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**THE
FIELD ARTILLERY
JOURNAL**

EDITED BY

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THE UNITED STATES FIELD ARTILLERY ASSOCIATION

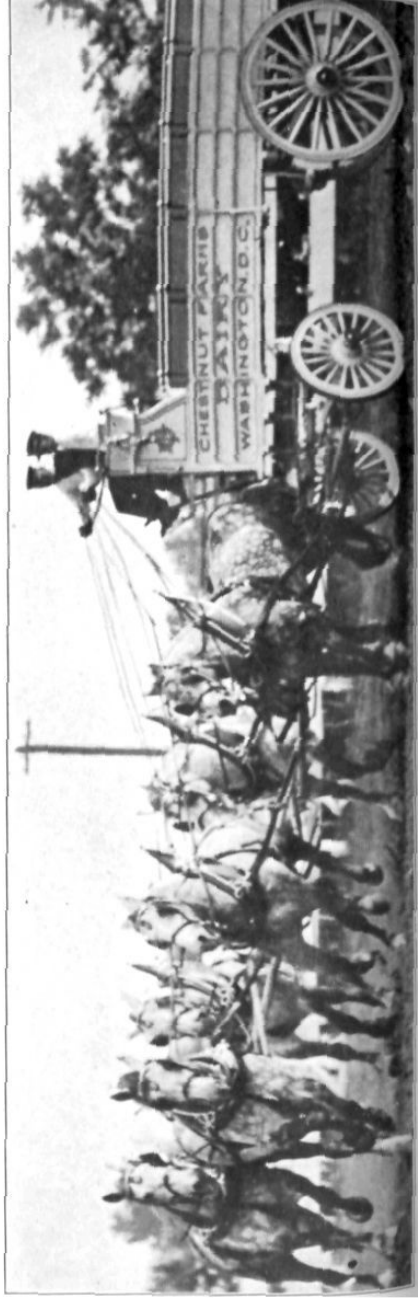
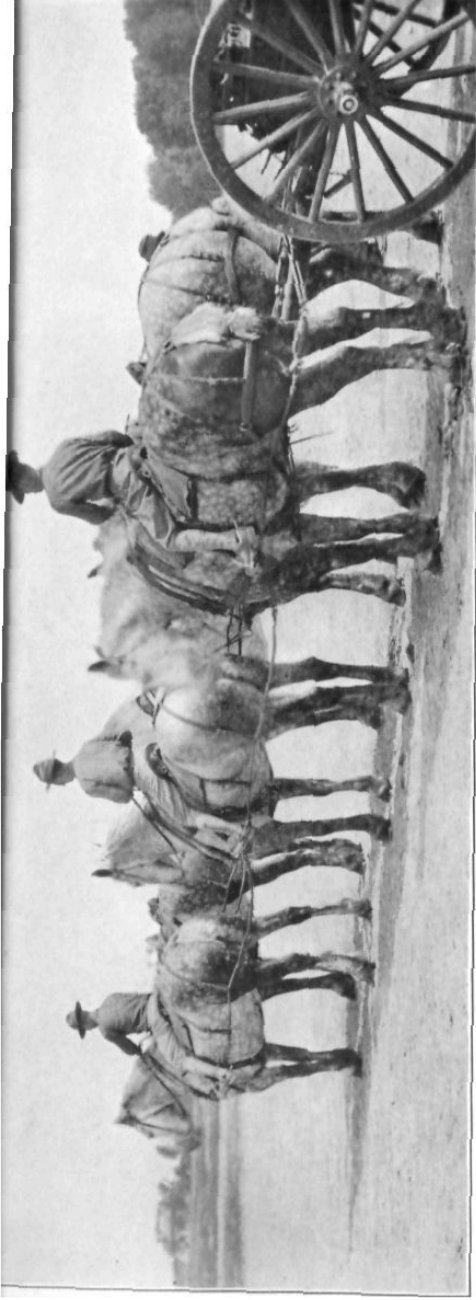
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Contents, September-October, 1923

Reserves	<i>Frontispiece</i>
The Organization of a Field Artillery Brigade for the National Guard..	369
By Brigadier General H. M. Bush, Ohio National Guard.	
With the Tenth Field Artillery at the Second Battle of the Marne.....	375
By Major J. W. Anderson, F.A.	
A Point of View in the Thirtieth Infantry	383
By Lieutenant (Later Captain) Johns Hopkins.	
The Same Fight as Seen by a Company of the Thirty-Eighth Infantry..	389
From the Operations Report of Captain (Later Major) J. W. Wooldridge, Commanding Company G.	
The Development of Artillery During and After the World War	391
By Major W. Y. C. Schuurman.	
Climbing Mount Pinatubo	413
By Captain F. B. Inglis, 24th F.A.	
Observations Upon the Evolution of Field Artillery Construction and Employment	423
By Joseph Mills Hanson, F.A., O.R.C.	
On the Polish-Bolshevik Front in 1919 and 1920	440
By Michael J. Fibich, Major, F.A., O.R.C.	
Current Field Artillery Notes	458
Organizing a National Guard Battalion.	
Summer Camps.	
Army Contact Camps.	
Field Artillery Association Membership at Fort Bragg.	
Results of the Colorado Endurance Ride.	
Eastern Endurance Ride for 1923.	
Polo.	
Individual Grades at the Field Artillery School.	
Book Notices	470



RESERVES

This Team Took First Prize at the Illinois State Fair, the Iowa State Fair and the New York State Fair in 1920, and First Prize at the International Live Stock Show, Chicago, in 1922. They Took First Prize for a Pair and Second Prizes for Three, Four and Six Horse Teams at the Eastern States Exposition, Springfield, Massachusetts, in 1922.

THE FIELD ARTILLERY JOURNAL

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THE ORGANIZATION OF A FIELD ARTILLERY BRIGADE FOR THE NATIONAL GUARD

BY BRIGADIER GENERAL H. M. BUSH, OHIO NATIONAL GUARD

To be a successful National Guard Officer a man must have, in addition to all the other essential qualifications, the idea and spirit of service.

When it was decided that Ohio should organize a complete Division it fell to the lot of the writer as the oldest Field Artillery Officer of the state to organize the Field Artillery Brigade. Without any recognized official status other than that of a had-been Colonel and with only an order from the then Adjutant General and a promise of the command of the Brigade when it was finally formed, a promise which was good as long as the fortunes of the political party then in power kept them there and the Adjutant General held his job, the work was started in the spring of 1920.

Clerk hire was allowed and postage paid for out of State funds, an office was rented and the work started. Letters were sent out to every former member of the writer's war-time regiment. The returns were nil. Former officers were uninterested or had removed from the state, former enlisted men were fed up on the subject and had their own problems of making a living, many of them having just married. A list of Field Artillery Reserve Officers was obtained and letters were sent them. The responses were very few and in no case did they come from localities where batteries could be located. The desire for a commission seemed only to come from those of the least experience and holding the lowest rank, but in every case the applicants were sure they could not accept anything less than a captaincy, while not a few were insistent on field rank. A few ex-field artillery men who had served in Guard regiments during the war were finally located and talked into coming back, among them some former majors whose labors and assistance have been untiring and invaluable.

The Infantry were already pretty well organized and the Cavalry were commencing to present troop after troop. Some \$20,000 was allocated by the Adjutant General which was spent in poster and newspaper advertising, and officers were placed on pay to organize

THE FIELD ARTILLERY JOURNAL

something in any locality where the least interest was shown. As far as the Field Artillery was concerned, the net result by September 1st was one battery.

The requirements set for the Field Artillery in the way of armory accommodations and the character and quality of the officer personnel did not fit in very well with the ideas of the then Adjutant General whose slogan was—"Get the men. We'll get the officers and armories afterwards." We are still getting them—the armories. Consequently the Field Artillery Brigade was a long way behind the rest of the Division.

January, 1921, saw a new Adjutant General, a veteran of the World War, and a new policy but reduced finances; but in August we were able to send eight batteries to Camp Knox, Ky., together with an ammunition train. However, we could not obtain recognition for a regiment, as no battery had been organized and mustered in as a headquarters battery.

On the arrival of the troops at Camp Knox it was found that over half the men were without clothing, blankets or equipment, but the storehouses there were opened and by midnight every man was uniformed and equipped, including black neckties. The horses and matériel of the 81st Field Artillery, together with their officers and noncommissioned officers as instructors, were turned over to us, and through their untiring and friendly efforts we succeeded in the two weeks in getting some order and training out of the organized mob, although it was rather hectic work, as the percentage of officers and men who had had any field artillery training was very small. Fortunately the few officers of field rank had held the same grades during the war and they did not have to be instructed from the bottom up.

That fall, with a full Brigade in prospect by spring, we laid down a programme of instruction and training for a five-year period. The first year, 1921–1922 was to be devoted to battery training and intensive instruction in firing, together with the necessary organization work on both regiments. The second year, 1922–1923, was to be devoted to battery training with the action of the battalion as a tactical unit as the goal, the tactical work to be stressed without relaxing on the firing. The third and fourth years are planned to take in the battalion and regiment as units. The fifth year it is planned to operate for a part of the camp period at least, as a Brigade, either alone or in conjunction with the rest of the Division.

In 1922 the Brigade went to Camp Knox as a Brigade for one week with each regiment having a week in camp alone, an arrangement necessitated by the small number of horses available. It is not necessary to go into any details as to the ups and downs of organization and training further than to say that the Brigade functions

THE ORGANIZATION OF A FIELD ARTILLERY BRIGADE

as such all the year round in all matters of training and policy. The Brigade Staff meets regularly once a week and receives instruction and training calculated to fit them to act as instructors in armory and camp. The regimental field and staff do the same thing.

The ammunition train has been mustered out as being unnecessary in time of peace.

With a very few exceptions we have had no difficulty in getting a reasonable supply of recruits at all times. The quality of the men applying for enlistment has been very good, although we suffered in some localities where the paid organizers recruited on the Court House steps, and thought only in terms of numbers present for muster-in, not for permanence or quality. The requirement that noncommissioned officers should be named and shown as such on the muster-in rolls has given endless trouble and has unquestionably rendered the work of the battery officers much more difficult. In every case it has been necessary to eliminate and rebuild from the beginning; in some cases this applied to the officers, and some of the batteries are only just beginning to recover from the effects.

The real problem which we have yet to solve with complete satisfaction is that of finding suitable material for officers. Reserve officers have been appealed to again and again, but with very poor results. With former officers and enlisted men we have had better success. Guard officers, particularly the captains, have to be pretty exceptional men in that they must combine ability to organize, administer, finance, and instruct as well as be of such local standing that they can command the support of the local civic organizations, speak at luncheons and talk with men of affairs and influence in their communities on something like equal terms. They must be able to give a very considerable portion of their time, not only the spare but many times of their working hours, to the affairs of their battery. In other words, they cannot be mere specialists and must be very much the reverse of pikers. We have been unsparing in the use of the gentler methods of elimination and the weaker and more inefficient officers are soon asked for their resignations.

In speaking of the officer and where he has been found, I cannot leave the subject without paying my tribute to the young men we have gotten directly from the R.O.T.C. The training given these men, especially at The Ohio State University, is wonderful, and in no single instance have we found ourselves loaded with a dud. Of course their age and the necessity of their getting a start in life tend to bar them, as yet, from the job as battery commander, but they have the technical training to make good there whenever it may be necessary to call upon them. Some of them have seen service overseas as enlisted men, while others were below the age limit at the

THE FIELD ARTILLERY JOURNAL

time. We look to this source for a portion at least of the war-time expansion, whenever it may come, although we are working hard to build up a cadet corps among our enlisted men as everyday promotions must come from within our own ranks. Residence in the community is essential to the holding of a commission in the battery located there. In war time we can switch officers and draw from the larger communities to bolster up the smaller, but in time of peace we must develop our own material locally.

The question of officer material also must be considered in the locating of an organization (battery). A community may earnestly desire a battery (they usually look at the possibility of the resulting armory for their community gatherings) and be able to show a supply of young men to fill it, but unless there are industries in the community which will attract and hold men of officer calibre, it is foolish to consider placing a unit there. It is true that we have some very good units in very small communities and some poor ones in larger ones. One of the larger (160,000) and certainly one of the best advertised communities in the State finds it difficult to support one single National Guard unit of an authorized strength of 43 men.

The problem of instruction when units are scattered as widely as they are in Ohio (we have one city with two and one with three units) is a difficult one. The limited funds allowed for the travel of the Army Instructors and Instructor Sergeants keeps them in one place most of the time. Even if they could travel, the limited number would not be able to visit all of their organizations with any regularity and handle the paper work which is loaded on the officers. The Instructor Sergeant has been a wonderful help where he has been of the right type of man, but if he is left in one place too long, even the best becomes dissatisfied or goes to seed, while the small pay and allowances work a real hardship. We have found that a shift every thirty days gives very good results all around.

The correspondence schools have been a complete failure partly for the reason that a Guard Officer cannot give all of his time to the work; to build up and maintain an organization worth anything takes many more hours of real work than those devoted to drill, and only the youngest who have not yet married can afford to neglect their own affairs as well as their families, and even these have to eat. Part of the reason for this failure lies in the subject matter required; while covering subjects of basic importance, many of the lessons are extremely dry and uninteresting and few are germane to the subjects upon which the officer has to study in order to prepare himself to instruct his battery. The urge to acquire information has to be very intense and the demands of other things have to be ignored in order to induce a man to spend his time looking up subjects and answering

THE ORGANIZATION OF A FIELD ARTILLERY BRIGADE

questions thereon which do not have a direct and immediate bearing on his at the minute problems. It is practically impossible to expect that all men at one and the same time will be equally informed on any given topic or branch of knowledge; there will be always some who will be in advance or behind the others.

