 21, 1935. Mr. McWhorter first met Yellow Wolf in 1907 and they remained close friends until the old warrior's death. The book is, literally, Yellow Wolf's own story of the campaign, told in his own words, just as they were related to Mr. McWhorter. Mr. McWhorter has a strong sympathy with the Indian viewpoint, which appears fully justified in the case of the Nez Perces. No less an historian than Colonel Ganoe has described the Interior Department's treatment of the Nez Perces as "unjust and inhuman." The book is attractively printed, and it is an important document which forms a valuable addition to the much neglected history of the Indian wars.

—H. S. F.

WAR WITHOUT MUSIC. By Peter Muir. Charles Scribner's Sons, New York, 1940. \$2.00.

During the Great War Mr. Muir was an ambulance driver. At the outbreak of the present war he was living in France, and enlisted once again. This time he was given the command of an ambulance section of the American Field Service, with the rank of lieutenant.

Muir insists throughout the book that the campaign of 1940 was far more costly than the campaigns of the Great War. Example; "In five weeks of active service our twenty cars handled the amazing number of twelve thousand five hundred sick and wounded, mostly stretcher cases. Sections during the last war rarely handled as many wounded in a year. But everything was like this in 1940—more terrible, more concentrated." This hardly agrees with the facts as we know them now, for it appears that the actual casualties of the campaign of 1940 were very slight compared with those of the campaigns of 1914-18. There are also some significant omissions. Although Muir makes a point of describing in detail the fighting he witnessed personally, in the whole book there are only one or two mentions made of the effect of German artillery fire—which might mean that a considerable portion of the German artillery was unable to keep up with the advance.

The keynote of the book is in the title. Muir contends that the French people did not want the war, and that they were led into it by their government. In consequence, the troops did not sing when going to the front, as in the Great War, but instead marched off in sullen silence. Muir was captured by the Germans just before the fall of Paris. He escaped easily, and after lingering in Paris a few days went over the border into Spain.

—H. S. F.

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SOME NOTES FOR BATTERY EXECUTIVES, by Captain Harold F. Handy. Price per copy20

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Because of repeated requests from numerous individuals and organizations, The Field Artillery Journal has reproduced in pamphlet form Captain Handy's popular and instructive article which was originally published in the March-April, 1939, Journal. This treatise is invaluable for battery officers, especially the newly commissioned.

WHERE THEY HAVE TROD, by R. Ernest Dupuy, Lt. Col., FA. Published by Frederick Stokes Co., 1940..... \$3.00

West Point graduates, and non-graduates in the Army who are interested in the history and traditions of West Point, are indebted to Colonel Dupuy for the painstaking research necessary to make accessible *Where They Have Trod*. It is an authentic account of the growth of a system of education in the Academy, and its influence upon the United States, by the author of *Perish by the Sword* and *World in Arms*. This book should be read by all officers whose sons are now, or expect to be cadets.

THE FLEET TODAY, by Kendall Banning. Published by Funk & Wagnalls Co., 1940..... 2.50

A readable first rate account of the United States Navy as it is today, by the author of *West Point Today* and *Annapolis Today*.

THE ARMED HORDE, by Hoffman Nickerson. Published by G. P. Putnam's Sons, 1940 3.50

For all who are interested in the more profound aspects of military thought, this book by the most persistent advocate of the substitution of the professional for the mass army, is strongly recommended.

A PRACTICAL MANUAL OF MARTIAL LAW. By Frederick Bernays Wiener. Published by Military Service Publishing Co., 1940..... 2.00

An extremely readable and informative book. The author says: "The purpose of this Manual is to provide a practical guide to the much-discussed and much confused field of martial law."

CARBINE AND LANCE: THE STORY OF OLD FORT SILL, by Capt. W. S. Nye. Published by University of Oklahoma Press, 1937 3.00

The historical and military background of the Field Artillery School. "This is a meaty and invaluable volume for collectors of Americana and for students of American history and it is a thrilling book for the general reader."—Burton Rascoe in *Esquire*. January, 1938.

SOLDIERS IN THE SUN, by Capt. William Thaddeus Sexton, FA. Published by Military Service Publishing Co., 1940..... 2.50

A comprehensive, chronological account of American-Filipino relations during the period 1899-1902. Should be read by everyone who has served in the Philippines, and by all who are interested in the vicissitudes of our armed forces in their various territorial conflicts.

CLOTHING AND EQUIPMENT REQUIRED BY AN OFFICER ORDERED TO ACTIVE DUTY, by Mr. Arthur E. DuBois. Published by Quartermaster Review25

The author is a civilian employee in the Standardization Branch of the Quartermaster General's Office, and is an authority on the subject of uniforms and insignia. Completely illustrated.

FIELD ARTILLERY: KING OF BATTLES, by Maj. Gen. H. G. Bishop. Published by Houghton Mifflin Co., 193565

The whole subject of modern field artillery simplified for the lay reader. This book originally sold for \$2.00.

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