A correspondence course to be of any value must, of course, start somewhere. To be useful it must cover certain lines of work from the beginning or in an elementary way, and by slow degrees work forward, but the forward movement must equal the pace set by the things with which the student is dealing and along which the course is supposed to help him. To attempt to have a course so arranged and adapted as to take in all the various degrees of information and progress possessed by those it is to benefit, would add a tremendous progressive burden to those conducting it until the whole system fell of its own weight. If the courses could be arranged to cover the drill schedules and fitted to the needs of the various batteries, and if the lessons could be issued long enough in advance to allow of completion before the schedule drill, they might prove of practical value, but here we would have the danger and trouble of lessons overlapping the work in hand. Further, if a regiment or a brigade is in the third year of its progressive instruction programme and a course, arranged in Washington with a view of assisting organizations still on their first or second years, is handed them, the third-year men are sure to lose any and all interest in the course as they are entirely human, and the human being of over average intelligence objects to being tied to the Sisyphian wheel.

I realize that the foregoing criticism is more destructive than constructive, but after twenty years of effort along this line I cannot bring myself to believe that correspondence courses offer the best means of education, practicable as they may seem, unless they are so numerous and flexible that each individual can find in them the meat he is most particularly in need of, and then we might just as well have an individual instructor for each officer. In commercial life we are constantly reading (in the advertising pages) of the man who went to the "top" through a correspondence course (it will always be noted that he took the course offered by the school paying for the ad), but they never show the other side of the picture. They never tell you of the many who registered in the courses offered, who paid their initial fees, bought the special books, worked faithfully for a while, and then dropped out without even getting the first raise in pay which the advertisements show coming in (by inference if not directly) to the happy possessor of one of their get-wise-quick courses. If such difficulties beset the student who is studying to advance his material interests, how much more will they surround the young officer of the Guard who is giving up his leisure time to the

THE FIELD ARTILLERY JOURNAL

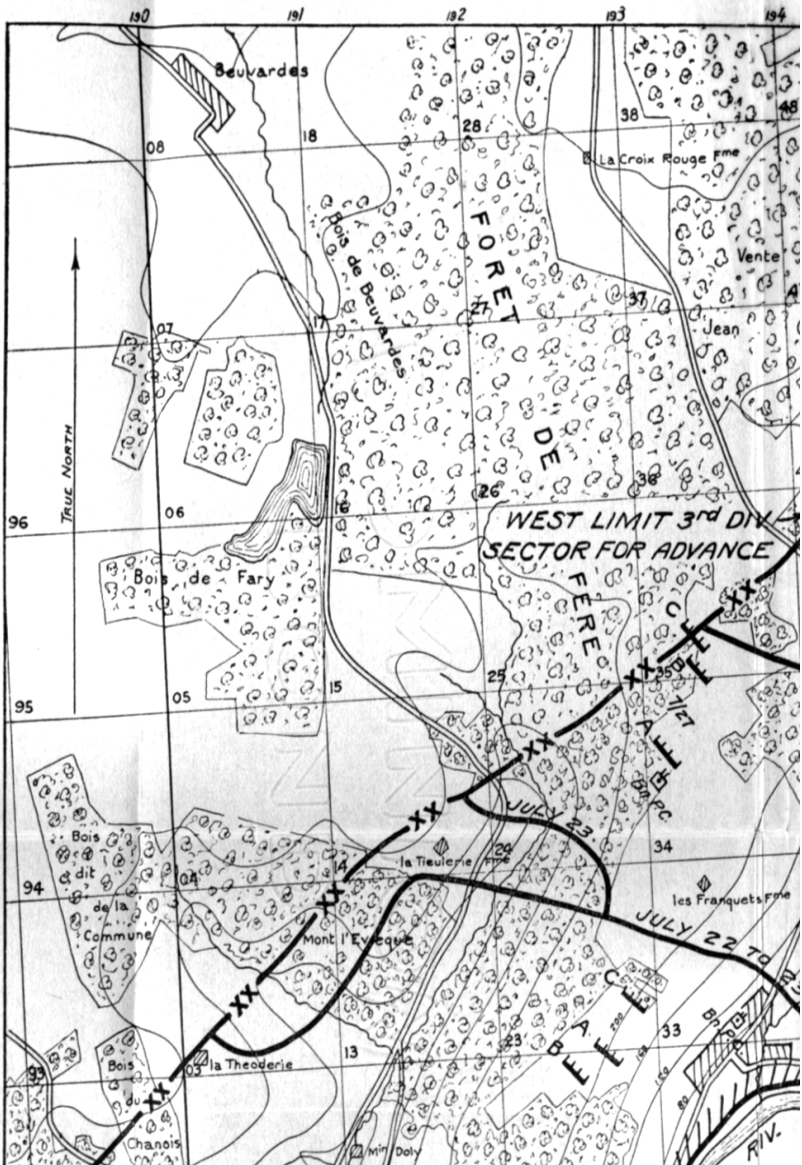
work and finds all of his pleasure and recreation being denied him. After all, service in the Guard must come as a form of recreation and change, and not be made a task and mere drudgery.

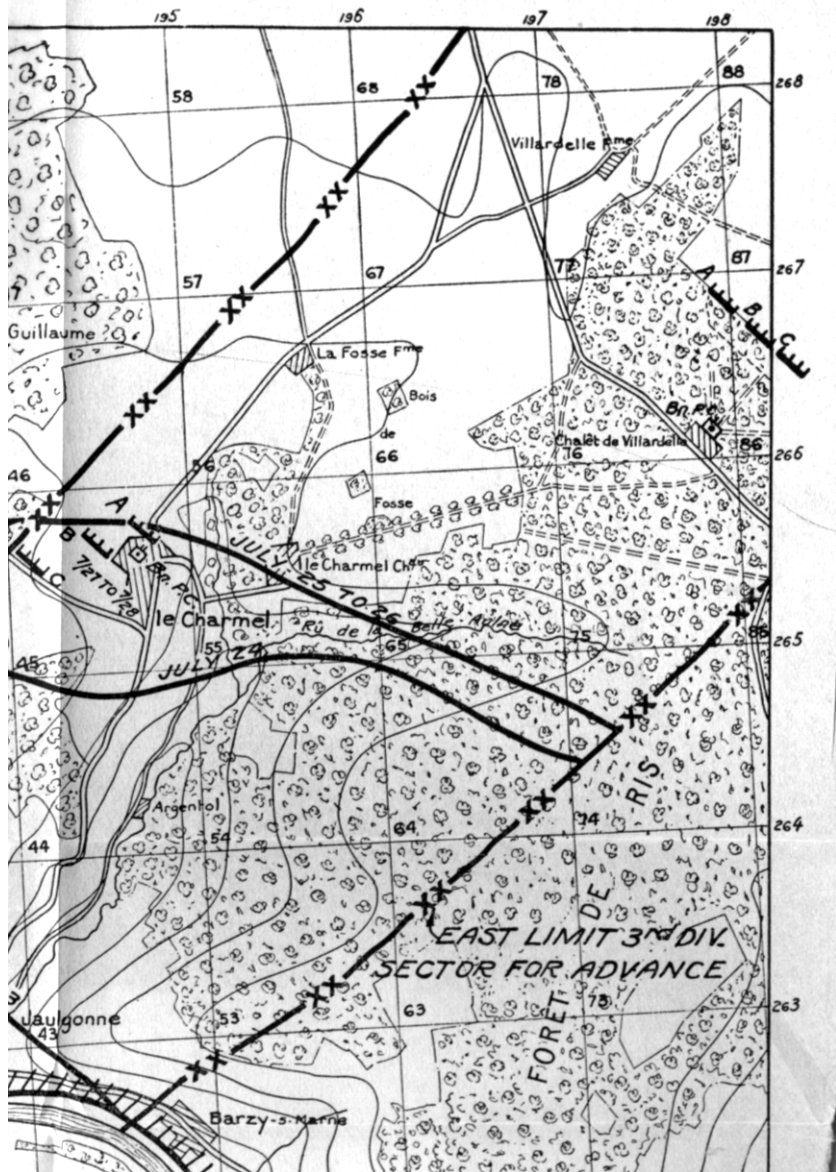
In this Brigade we are now working on a course of reading, obligatory on all staff officers not so situated as to be able to attend one or the other of the central schools (Brigade and Regimental) and urged on all others according to their grades and duties. We hope in this way to lighten the load of mere work and at the same time to gradually educate the best among us for the more responsible positions.

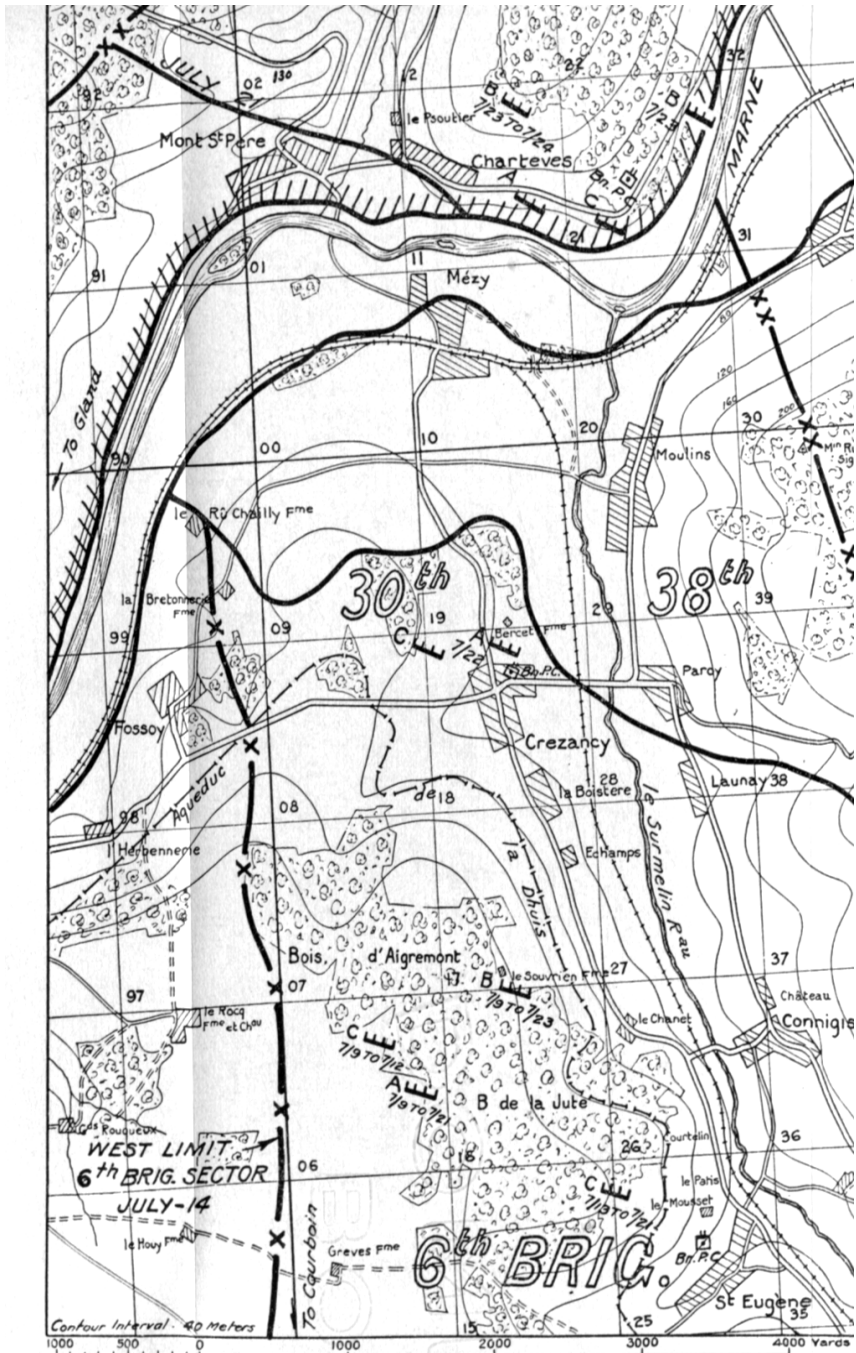
The whole chance of progress lies in suitable instruction; this must come from the Regular Establishment and means adequate provision by Congress for meeting the expenses, including liberal travel allowances.

In conclusion it might be well to say that what we have done and what we have built up has been done, as far as armory training goes, in old factories, stables, farm buildings, fields and vacant lots. Only five organizations in the Brigade occupy State owned armories, all of them built for infantry companies, and two of them are occupied in conjunction with infantry companies. We have carried through our programme of instruction, although the going and the performance have not always been as finished as we would like to see, but we have drivers who can drive and care for their horses, gun crews who can be depended upon for both accuracy and speed, special details who can function and do it well, battery executives who know their jobs, captains who have shown their ability to not only recruit and hold good-sized organizations, but who can put their batteries into a tactical position with skill and speed. The battalions still need a lot of work, but they have made their start and done it with credit. We have developed a very creditable corps of instructors among the field and staff, regimental and brigade. We look forward to the future with confidence, provided always that appropriations, horses and instructors are maintained at their present level and, we fondly hope, increased.

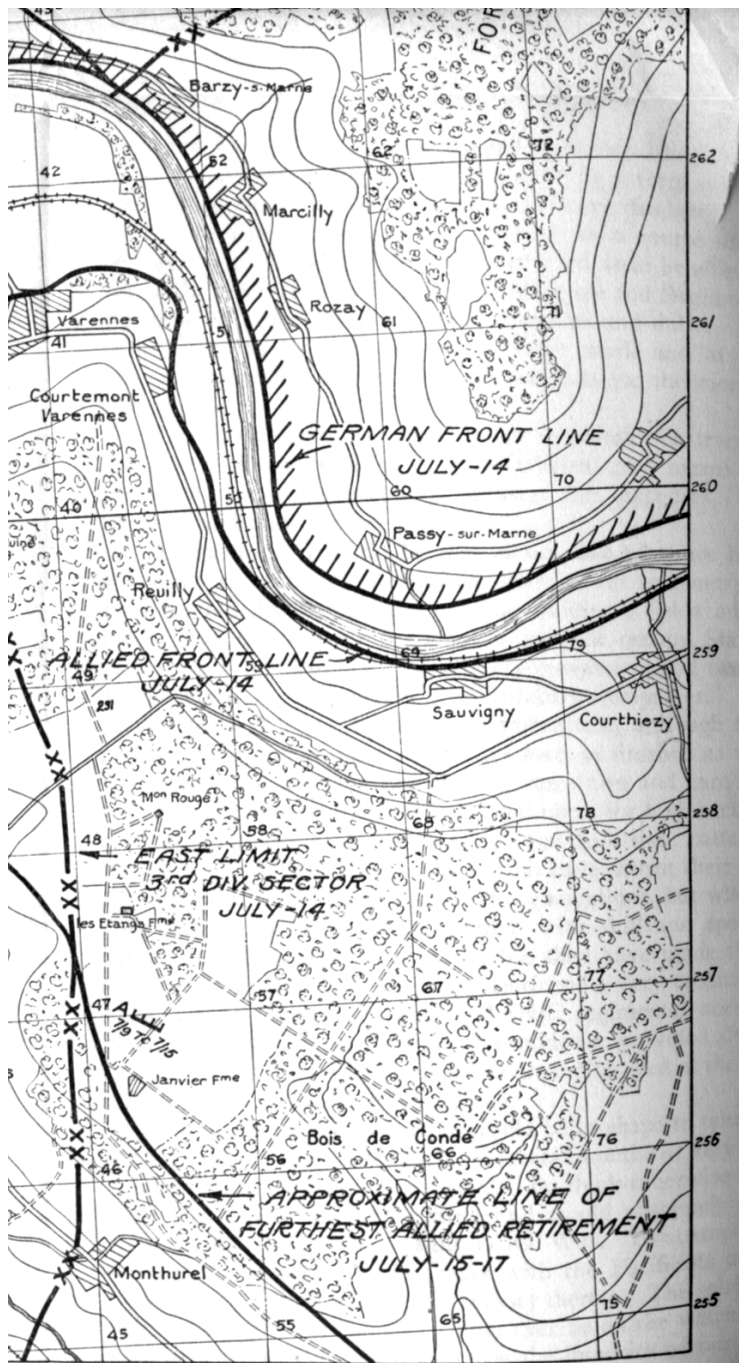
We cannot say that we are or would be in shape to take the field and meet an invading force short of several months of very intensive training, both physical and technical. To think otherwise would be criminally foolish in the extreme and would absolutely belie the costly (in lives) experience of the World War. To attempt it would be plain and unadulterated *murder* with the Pacificists and cheap economists responsible for and accessory thereto. The spirits of our "killed in battle" cry aloud to us to ever be on the watch for, and prepared for, some future attempt on the integrity of our Republic and the peace of its citizens.







SECTOR LIMITS AND FRONT LINES ARE ONLY APPROXIMATE. OPINIONS



STILL DIFFER IN SOME CASES AS TO THE EXACT LOCATIONS

WITH THE TENTH FIELD ARTILLERY AT THE SECOND BATTLE OF THE MARNE

BY MAJOR J. W. ANDERSON, F. A.

I am setting down herein a very brief and incomplete outline of the operations of a battalion of 75-mm. guns, from July 7, 1918, when they detrained at Collumniers and La Ferte Gauche, until they were relieved near Cierges on August 1st.

The combatant units of the battalion, for convenience's sake, are referred to as Batteries A, B and C, though at the time of this operation, these designations were almost forgotten, and in their place the less formal names of "Arthur," "Alf" and "Homer" were used exclusively. These names were given the batteries at the time that "Rattlesnake" christened the Regiment "Reason," and the Regiment in turn foisted the name of "Ragamuffin" upon the battalion.

"Ragamuffin's" existence was limited to his period of usefulness as camouflage, but Arthur, Alf and Homer, despite changes in personnel, clung to the organizations with a strong hold, and still, I trust, are proud names with the First Battalion of the 10th Field Artillery.

For days before departure from our training camp at Coetquedan we had sensed a certain gravity of the situation on the Marne, and were more or less prepared for the atmosphere of tension which greeted us at Viffort upon reporting to Brigade Headquarters the night of July 7th. There the necessity for rapid movement above all else was emphasized, and accordingly the batteries were pushed to the utmost, by day and night, that they might reach their previously located and partially prepared positions prior to the expected attack.

In our instructions for meeting this attack, which had been expected nightly for some time prior to our arrival, unusual emphasis was placed upon the importance of our switch-line positions, or the positions to which we would retire. It seemed almost a foregone conclusion that our resisting power could not withstand the German attack and that we would be forced back to the previously reconnoitred and partially prepared line extending roughly between Gland and Courboin. Fortunately our training had dealt lightly with movements to the rear, and if the occasion arose for

THE FIELD ARTILLERY JOURNAL

retirement we did not recognize it as such, and succeeded in our ignorance.

The positions occupied by the batteries of the battalion were in support of the right sector of the Third Division line held by the 38th Infantry. Battery A was on the right and entirely without the divisional sector. It was located in the open, though somewhat screened by a line of trees, about 500 metres to the north and east of Janvier fme. Battery B was in the wooded line south and east of Le Souvrein fme., and Battery C occupied a position to the north of Grieves fme., at 07-67, until July 12th, when the battery was moved to a position 700 metres northwest of St. Eugene, at 20-58.

Battery A was commanded by Captain Arthur Brigham, Jr., an officer who was commissioned from the ranks of the regular army in the early part of 1917. This battery occupied its first position on the night of July 9th, and at once concentrated on the difficult problems of observation, communication and supply. Its separation from the rest of the battalion by a deep valley with an air-line distance of about 3 km. to Battalion Headquarters, as well as its location in the midst of the French troops, rendered it detached in fact, if not by order, particularly during periods of heavy hostile artillery fire. This separation of the battalion over a front of 4 km. by airline, and a much greater distance for purposes of communication, was, as can be seen from the map, made from necessity rather than choice. The sector held by our infantry was so formed in the depth and on the sides of the Surmelin Valley that there was no alternative, provided the sector was to be fully covered.

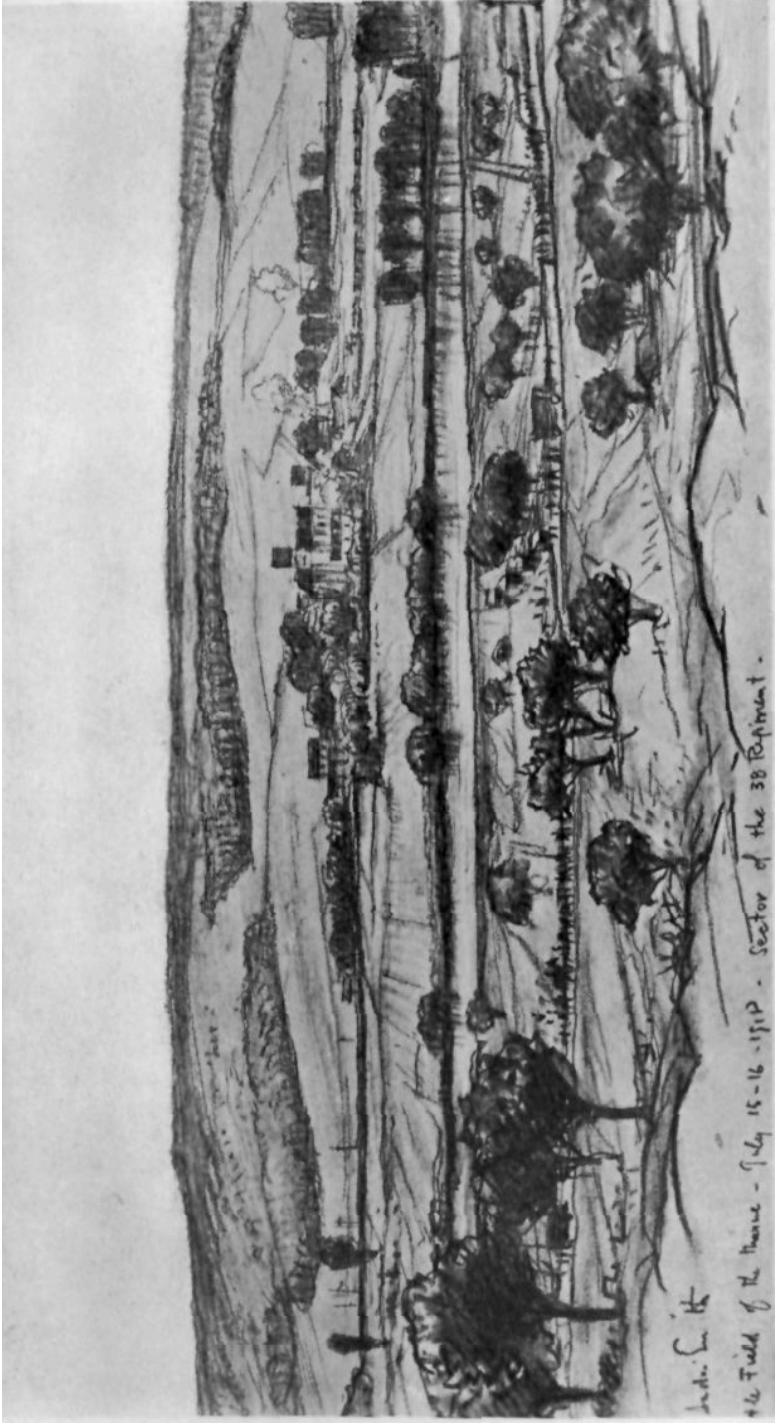
This battery's position was well organized by July 14th. Two wire lines over separate routes had been laid to Battalion Headquarters, and these lines cross connected. Pits had been provided for the men and some shelter for ammunition. The battery had established an observation post well to the front on the face of the hill to the north and east of Moulins.

About 2 A.M., on the morning of the 15th of July, the French infantry, which occupied the sector, began its withdrawal, and by 6 A.M. had taken up a defensive position through Janvier fme., 500 yards behind the battery. During this time the battery lost its observation detail of one officer and five men, who were captured by the enemy.

The French artillery in the sector had begun its withdrawal as early as one A.M., and by day-break all of the artillery in front of, or on the flanks of Battery A, had been silenced or withdrawn. Battery A continued its fire until its ammunition supply was exhausted at about 5 A.M. The battery was then held inactive



BIRDS-EYE VIEW OF JAULGONNE, JULY 30, 1918. LOOKING NORTH OF EAST



MEZY AND SURROUNDING COUNTRY

This drawing was made on the slope of the hill east of Chartèves and looking due south. The road between Jaulgomme and Chartèves is seen in the foreground. Beyond the river Mezy is marked by the church and a scattering of houses. To the left of the church is seen the railroad station and leading on to the left is the railroad embankment. From a drawing by Captain J. Andre Smith.

WITH THE TENTH FIELD ARTILLERY

in the attempt to locate a re-supply of ammunition, until about 7:30 A.M., when the enemy's advance line occupied the woods at their right front, and opened a heavy rifle and machine-gun fire on the French infantry at Janvier fine.

Being between the fire of the two lines and with no ammunition, the battery commander disabled his guns, assembled his men, carrying with them their wounded, and withdrew, reporting directly to the regimental commander at Courboin.

The personnel of Battery A was then held at the disposal of the Regimental Commander, pending its re-supply with guns. This re-supply was taken up at once, though Battery A did not occupy another position until July 19th. This position was at 09-63, west of the Bois de la Jute. The guns of Battery A, I believe, were recovered on the 18th of July, by a detail from this battery, but how many of them had to be replaced from the rear upon the occupation of their new position, I do not know.

Battery B was commanded by Captain Alfred K. King, a graduate of West Point in the class of 1916, who was later promoted to the grade of Major, and was killed in action on November 7th.

This battery was located in by far the most exposed position of the battalion, but by some freak of fortune their losses were comparatively small. Their cover or concealment was little, and their protection practically nil, except that which had been provided through diligent digging prior to the attack. The losses they did suffer were principally in men transporting ammunition through a difficult wood road from the dumps in rear to the battery. This road was almost impassable to transport of any kind, and with the shortage of animals and vehicles a large part of the ammunition obtained on the night of July 14th, or shortly thereafter, was transported by hand. About 4 A.M. on the morning of the 15th, the ammunition with this battery was exhausted, but a search located approximately 1000 rounds of shell in a nearby deserted French position, and this supply was used until seven o'clock in the morning, when it in turn ran very low. Though the German front elements had advanced to a point little more than 1000 yards beyond the battery, firing was suspended, retaining the few remaining rounds for use as the enemy came into view from the guns.

In the meantime, every effort was made to supply ammunition from the rear, but this supply was extremely slow and uncertain, due to the demoralized state of transportation and to the fact that all dumps of any size had been blown up; consequently, scattered ammunition, particularly from French positions, was about all that we could count on, and the search for, and location of such, ammunition was carried on with enthusiasm akin to that found in an Easter egg hunt.

THE FIELD ARTILLERY JOURNAL

Battery C was commanded by Captain Homer Cook, an emergency officer from the 1st Training Camp, who was later promoted to the rank of Major and commanded this battalion. His battery suffered greater casualties on the night of the 14th–15th of July than either of the other two in the battalion. This was due, I think, partially to the fact, indicated from German maps obtained after the attack, that the location of this battery was near the storm centre of their artillery preparation; and in part possibly to the fact that its location had been better determined by the Germans. In all batteries, prepared auxiliary positions were used prior to the night of the 14th–15th, for practically all fire except the O.C.P. and the barrage, and great emphasis was placed on the concealment of the normal positions. This battery, however, either on the evening of the 13th or early in the evening of the 14th, had been required, on short notice, to fire a gas concentration considerably out of its sector, which necessitated the removal of its pieces into the open, and into a line approximately 90 degrees to its normal front. On the night of the 14th–15th, it lost two guns by direct hits, one officer and six men killed and 40 wounded, this being a very large percentage of the number with the firing battery at that time.

There was considerable difficulty experienced in this battery, also, in obtaining ammunition. However, I think the shortage there was not so marked as in the case of the other two batteries of the battalion. A great deal of ammunition of this battery was carried by hand through a wood road, which was practically impassable for wheeled vehicles.

Anticipating the enemy's action by 30 minutes, our general O.C.P. was fired at 11:45 the night of July 14th–15th. By 12:30 it was being returned to us with interest, and throughout the remainder of the night both the enemy and ourselves kept up a constant and heavy artillery fire. The retention of wire communication, even with the closest units, was almost impossible, notwithstanding great effort and much self-sacrifice on the part of the communication details.

The echelon of the regiment was consolidated about 7 km. in rear of our positions, and with it fortunately had been retained practically all of the animals, primarily with a view to their protection from gas. With the firing battery, there were about 30 on the night of the 14th–15th of July, and of these there were no more than two or three survivors.

I have mentioned the observation post of Battery A which was used primarily by that unit. In addition, the battalion established an observation post in the front edge of the woods near 05–80, which was utilized by both Batteries B and C, and on some occasions, I believe, for the adjustment of the fire of Battery A. In

WITH THE TENTH FIELD ARTILLERY

addition to this, Battery B had an auxiliary observation post directly in its front, and Battery C, in a tall tree near its position. The battalion O.P. indicated above had been established in a shallow trench dug for the purpose. About 30 or 40 yards to the west of this trench was one of two steel observation cages used by the French artillery in the sector. It was referred to as "Georgette," I believe, and the other known as "Brunette," or something to that effect. It consisted of a steel box about four feet square and about 6 feet high, set well into the ground and provided with a spindle for carrying scissors, glass and a swivel seat for the observer. It was connected underground to the rear with a rather comfortable dugout. During the night of the 14th–15th of July, the observer from the battalion on duty in our shallow and uncomfortable trench, observed the abandonment of this steel O.P. by the French, and straightway proceeded to make himself and detail comfortable therein. On the 17th, the French returned to claim it, but were unsuccessful. It had been captured by the battalion, and was jealously guarded and transported until we left our rest area for the St. Mihiel offensive, when we stored it in a little French town, where it possibly is still.

We thought, prior to the 14th–15th, that we were supplying ourselves with ample wire communication through the duplication and cross-connection of all lines from O.P.'s to batteries and to battalion P.C. However, that night's experience indicated that open lines could not be kept in operation through such a bombardment. On the 15th, we conceived the idea of using the large concrete aqueduct shown on the map, passing near our O.P. at the north, thence to the south and east within a few hundred yards of Battery B, Battery C, and the battalion P.C., thence to the rear in a general southerly direction to Montlevon, and beyond, for the protection of as much of our lines as possible. On the 16th, we got into this aqueduct, through shell holes in its surface, and ran lines with which we had no further difficulty. At this point, the aqueduct was about six feet in diameter and remained the same size, I believe, for some distance in both directions. It was so pierced with shell holes that it carried little more than six inches of water. One surprising thing to me was that it had not been used or considered for use before.

Through the night of the attack, on the morning of the 15th, and into the 16th, the German aviators caused us a great deal of discomfort, coming down at times to the very tops of the trees in the vicinity of the batteries and attacking them with hand grenades and machine guns. Battery C used its machine guns to advantage on these occasions, and claims in its report the grounding of a plane at 11:00 o'clock on the morning of the 15th. However, a considerable difficulty with these guns was to restrict their fire to times

THE FIELD ARTILLERY JOURNAL

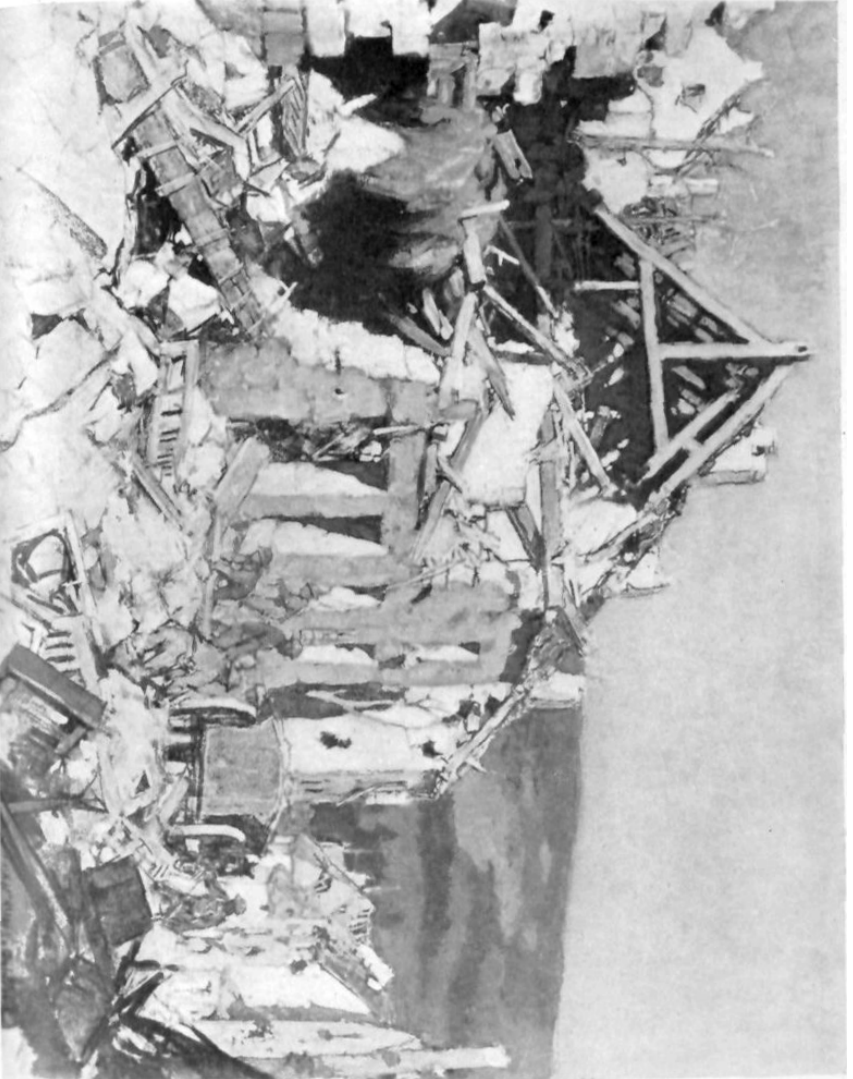
when it was necessary, the tendency—and a very strong one—being to shoot as soon as, and as long as, the plane could be seen.

About six o'clock on the morning of the 15th, one of our liaison officers with the advance infantry battalion, came to my P.C., shot through the forearm in two places by his own pistol, which had been taken from him by a German and turned against him when he broke away and escaped. The sergeant with him at that time, as his assistant, was killed in the attempt of the two to escape. Information sent from this officer on two occasions earlier in the morning had been of considerable value in keeping the battalion informed as to the situation.

The 15th and 16th were rather uncomfortable. Colonel McAlexander, commanding the Thirty-eighth, had moved his P.C. to St. Eugene during the night of the 14th–15th, and in the morning of the 15th reports were conflicting and the situation, of course, somewhat doubtful. We had lost one battery; our infantry had withdrawn to within 1000 yards of another battery, and the infantry on our left was passing through our position toward the right rear. It looked as if we had an excellent chance of being completely surrounded. It was possible at this time to have gotten from the rear sufficient transportation to withdraw our guns, had this procedure been advisable. I consulted with Colonel McAlexander, at St. Eugene, as to his intentions, knowing that should he move to the rear we would be in a rather serious position. He informed me in no uncertain terms that he was going to stay where he was, so we patterned our plans accordingly—dug in a little better, and left the horses with the echelon.

One somewhat amusing feature of this morning of the 15th was the opening up of fire from a German machine gun immediately in rear of the infantry P.C., at St. Eugene. This disturbed the whole community for a short time, until it was found that the gun was a captured one, being used by our own troops.

From meagre records on hand, I find that on the 14th of July, the three batteries averaged 65 men and 7 horses each with the firing battery, and that the Battalion Headquarters had 35 men and 6 horses. The remainder of the men and animals were with the echelon in the Ht. Forêt. There were approximately 2000 rounds of ammunition in each battery, and the batteries at this time were expending about 400 rounds each per day. This supply of 2000 rounds was somewhat augmented during the day of July 14th, and its increase was feverishly hastened during the early part of the night. In addition to this ammunition, there was a considerable dump in the Bois de la Jute, about one km. from both Batteries B and C. Most of this dump was blown up during the night, though early in the bombardment both batteries increased their supply therefrom.



CLEARING THE ROAD THROUGH MONT ST. PÈRE
From a drawing by Captain A. V. Ayllward.



TRAFFIC TO MONT ST. PÈRE

The valley of the Marne at Mont St. Père was alive with artillery activity during the American advance. This view is from a part of the town on the hill. From a drawing by Captain George Harding.

WITH THE TENTH FIELD ARTILLERY

On the night of July 21st, Batteries A and C were advanced to positions about 500 metres north of Crezancy, Battery A in Bercet fine., and Battery C directly west of it, 500 metres. Battery B remained at Souvrien fine., and the Battalion P.C. was moved to Crezancy.

On the 22nd, a reconnaissance across the river was made from Charteves in the direction of Jaulgonne. This reconnaissance resulted in a tentative decision to place two batteries south of the Charteves-Jaulgonne road, about one km. east of Charteves, and one battery in the front edge of a strip of woods running along the southeast side of this road at a position near 28-18.

The movement across the river was begun with the advance of Battery B from its rear position to the crossing at Mezy, where the engineers were constructing a pontoon bridge. The battery advanced after dark to the railroad embankment and there waited throughout most of the night, the Battery Commander, with his details, meantime making his reconnaissance and preparing his position. Delay in the construction of the bridge necessitated the movement of Batteries A and C, followed by Battery B, to the vicinity of Gland, where the battalion crossed the river early in the morning of the 23rd. We moved from there through Mount St. Père and Charteves, to the positions previously selected, arriving at these positions about 10 A.M. Batteries A and C occupied their positions without difficulty.

The original plan to occupy Battery B's position at night by skirting around the lower edge of the woods, was found to be impracticable by day, due to observation from the enemy in le Charmel Château. The stretch of road, about 700 metres long, extending through the woods was fairly well obscured from view along its sides close into the trees, but was being constantly harrassed by small calibre artillery fire. Three guns of Battery B were unlimbered at the turn in the road (23-13), camouflaged with broken branches from the trees, and wheeled by hand into their position. This position, though in the extreme front edge of the woods, was screened from actual observation by brush and small trees. The position was successfully occupied, but it, as well as the approaches thereto, was under such continuous fire that it was necessary to withdraw the pieces at about noon. The battery was then taken by a precipitous and rocky ascent to a position in the woods on the high ridge to the north and east of Charteves, near 18-18. On the next day, Batteries A and C were moved to the high ridge over the same route followed by Battery B, and that night the entire battalion occupied positions in the vicinity of 26-30. The battalion P.C. was moved from its location of the 22nd at 24-14, into Jaulgonne. On the night and morning of July 26th, the battalion was moved to

THE FIELD ARTILLERY JOURNAL

positions about one km. west and south of le Charmel, and that afternoon occupied positions on the outskirts of the town itself.

A part of the 27th and the morning of the 28th were spent in reconnaissance in the direction of Villardelle fine. At noon on the 28th the battalion was moved into position along the front edge of the woods northeast of Chalet de Villardelle, near 82-68, this much to the horror of a French lieutenant-colonel of cavalry, commanding a cavalry unit at that time champing at the bit in the woods alongside these positions. He attempted to explain that it was neither the time nor the place for artillery, but we came and he left.

On the movement to these positions, I waked up to the fact that the echelons of the various batteries were scattered over a depth of about ten miles. Upon leaving our stabilized positions on the Marne, each battery commander had been given a battery complete, with which to do as he saw fit. Each captain had a different idea as to the best positions for his echelon unit, and consequently, though firing batteries were kept close together, the rear units were scattered all over the country. Appreciating this situation on our move from le Charmel, I consolidated the three battery echelons with the battalion echelon into a single unit, placing in command the best officer for the purpose who was available. This consolidation functioned with marked efficiency and satisfaction, and was employed throughout the remainder of our operations in France.

A reconnaissance made on the 29th took a party of one officer and three men to the northeast of these positions and around the rising ground to the southeast of Roncheres. Upon reaching the open, it was seen that the reconnaissance necessitated the use of terrain not hidden from observation by the enemy, so the men in the party were sent back with the belief that fire from artillery would not be wasted on a single figure. This belief proved to be entirely erroneous, the officer being carefully followed with well-directed fire from a 77 around the entire face of the hill, and to within a comparatively short distance of Villardelle fine.—the objective of the reconnaissance.

On the night of July 31st, we moved from these positions to positions 1200 metres north of west from Roncheres, near 00-90. These positions were in area assigned to the French, and during their reconnaissance we were informed that they could not be occupied except through the authority of a French officer, whose location we sought diligently for some time, but without success.

On the night of August 1st we were relieved, and started our march to the rear.

Throughout this period of 23 days, the battalion had expended an average of 100 rounds per gun per day, this average being approximately the same for both the 12-day period from July 10th

A POINT OF VIEW IN THE THIRTIETH INFANTRY

to July 21st, when we were on the defensive south of the Marne, and for the 11-day period of movement, from July 22nd to August 1st. The losses throughout this period consisted of 1 officer and 15 men killed; 11 officers and 126 men gassed or wounded, and 1 officer and 6 men captured. Approximately one-third of the battalion's animals were lost, and there was a like reduction of matériel.

A POINT OF VIEW IN THE THIRTIETH INFANTRY

BY LIEUTENANT (LATER CAPTAIN) JOHNS HOPKINS

IN the latter days of May, 1918, the 30th Infantry, although it had not yet finished its prescribed training period, was ordered to the line to help in the defense of the Marne river, the crossing of which was being threatened by the German offensive, which had shattered the French Army on the Chemin-des-Dames between Soissons and Rheims.

The 3rd Battalion, of which I was a member, detrained about five o'clock one afternoon, and after a long and exhausting hike, lasting until two o'clock the following afternoon, pitched camp in the Grand Forêt. We were from there sent to Nogent d'Artaud. Next we were moved up to Chezy-sur-Marne, where the battalion first came under shell fire. Our next move was to Nogentel and from there to Courboin, where we remained until we took up a position in the wood about Crezancy in preparation for relieving the 1st Battalion of our regiment on the bank of the Marne.

While the 1st Battalion was in position on the Marne, and the 3rd Battalion was in support, the 2nd Battalion made an attack together with the French in an effort to retake Hill 204, which, I believe, was partially successful. Here the first casualties occurred. E and F companies made the assault, and lost four officers, killed, besides a number of men.

The 3rd Battalion relieved the 1st Battalion on the river bank about June 22nd, and the Division was then holding a sector on the Marne stretching to the east of Chateau Thierry, with the 4th Infantry on the extreme left of our sector, then the 7th, 30th, and 38th, in the order named. On the right of our sector were the French. A few nights before we relieved the 1st Battalion, that battalion had sent a raid across the river under Captain Lasseigne, and had captured several prisoners from which the regiment gained valuable information. However, this raid had made the Germans very wary, and when a few days later our battalion tried a similar raid, under Lieutenant Alden Purrington, the boat was sunk by enemy machine-gun fire before it was half way across the river.

THE FIELD ARTILLERY JOURNAL

The 3rd Battalion remained in position on the river at Mezy for about two weeks before it was relieved by the 1st Battalion. The 2nd Battalion in the meanwhile, resting at Courboin after their attack on Hill 204. During their stay on the river bank the moon had been full, making it very hard to move from place to place, even at night. Moving in the day time was utterly out of the question, as the Marne is only about fifty yards wide at this point, and the Germans were watching their side as closely as we were watching ours. The battalion on the river functioned only as outposts really, as our first line of defense stretched along the edge of the Bois D'Aigremont facing the enemy. All the men who could be spared from the support battalion, and even the support companies of the front line battalion were kept busy consolidating and improving this main position.

During this second stay of the 1st Battalion, on the line, information was obtained from prisoners that a new German offensive was under way, and might be launched any day. Accordingly K Company, which was the company to which I was assigned, and which was commanded by Captain John C. Adams, was sent to take up a position near the headquarters of the 1st Battalion, and to be subject to the orders of the Commanding Officer of that battalion, Major Walker. Here each man in the company was told to dig a separate trench for himself, five feet deep and just big enough for him to lie down in. The men were very thankful for this order a few days later when the Boche barrage came down on them.

On the night of the 14th–15th of July the last great German offensive was launched. The disposition of the 30th Infantry on that night was as follows: The 1st Battalion, under Major Walker, was on the line, with B and C companies on the river bank, and A and D companies in support. K Company from the 3rd Battalion was also attached to this battalion, as I have stated above, and was dug in near 1st Battalion Headquarters. The remaining three companies of the 3rd Battalion under Major Pascal were in support in the Bois d'Aigremont. The 2nd Battalion, under Major Sylvester, was moving up that night to relieve the 1st Battalion, and when the German barrage fell were caught on the road.

At precisely midnight of that unforgettable night of July 14th–15th the German preparatory barrage broke. I was calmly sleeping in a little hole I had dug for myself under a rock, and when I stuck my head out I was confronted with a sight I cannot ever forget. It looked as if there were not a spot in the woods where a shell was not hitting. The noise was indescribable, and incessant. Limbs of trees were falling all around and in not a few cases whole trees were being torn up by the roots. Apparently two barrages were working, one moving steadily forward a certain distance, and then starting

A POINT OF VIEW IN THE THIRTIETH INFANTRY

all over again, and the other moving forward and back in a zigzag formation. Our company was a reserve company, to be called upon by Major Walker when he needed us, and sent where he directed, so there was nothing we could do but wait in readiness for his orders to come.

We afterwards learned that the 2nd Battalion, which, as I have said, was moving up to relieve the front line battalion, was caught on the road by this barrage and suffered very heavily. Lieutenant Clarence E. Allen, commanding E Company, when the barrage fell, immediately realized that the woods were the spots where the Germans were concentrating their fire and turning to his men yelled: "Keep out of the woods! Get off the road into the field and lie down!" Just then a shell fragment struck him in the chest, and tore through his body, coming out his back. Although he lived all night, suffering intense agony, he died about daybreak cursing the Germans with his last breath. With his death the Regiment lost one of its most popular and efficient officers.

But to get back to K Company—the barrage had not been raging more than fifteen minutes when a distinct gas concentration was noticeable. I looked at my watch and it was twenty minutes past twelve, so I put on my gas mask and tried to settle myself as comfortably as possible—if the word comfort can be used at all in this connection—for the ordeal of spending five or six hours with a gas mask on. I had no sooner gotten settled to the best of my ability in my hole, than somebody flopped in on me. My heart, which was hardly beating in a normal manner anyhow, took an extra somersault, for the thought that immediately crossed my mind was that the man was a messenger from Captain Adams telling me to form my platoon—a feat which I knew to be impossible midst that wild din, and in that inky inferno streaked with bursting shells. In fact, it was several minutes before my visitor could make himself heard. I finally discovered that it was Corporal Lavine, the company clerk, who had, like the foolish virgins in the Bible, not been prepared. He had put off digging himself a hole, and when the barrage broke had been lying wrapped in his blanket with no protection whatever. After seeking several temporary shelters he had stumbled across my little abode under the rock. So there we lay all night, Lavine and I, while three times flying fragments of shell struck our rock, nearly splitting our ear-drums. Lavine, in his wanderings, and before he had put on his mask, had inhaled just enough gas to make him ghastly sick. Several times he vomited, but on account of the now heavy gas concentration, could not take off his mask. Therefore, although I was far from comfortable, his plight was many times worse than mine.

Just before daybreak the heaviest part of the barrage lifted to

THE FIELD ARTILLERY JOURNAL

the back areas, and we knew the Boches' crossing had commenced. I immediately reported to Captain Adams, and he told me he had sent a man over to Battalion Headquarters for orders from Major Walker for deployment. At that moment the man returned, saying there was no one at Battalion Headquarters. Captain Adams believing that the man was lying, and that he had shown a yellow streak by not going at all, told me to go and obtain the orders. When I got there I found it was as the man had said, no one was there. For some unknown reason Major Walker and his staff had vacated their headquarters, without notifying us. I reported this fact to Captain Adams, and turning to me, he said: "Hoppy, I don't believe a man in this company will come off this hill alive, our orders are to stay here until further orders, and here we stay, unless we can get word from regimental headquarters." The barrage falling in the woods where regimental headquarters were, was still very heavy, so Captain Adams asked for volunteers to go there and get orders for us. Our position was very perilous, as both our flanks were wide open. One of our buglers, George Frank, by name, immediately volunteered to undertake the commission, and Captain Adams wrote his note to Colonel Butts. The company then took up the strongest position it could with such a limited number of men, and opened fire on the Germans crossing the river. Near the position we chose was a sergeant of the 30th Infantry machine-gun company still firing his gun, although he had only one man left with him and his (the sergeant's) hand was nearly severed, the flow of blood being stopped by a tourniquet.

In front of us segregated remnants the 1st Battalion were still fighting desperately, and all these little bands that were near us consolidated with our company. However, the counter-barrage laid down by our supporting artillery during the night had been very effective, and the Bavarian Guard Divisions, which had headed the attack on our sector had suffered severely; that, coupled with the very stiff resistance offered by the Infantry and Machine-gun units along the river, had to a very great extent demoralized these troops. They had been told that they would meet no resistance whatever, and very much the reverse was the case. This may be illustrated by the fact that Lieutenant James H. Gay, of C Company, with the remnant of his platoon, being cut off from our lines, opened up in the rear of a body of Germans with the result that a German major and several other officers and about 150 men surrendered to him.

Our position on the hill was getting more and more precarious each minute, and we eagerly awaited Frank's return. Finally, about 11 A.M., he came back with an order from Colonel Butts to return to our first main line of defense, which was on the edge of the Bois

A POINT OF VIEW IN THE THIRTIETH INFANTRY

d'Aigremont. Accordingly, K Company fell back by platoons to this position.

That position in the Bois d'Aigremont the enemy never reached and that night a counter-attack was launched by part of the 3rd Battalion of the 30th Infantry and some troops of the 4th Infantry, which established our line again on the river bank. In this counterattack Captain Fred Moore, commanding I Company, was killed and another officer, admired by all who knew him, passed into the Great Beyond. In the fighting covered by those twenty-four hours the 30th Infantry lost very heavily in officers and men. I do not know the exact figures, but it seemed to me one out of every three officers you would ask about was either killed or wounded.

The following night K Company, together with the other units of the 30th, were relieved by elements of the 28th Division (American), and withdrawn a few miles for reorganization. We thought we were to be relieved entirely, as we had been in the line since the end of May. However, there was no such luck, and on the morning of the 22nd of July we were ordered forward. At this point I was transferred, with Lieutenant Clark, of L Company, to E Company, E Company having lost all its officers but 2nd Lieutenant Norcross. Lieutenant Clark, being my senior, took command of the company. I hated leaving old K Company, as I had been with them since I had joined the regiment, and I had grown to love Captain Jack Adams as a brother. Under his command K Company had been developed to the point where it had no peer in the regiment, and I do not believe in any other regiment.

After an all-day hike we crossed the river that night at Mezy, and about midnight relieved G Company of the 38th Infantry on the top of the heights above Charteves.

At five minutes of eleven the next morning we received orders to attack at eleven o'clock. We hurriedly formed the company, and although the barrage had already started, advanced through Jaulgonne and along the road leading to le Charmel Chateau. We met with practically no resistance, and about two o'clock Major Sylvester, commanding the 2nd Battalion, sent orders to establish our position on a certain specified line. At just that moment I saw a rocket go up on the other side of a little hill, and turning my platoon over to a sergeant took a corporal and two other men, and started down the road to investigate, thinking maybe it was a signal from the 3rd Battalion, which was on our left. When I got around the road I could see nothing but open field with a few bursting shells, the barrage having died down. I told the men to climb up to the top of the hill and see what they could see on the other side. In the meanwhile I put my revolver under my arm, and took out a cigarette, and lit it. I then called to the corporal, asking him what he could

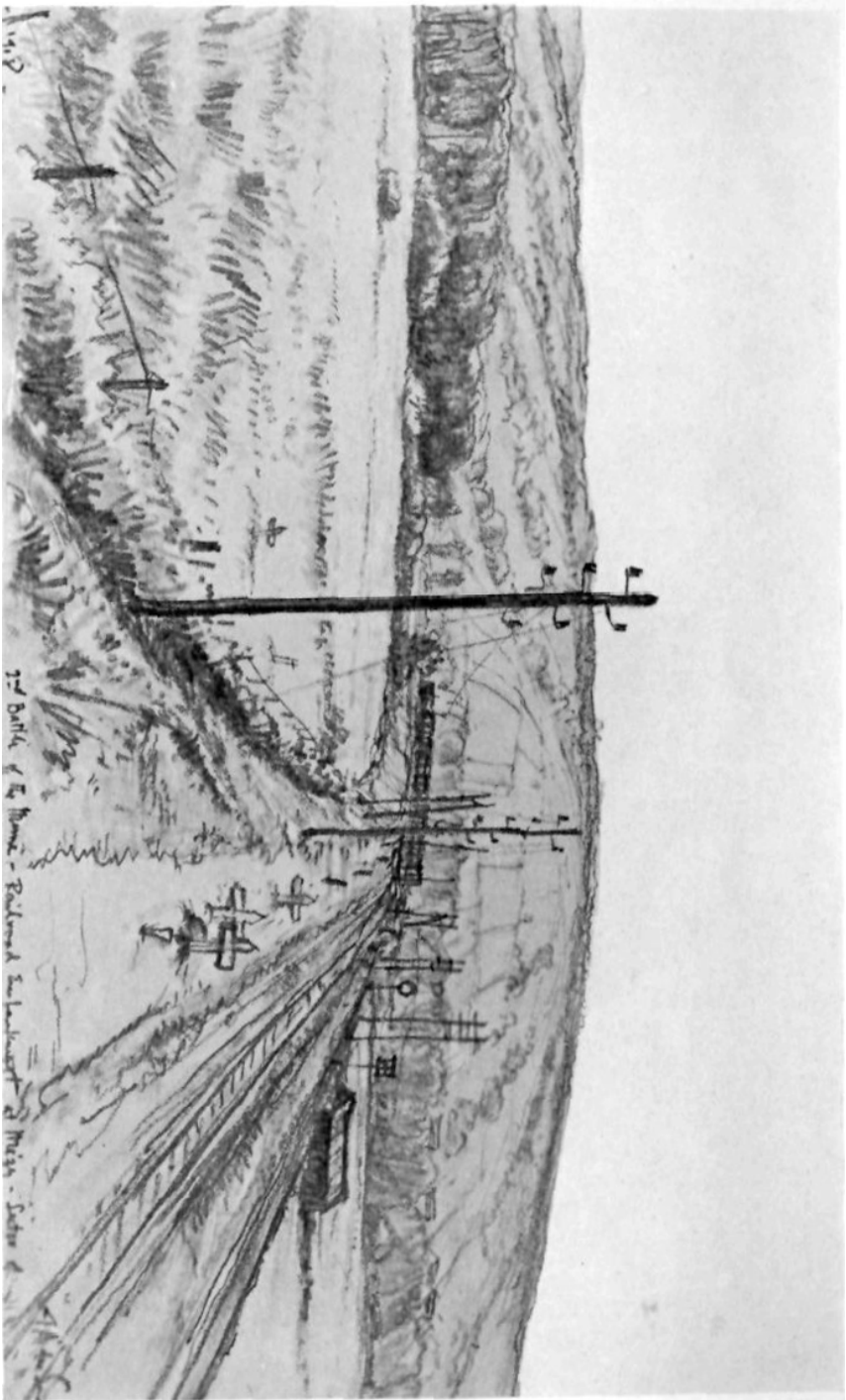
THE FIELD ARTILLERY JOURNAL

see. He said nothing but a wheat field with a demolished French plane on it. I said, "All right, let's go back." I had no sooner said those words, in English of course, when a nest of machine guns opened on us at less than 50 yards. The corporal and one of my men were killed, and the other man and I broke all records for the 20 or 25 yards we had to go to get around the bend of the road, and get protection of the hill. We ran right into Major Sylvester, who was coming up the road with the object of picking a place for his P.C. We advised him that that was no place for a P.C., and he told me to go back to my platoon and clear those machine guns out. He gave me to support my attack two machine guns and the 8th Machine Battalion under Lieutenant Eddie Driggs.

Driggs set up his gun, and I reconnoitred my position, deciding to try to attack the enemy in the rear by going around the other side of the hill, as a frontal attack with the few men I had was out of the question. Accordingly, out we started across the field, which was knee high with wheat, but we had gone only 15 or 20 yards when another nest of machine guns opened up on us, directly in our faces. To charge across that wheat field some three or four hundred yards wide with the thirty men I had would have been suicide. We had no supporting troops, and no protection on either flank, and the only cover we had in crossing the field was the wheat, which the machine guns were combing thoroughly. I gave the command to withdraw to the protection of the hill and found that my little force was reduced to less than twenty-five. I sent word to Major Sylvester that that position of the enemy could not be reduced by less than a battalion of men, and that there should be preliminary artillery fire to aid them.

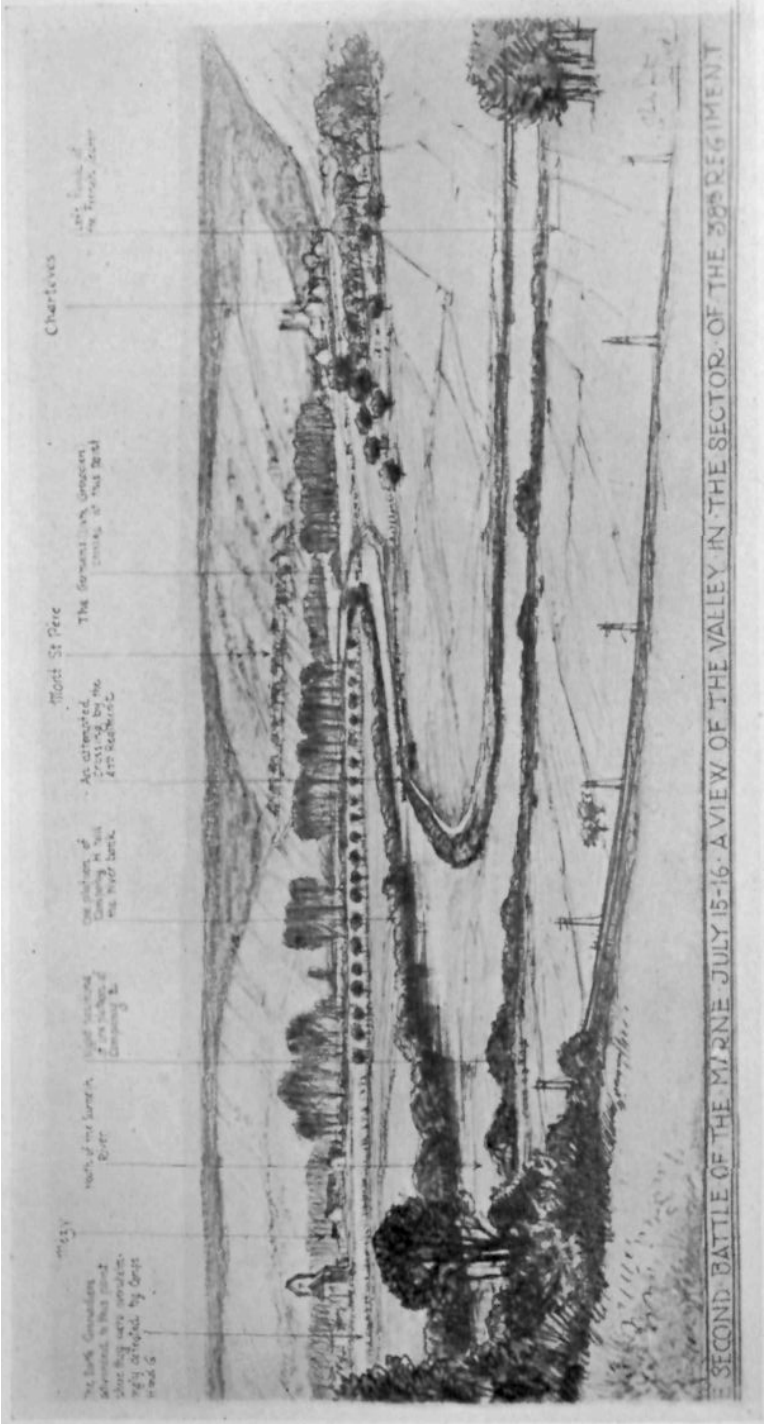
We were encountering here the same tactics on the part of the enemy, that they used all through their rear-guard action in evacuating the Marne salient. They had men in trees with direct telephonic communication with their artillery, and as soon as an attacking body could be seen, those men would telephone back the exact coördinates, and in a very few minutes you would have accurate artillery fire to contend with, in addition to very stubborn machine-gun resistance. Major Sylvester sent me word to give up any idea of attack, but to hold that bend in the road at all costs. It was far from pleasant, for our battalion line was about 200 yards in our rear, and although I sent out patrols we could not find any American troops on either our right or left. However, luckily for us, the Germans attempted no counter-attack and two days later we were relieved by a battalion of the 7th Infantry, which tried all morning to dislodge the machine guns that had held us up and finally had to ask for artillery support before they were successful.

The night we were relieved we retired to Barzy-sur-Marne, in whose cellars we enjoyed a long and very welcome unmolested sleep.



THE BATTLEFIELD AT MEZY. LOOKING EASTWARD TOWARD HILL 231 IN THE DISTANCE

At the foot of the hill and to the right are the roofs of Meuzins, while to the left of the track a line of trees marks the mouth of the Surnelin River. The embankment in the foreground marks the German objective and our defensive line in the sector. From a drawing by Captain J. Andre Smith.



WHERE THE GERMAN OFFENSIVE FAILED

This drawing was made on the Paris-Metz road, between Varennes and Moulins, and looking northeast and down stream. From a drawing by Captain J. Andre Smith.

SAME FIGHT AS SEEN BY A COMPANY OF 38TH INFANTRY

It was at this point that I was again transferred, this time to G Company, whose only remaining officer, at that time, was Lieutenant William E. Dupree. It was also here that I heard of the death of Captain John C. Adams, than whom a better officer never lived. He had been killed in the attack the 3rd Battalion had made on le Charnel.

THE SAME FIGHT AS SEEN BY A COMPANY OF THE THIRTY-EIGHTH INFANTRY

FROM THE OPERATIONS REPORT OF CAPTAIN (LATER MAJOR) J. W.
WOOLDRIDGE, COMMANDING COMPANY G

Sector: From Mezy Depot east to 75 yards east of railway bridge over wagon road. See map. Some 600 yards of river bank.

Disposition. One platoon on river bank; one platoon on forward edge of railway bank; one platoon just in rear of railway bank; and one platoon on spur track. Four platoons in depth. All combat groups were in narrow slit trenches which prevented loss from bombardment. I had my full company in action, including kitchen personnel, except the regular detachments, Intelligence, Battalion, etc., 251 men.

Enemy Strength: On my front, one full regiment as nearly as can be estimated and by information from six captured officers.

The general bombardment lifted on my front at about 3:30 and a creeping barrage set in behind which the enemy machine-gun detachments came at 40 yards, first in boats, then on pontoon bridges, one of which was placed at about my centre and the other on my extreme left flank. The regiment that came over on the left flank bridge (same estimate and information) veered off and went through the 30th Infantry sector to the woods in rear of the 30th Infantry sector. The regiment which came over at my centre fought through my first platoon on the river bank, exterminating same, except for three wounded men. They gradually eliminated my second platoon on the forward edge of the railway bank, their place being taken in desperate hand-to-hand fighting by my third platoon. The fourth platoon being simultaneously deployed in place of the third. Any of the enemy who battled their way through the three platoons were easy prey for the fourth and there was absolutely no infiltration on my sector.

From this engagement, which lasted several hours, I don't know how many, we sent in 383 prisoners which I personally counted and two large groups, 60 and 71 from the south of the spur track which I did not count. I am just in receipt of a letter from one of my wounded men who was conducting a large group of prisoners, which states he was ordered to turn them over to the 110th Headquarters

THE FIELD ARTILLERY JOURNAL

(whatever that is) because he could not find his own. We took 52 machine guns and a great quantity of German impediments. A flank attack which I personally conducted sent in 185 prisoners and accounted for many killed, but the manœuvre was costly, as only three of us returned. Lieutenant Murray was killed in this attack. The lieutenants who led the first platoon on the river bank and forward edge of the railway bank were killed during the first five minutes of fighting.

The second attack was made at 10:30 A.M. from the rear of the 30th Infantry sector, a skirmish line coming from woods some 800 yards in rear of Mezy. Some 30 men of Company "C," 30th Infantry, under Lieutenant Marsh, were left on the 30th Infantry sector and were ordered to surrender. Lieutenant Marsh then turned his command over to me. I was further augmented by 12 men of a Stokes mortar battery under Lieutenant Frederick Winant, Jr., a splendid officer. With these, together with my kitchen personnel, company clerks, two runners and three buzzer operators, and what men I could take from my line, I took up a position behind rock piles on the south edge of Mezy and repelled the enemy, some 250 strong. We then occupied an "L"-shaped trench immediately in front of the rock piles, which was an extremely ill-advised move on my part. Twenty men under Lieutenant Marsh had been sent to a bit of woods at the right. They did excellent work, keeping up continuous fire after mine had been silenced by the enemy from the woods position, who enfiladed one arm of our trench with minenwerffers, one-pounders and machine guns. We finally got out by individual dashes to the rock piles, bringing a couple of prisoners and a German captain. I withdrew all troops to my original line except a strong outguard.

Third attack: A weak attack was made on our left flank on the railway. This was repelled by my outguard augmented by two squads from our line.

Airplanes: The air was thick with German airplanes who had no trouble in bringing down the few French planes that made their appearance. They sprayed us with machine-gun fire.

We withdrew under orders at 4:30 P.M. to support position on the aqueduct line. Some three days afterward we crossed the Marne and followed the retreating enemy. Company "G" acted as advance guard to our battalion. We sent platoons through the woods to clear out the enemy and finally reinforced Company "B" of the 1st Battalion, who were held up by strong point.

Losses: 3 lieutenants; 1st Lieutenant D. C. Calkins, 1st Lieutenant M. M. Phillips, and 1st Lieutenant K. P. Murray; 139 men and 8 sergeants. Lieutenant Thacker was sent to the rear suffering from gas and exhaustion.

THE DEVELOPMENT OF ARTILLERY DURING AND AFTER THE WORLD WAR

BY MAJOR W. Y. C. SCHURMAN

A lecture delivered on October 27, 1922 before the general meeting of members of the Association of War Sciences, Netherlands. This is published by permission of Major Schuurman. Translation furnished by the courtesy of the Military Intelligence Division, General Staff, War Department.

ON complying with the request of the Board of this Association, a request made during the last year, to give you an impression of the development of artillery during and after the World War, I need not specially emphasize that I cannot do so with the pleasure, with which I wished to fulfil this task. Last year we had entered into a project, in which everyone was convinced that the artillery equipment of our army would not do any longer, and for which, without considering the several possible methods of reorganization of our forces, a sum of one hundred million guilders was to be destined for the new artillery of our army. Since then the economic exhaustion, already prophesied by some people, has overtaken us so rapidly and with such a power, that we dare not now speak of any extra expenditure of such an amount for defensive purposes.

Now the fact is apparent that, to use the words of a world reputed statesman, while swimming into a pond of gold we postponed the improvement of our forces by army and naval bills. After the preparation of both bills the pond has become so shallow that we dare not even speak of swimming, having barely enough to satisfy our thirst. Moreover, the perusal of Chapter VIII of the Budget for 1923 teaches us that a prominent part of the inevitably necessary economy has hit the place where the need was greatest, *i.e.*, the purchasing of the new matériel for the reëquipment of our army. Meanwhile, Gentlemen, courage lost, everything lost, let us forget the reality for a few hours, and let us go in for the actual artillery problems. Even if our work be of a purely academic value, we will have the satisfaction of having done what is within our power.

On coming then more directly to my subject, I must begin by pointing out how extraordinarily extensive the field is which lies before me. Let us forget for this moment the circumstances of the Netherlands and let us remember how, during those four years of terrible war, the thundering of the guns was even to be heard nearly without interruption on our borders—how the artillery surprises

THE FIELD ARTILLERY JOURNAL

which came to our knowledge, succeeded each other rapidly—how after the War the most prominent German Infantry soldier—von Ludendorff—proclaimed: "There exists no longer one main arm, there are now two."

My temptation to plunge into a sea of artillery specifications and particulars is therefore great. In order to escape this danger I have aimed at finding in the enormous material a few directive lines, and at keeping to these lines insofar as they are of direct interest to us. Consequently no rich abundance of sources will be found in my work; moreover this would be superfluous—these sources can be easily found in every military library by everyone anxious to study them.

A fact to which I want to draw your attention is that the war itself did not bring us—and where it did only by way of exception—the ordnance of the future. If one thinks to be able to distil out of the powerful artilleries which fought each other for years with such disastrous results, the very best and latest in the way of ordnance construction, he will find himself deceived. And, nevertheless, this poor result is not illogical. For ordnance design and construction, not only a careful study, calculation and building is necessary, but in addition experimenting on large scales. The requirements for war and peace artillery are so extensive that each desired solution is to be considered as the rare sheep with five legs. In most cases, as in so many other material affairs, one must content himself with a compromise which comprises as much as possible of our desire as to weight, mobility, power and cost. For such quiet, scientific, time-swallowing experiments the rough war conditions did not leave time; we must, however, greatly admire what has been accomplished. Especially the bringing down of weight to the very minimum proved to be possible for new war-time constructions.

What we positively observed during the War was a pronounced desire for artillery of different types, which desire was born out of the development of modern tactics. A careful study of this science is necessary to determine what types of artillery are needed. This does not mean that we must stop by studying tactics. On the contrary, as much as tactics demand certain requirements from the technical sciences, so much the latter limit the former; so that technical sciences—by improving by leaps—cause a greater and faster development of tactics. In case the tactical man does not consider this possibility, there is no doubt that the beginning of a new campaign will cause disagreeable surprises and that the true tactics will be learned amidst severe and bloody losses.

It is an acknowledged fact that highly developed peace industries only will produce small differences in war and post-war products. Since the war all ordnance makers are busy to meet the new demands

DEVELOPMENT OF ARTILLERY DURING AND AFTER WORLD WAR

in the most efficient way and an ordnance specialist of reputation declared that nearly all constructions previous to 1919 are to be considered obsolete. This does not mean that all such constructions are of no use; no army can ever be equipped exclusively with the most modern industrial improvements. Normally it can at best be pretty well acquainted with what is to be expected to belong to the equipment of possible opponents and thereby be warned as to which counterprecautions must be taken.

In order to follow the development of artillery during the great war, I wish to recall to your mind the specific artillery affairs of this vehement period.

First of all we see immediately after the outbreak of the war the performance of the heavy 420 mm. German mortars, which in combination with other heavy artillery, were put into action against the Belgian fortresses on the Meuse. The sensation created thereby was not caused by the large calibres of these guns. Indeed it was of general knowledge that Krupp had already built long, coast defense guns of 450 mm. The construction of short, heavy calibre guns would therefore not meet with difficulties. General surprise and justified admiration was roused by the fact that these heavy pieces were of such construction that they could be brought into battery with only a short delay on any desired place of action. One of the two types of this mortar could be moved by railroad, the other one by motor-traction. Especially the light-weight mortar, transportable in four loads (tube, carriage, platform and implements), was comparatively very mobile and could be assembled within nine hours, the more remarkable as motor-traction in those early war days had not reached the present state of perfection. The transportation of the projectiles of 800 kilograms and 920 kilograms was far from easy, even as was the handling of them while loading, which of course could not be accomplished by manual power and had to be executed with cranes.

Another feature of these guns was, that allowing for a muzzle velocity of 450 metres per seconds, they were called mortars. This put an end to our simple, easy classification of artillery into three types by their muzzle velocities: rifles, howitzers and mortars. Our 120-mm. howitzer allows of a maximum muzzle velocity of only 300 m.s. Henceforth those guns are called mortars, which permit firing with elevations over 45 degrees, thus giving angles of fall from 70 to 75 degrees. This involves at the same time a very great vertical velocity at the striking point. For this we will have to remain at such distance from the target as to fire with the largest possible powder charges. Thus the double effect is arrived at: great angle of fall and great penetrating power. In the case of the Belgian fortresses 1500 mm. of concrete and 14,000 mm. of sand were easily

THE FIELD ARTILLERY JOURNAL

penetrated. The protection of these fortresses, which was apparently of poor quality, was easily perforated and the enormous projectiles containing bursting charges of 130 kilograms caused an overwhelming effect in the interior of the fortifications.

In view of the small number of projectiles, which could accompany the mortar and the small rapidity of fire, the control of this fire required the greatest possible care, in order to obtain sufficient accuracy of fire on comparatively small targets. The Germans were given the most satisfactory conditions for fire control by the fact that the Belgian, surprised by the new methods of warfare, did not, or could not, prevent the German observers from coming very close to the targets under fire. This allowed a fire control like that on the target range. The results were commensurate. The dispersion, notwithstanding the unfavorable factors of long range and high elevation, were, owing to the large calibre, so small that direct hits were soon obtained.

In connection with the organization of the Netherlands forces we dare not even dream of this sort of artillery. Yet there is in two respects something to be learned for us: in the first place that the development of the art of fortification has to take more logically in account the progress of artillery. In former days we used to decrease the dimensions of our fortresses in proportion to the increase of accuracy of artillery fire. They could not now, however, be decreased in such a way that they would not offer a sufficiently large target, thus facilitating the task of the enemy artillery by permitting them to annihilate such a fortress with a minimum number of rounds. It is but logical to offer a small target to a badly firing artillery, and a large one to a well-trained artillery, thus forcing it in both cases to waste an unproportionally large number of rounds to overcome the many small objects.

In the second place, I was impressed by the complaint of a German battery commander regarding the way his battery was used in the later stages of the war. In these periods the heavy mortars (fortresses and fortifications failing) were detailed as common artillery to a part of the trench front. And in these places the tactical commanding officers in most cases had no idea of the essence of the heaviest mortar fire. Frequently orders were given which could be executed faster and with less waste of ammunition (as to its weight) by lighter guns, or targets were indicated which were unsuitable for the heaviest of mortars; and finally in many cases there was not enough ammunition at hand to arrive at the results aimed at. Now I am perfectly aware that we do not have, and will never have, such heavy artillery, but the principle prevails too with smaller calibres. The use of large calibres in cases where smaller calibres would do, is uneconomical.

DEVELOPMENT OF ARTILLERY DURING AND AFTER WORLD WAR

Heavy artillery and its expensive ammunition should be reserved for targets which cannot be overcome by smaller calibres. In order to execute this demand we must have a clear knowledge of the effects of the different guns and projectiles on the targets found on the battlefield. It is a fact that erratic and wrong ideas exist on this subject and not only with infantry officers. Therefore it is highly desirable that everywhere target practice be utilized for studying the effect on targets which might present themselves on battlefields, and which are nearly always absent on target ranges. The results should be liberally published.

I shall not leave the subject of heavy mortars without just mentioning the Austrian 305-mm. motorized mortars, which were superior in mobility to the 420-mm. mortars and which had sufficient effect against almost all targets. Finally, I wish to mention the last word spoken by the French ordnance makers, who produced at the end of the war a 520-mm. railroad mortar of a total weight of 265,000 kgs. firing a shell of 1400 kgs. with an initial velocity of 500 m.s. Very probably this gun was destined to annihilate the German fortifications near Metz.

The second artillery phenomenon was the enormous increase of intensity of fire concentration. We have seen that during the attack on the south front of the Antwerp position, the lines between the fortresses—which themselves were under heavy artillery fire—were susceptible to such an intensive fire from middle calibre and light calibre guns, that the Belgian defendants were regularly shot out of their positions, even before the attack of the German Infantry. As noteworthy is the fact that this same Belgian Army, a few weeks later on the Yser, successfully resisted the same sort of artillery fire and remained in possession of their position, regardless of the heaviest losses and casualties. This complete and sudden change was due to the purification which the Belgian Army had endured, to its getting used to remaining under modern artillery fire and above all to the firm and steady will, saturating all soldiers, to resist to the extreme on the very last piece of their own country. There is a lesson for us in it too; we too will have to command young inexperienced soldiers during the beginning of an eventual war. Therefore it is necessary to impress all—young or old—with the fact that troops which have the will to keep their position and which know how to make use of the terrain, cannot be driven out of it by enemy artillery fire.

I am sure that in this meeting it is unnecessary to emphasize that the above mentioned in no case may lead to an underestimation of the power of artillery fire, either enemy or our own. Lack of respect for enemy fire leads to great and bloody losses and brings confusion and panics; underestimation of the power of our own artillery

THE FIELD ARTILLERY JOURNAL

fire leads either to irresolution or to wantonly advancing without duly considering the possibilities of such fire. Both methods lead to unnecessary losses and miscarriages or failures.

By advancing one more step, we come to the German reports of the extraordinary results of high-angle fire and the French enthusiastic praises of "notre incomparable 75 mm."

A good understanding necessitates the recollection of the fact that Germany had mixed Regiments of Field Artillery, consisting of sections of 77-mm. field guns (light and mobile, but with small ballistic power, a good shrapnel and a high-explosive shell with small bursting charge)—and of sections of 105-mm. light field howitzers with better range and a powerful projectile (high-explosive shell) with an effective—be it not excessive—bursting charge. Behind this stood the Corps Artillery Regiments with 150-mm. howitzers, 105 and 150-mm. long guns, and 210-mm. mortars, all modern artillery with good range and effective projectiles.

On the other side the French were equipped with an artillery of many 75-mm. field guns, the pace-makers for modern artillery. This field gun was heavier than the German one, had considerably more ballistic power, a better shrapnel and a high-explosive shell with comparatively very large bursting charge. Behind this they had batteries of 155-mm. howitzers in practically insufficient quantities and no other important modern heavy artillery. As to training, the French light artillerymen were more impregnated with the modern use of new artillery than their German opponents were, while the personnel of the German *heavy* artillery had the same advantage over their French opponents. These circumstances explain fully the high opinion of the French for their 75-mm. field guns and the enthusiastic German appreciation for high-angle artillery.

On condensing these experiences, we come to the conclusion that the Germans, who during the war of movement were almost everywhere the attacking party, had a most profitable use for their heavy artillery when preparing and initiating their attacks, and suffered severe losses during their attacks from the excellent French light artillery, which could not be annihilated because of its good tactical use. The German short-range field artillery compelled to be advanced excessively, suffered severe losses, especially as to observers and battery commanders. On the other side the French were seriously handicapped by their lack of high-angle artillery, but by getting 100 per cent. out of their excellent light gun they did everything in their power to neutralize the bad effects of this lack. Especially the longer ranges helped them against the heavier German guns without enabling them to overcome wholly their shortage.

During the whole war both parties were constantly aiming at improving their shortage. Initially the French—gaining time by the

DEVELOPMENT OF ARTILLERY DURING AND AFTER WORLD WAR

solidification of warfare into trench warfare—used thereto their old heavy fortress artillery, of which sufficient quantities were at hand, and which had powerful ballistic qualities and good high-explosive shells with ample bursting charges. Consisting, however, only of long guns, they could not wholly replace the necessary curved fire guns; so the manufacture of a number of new guns of all calibres had to be effectuated. The eminent French ordnance constructors have solved this problem, and at the end of the War the French Army was equipped with several types of short guns up to a calibre of 520 mm.

In the same way the Germans felt the necessity of getting a more powerful light gun, than the one with which they entered the war, and of which they had already increased the range, so as to permit firing with long-point shells at distances up to 7850 metres. For this purpose they built a new (longer) field gun to be mounted on the carriage of their light field howitzer, so as to allow of fire at elevations of even 45 degrees. With these guns they obtained ranges of 9100 metres and by using stream line shells even 10,700 metres, thus exceeding the ranges of the French field guns. In the meantime the French did not remain idle and they had made provisions for firing up to 10,000 metres, be it only by digging in the trail. In order to bring the gun back into battery at high angles of elevations they had to increase the pressure in the recuperator and to construct a small, extra, pneumatic buffer to check the too rapid return when firing at low angles.

Both the German and French field guns were now furnished with divided charges. Firing with too great muzzle velocities involved two considerable disadvantages. In the first place the tube suffered enormously from the heavy pressures, so that the expenditure of tubes, already increased by the unforeseen large consumption of ammunitions and the long duration of the war, could hardly be met. Firing with reduced powder charges greatly increases the life of a tube. So the range table of our 150-mm. howitzer L/15 mentions that with the same wear of the tube 1, 3, 7 and 14 rounds can be fired when using the four different powder charges. Moreover an important economy in powder is obtained, which is a considerable feature in war times. This is a warning for every artilleryman to fire only with such a charge as is necessary to get the desired result. If he wants a long, flat trajectory against live targets with shrapnel fire, if he wants a great striking velocity when firing against resisting targets or if firing at great ranges, then he wants the large charges. In all other cases he must prefer the smaller ones. For our field artillery, too, this problem is not without importance, because we use war-time charges when at peace-time practice. From a point of view of practice this has many advantages, but if we do not want

THE FIELD ARTILLERY JOURNAL

our field artillery worn out prematurely it will be advisable to use smaller charges. I know there are a lot of objections against this, but these can be overcome, and the saving of our matériel is of too great importance. Our Navy, for which the short life of their very long guns makes this problem of a still greater importance, has already adopted this principle. Of course a few rounds must always be fired with war-time charges for practice.

A second disadvantage of firing long guns with large charges is that at short ranges one cannot fire over one's own troops. During manoeuvres and at target practice this generally is not noticed, but during the war the French suffered severely through it. The trajectory is so flat that the maximum ordinate is only a few metres. When firing at targets at a short distance ahead of our own infantry either to support an attack or to repulse that of the enemy, the projectiles are passing so closely over our own troops that the smallest error in laying inevitably causes disasters. To avoid this the Artillery can be brought farther to the rear, but this method involves several kinds of tactical and technical drawbacks, as less range into the enemy position, more difficult communications with our own observers and our own infantry, etc. Here also the use of smaller charges will be necessary. All modern guns are adapted to fire with divided charges.

The desire for longer ranges was not restricted only to light artillery, the advantages of excess range being so great. These advantages manifested themselves as follows:

- a. More freedom in the choice of position.
- b. The possibility of placing the artillery so far to the rear, that it can perform and still be out of reach of the enemy artillery. By placing the artillery farther to the rear the enemy could be forced to advance his counter-battery guns, thus forcing him to expose it more and to bring it within reach of lower-range artillery.
- c. To place under fire a greater depth of enemy terrain, thus making possible a longer support of the attack without the necessity of changing position.
- d. A greater possibility of effecting fire concentration by making use of adjoining units.
- e. The moral effect; the knowledge that the enemy can take us under fire, without our power to reply to it, is most demoralizing.

For these reasons, which can be supplemented at one's pleasure, the French wanted before all to reduce their shortage in 105-mm. long guns. This type of gun, with a comparatively light weight, uniting a long range with a powerful projectile, proved as useful for

DEVELOPMENT OF ARTILLERY DURING AND AFTER WORLD WAR

the Germans as annoying to the French. Technical impotence cannot be presumed on part of the French, for already in 1913 Schneider had constructed a 105-mm. gun, weighing in battery only 2350 kgs. with a projectile of 17 kgs. and a maximum range of 12,500 metres. At the beginning of 1918 the French Army already had 2000 of these rifles. One of the principal advantages of this type of gun is that it can follow an operating army in all its movements, by transporting the gun on a separate vehicle.

Meanwhile the Germans did not remain idle; they had built besides their old 105-mm. gun with 11,000 metres range and transportable in one load, a new type with a maximum range of 14,000 metres and transportable in two loads.

It is worth while to discuss further the long 105-mm. field gun in view of the fact that the War Minister has brought this type up for consideration for our future corps artillery. As well as the corps artillery itself this type will be received with acclaim because if our artillery lacks one thing it is long range and again long range.

It would not be impossible to increase the range of our existing field guns in the same way as the belligerents did by using a better shaped projectile and by transforming the carriages to allow high elevations, but a real effective solution is only to be obtained by purchasing new materiel, and that the most modern.

Where a complete piece consists of four principal parts, *i.e.*, tube, carriage, ammunition and traction, we must begin with considering first of all the development of the whole. We have already mentioned that long guns were mounted on carriages permitting of fire under 45 degrees elevation. The carriage problem becomes much more difficult with the increase of calibre. The long gun demands a long recoil, the room for which cannot be easily found under high elevations. Up to 30 degrees the common type of carriage is possible, but at greater elevations a new type of carriage must be used. The development of modern artillery has solved this problem. The existing carriages allow an axle traverse of a few degrees without shifting the trail, which latter manœuvre includes the lifting of the spade out of the ground, thus losing the direction and time. Heretofore it proved necessary to work out a construction which would permit of large and rapid traverse without losing the direction. The French ordnance constructor, Deport, solved this problem before 1914 as far as light artillery was concerned by building a carriage, with split trail. Between the two parts of the trail when split, the gun could freely traverse and had ample room when recoiling. This split trail permits a traverse from 30 to 60 degrees depending upon the calibre of the gun. Before the war the Italian field artillery already used split trail carriages, which were considered by them satisfactory. During the war the French further developed split trail carriages for their

THE FIELD ARTILLERY JOURNAL

new, long, middle calibre field guns; while especially after the war the American constructors favored this construction, too, and—insofar as I can judge from theoretical specifications, designs and photographs—have obtained excellent results. By using the split trail a larger traverse is obtained at the same time as ample recoil room for the gun at great elevation. The Italian split trail field gun allowed elevations up to 70 degrees, which might prove useful when firing at aircraft and at targets at high elevations such as exist in Italy. It is evident that each part of the split trail must be strong enough to absorb nearly the whole of the recoil effort and therefore demands a heavier construction (15 per cent. increase of weight) than a single trail.

The Germans solved the same problem by placing the carriage in firing position on a steel platform with circular track, which was anchored in the ground with five iron stakes. The trail was fastened to the longest stake, which was located in the *centre* by means of tie-rods. The spade became inoperative. Thus they obtained a free field of fire of 360 degrees, which certainly fulfils the maximum requirements. The total weight of circular track, stakes and tie-rods, which had to be transported separately, was for the latest German field gun 140 kg., *i.e.*, 10 per cent. of the piece in battery.

The split trail offers the advantage of a short delay for coming into battery (not much more than necessary for a single trail) and that once in battery the personnel can remain behind the cover of the shields. The circular track system allows of unlimited field of fire; the coming into battery takes more time than a single or split trail system and forces the personnel to leave cover when changing the direction. Test must prove which system will be most practicable for us. Personally I am inclined to give the preference to the split trail construction because it combines allowing of large traversing with great elevations. Its heavier weight may by no means prevent its adoption. Its extreme practicability must be decisive.

As to projectiles, which subject I shall refer to again, part of them should be of modern stream line model in order to get the long ranges.

The weights of the loaded transportation vehicles for the 105 mm. need not exceed 2500 kilograms, thus permitting as well of horse as of motor traction. I shall come back later in the discussion to the traction problem which is here not decisive. The weight of a modern 105-mm. long gun in battery is around 3000 kilograms. This weight is rather heavy for our soil conditions, but experiments with our existing 105-mm. long guns (Krupp, 1913) have not shown that this weight would be unpermissible.

The American constructors have been able to build a long gun of

DEVELOPMENT OF ARTILLERY DURING AND AFTER WORLD WAR

calibre 85 mm.* with a range of 14,000 metres and which of course is lighter and less expensive than the 105 mm. Also its ammunition will be cheaper, that is to say, per round. In connection with this the question may be brought up whether the 85-mm. American gun would not be preferable to the 105 mm. Before answering this question two other points must be made clear. First, whether the 85-mm. projectile will be powerful enough to obtain the results for which the 105-mm. guns are destined. Second, whether the dispersion of the 85-mm. gun shell in range is within the permissible limits in relation to the targets to be destroyed. Before clearing these two points another question must be brought up: What are these targets? My opinion is that we need long-range guns of small calibre (the 105 mm. is a small calibre gun) in the first place for counter-battery work. The matériel losses caused by unopposed artillery fire become excessively demoralizing if one has no means to oppose it. It will be detrimental enough if enemy batteries cannot be engaged because of their being under such cover and camouflage so as to make them impossible to discover. The worst of all is to know the exact positions of the enemy and not have the means to get at him. For this counter-battery work I believe that an 85-mm. gun has sufficient power as well when firing high-explosive shells as when using gas shells. If experimental fire shows that the dispersion of the 85-mm. gun is sufficiently restricted, this gun will be satisfactory for counter-battery work. Another series of long-range targets are: Live targets, either to force them to premature or early deployment or to render impossible to them the use of certain roads, intersections, cantonments, etc. In most of these cases the 85 mm. will do; however, for taking under fire cantonments in which the enemy has already established himself the 105 mm. will prove superior to the smaller calibre. In view of the fact that in this case even the 105 mm. will often prove ineffective too, this superiority will not be of much value. My conclusion is that there are enough reasons to experiment with both calibres before making a decision as to the type to be purchased.

Again I draw your attention to the fact that the weight of the 105 mm. is not decisive. If this calibre proves desirable its heavier weight is of no vital importance. Lower price and greater number of projectiles however are an indication in the direction of the 85 mm.

The development of the light 105-mm. field howitzer has kept pace with the development of the long gun of same calibre. Initially we were satisfied with a range of 6400 metres, but soon the necessity of longer ranges for this useful light howitzer became clear, resulting

* EDITORS NOTE: The United States is not developing an 85-mm. gun.

THE FIELD ARTILLERY JOURNAL

at the end of the war in a German construction with almost 10,000 metres range. This howitzer had a length in calibres of 22 and a muzzle velocity of 427 m.s. (the existing Dutch howitzers have calibre lengths of 12, 14, 15 and 17, respectively); in order to obtain a large field of fire the Germans made use of the circular track system.

Post-war construction of longer range light field howitzers are not known to me; of course longer ranges can be obtained also with split trail carriages. Meanwhile, heavier calibre howitzers have already been built with muzzle velocities which approach the initial velocity of our light Krupp field gun (500 m.s.), so that I cannot see why an increase of range for the 105-mm. howitzer should fail to come sooner or later. Such an increase of range will keep pace with an increase of weight and it depends now on the abilities of the ordnance makers if such weights will be permissible for light field howitzers which must be able to accompany the light, long field guns. We need not be too much afraid of a somewhat heavier construction because a howitzer allows of a more liberal choice of position, the long range still increasing this freedom, and the use of split trail or circular track facilitates the laying of the piece so much that a heavier weight cannot be considered a real hindrance. Only when on peacetime manœuvre is the heavier weight a calamity; let us suffer this calamity bravely in order to have the best possible in war times.

I shall no longer discuss the light field howitzer. A smaller calibre has no place because lighter projectiles fired with small charges and low velocity involve large errors and lack penetrating power when fired on horizontal covers.

Although there exist no prospects of having our artillery newly equipped with heavier calibres, I cannot leave quite unmentioned the enormous progresses of this kind of gun. An extremely successful specimen is the German long gun of 150 mm. which has already been put into service during the war with a range of not less than 22,000 metres. The weight in battery is 5000 kgs., but it was transportable in two loads of respectively 3000 kgs. for the carriage and 3650 kgs. for the gun—transportation vehicles, by all means of acceptable weights for heavy ordnance.

After the war America constructed a 155-mm. gun with a range of 23,000 metres. This rifle is mounted on a caterpillar self-propelled mount, which increases the total weight considerably, but permits of moving the piece through all terrain, if firm enough. We need not tire our brains with the question whether such construction will be practicable in our soft terrain. These grapes are sour. The same consideration prevails for the modern 120- and 150-mm. howitzers with ranges of 11,000 and 12,000 metres.

DEVELOPMENT OF ARTILLERY DURING AND AFTER WORLD WAR

Let us now discuss the ammunition problem and well in the first place the ammunition expenditure in general, and afterwards the ammunition construction and its development.

We all know that after the Russian-Japanese War everyone was prepared to meet in future European warfare an enormous ammunition expenditure. After the end of that war everywhere the stock of ammunition was increased after careful calculation insofar as it was not limited by finances. In our country the financial limits were soon reached; be it acknowledged with gratitude that Minister Colyn obtained some results in this direction. France fixed upon 4000 rounds per 75-mm. gun and entered into the war with a supply of six million rounds of this calibre, 50 per cent. high-explosive shells and 50 per cent. shrapnel. As early as September 12, 1914, there came cries of distress concerning advanced exhaustion of ammunition. No one had ever foreseen such an enormous expenditure and it was still to increase.

With the trench warfare no military movements of any importance were possible without being initiated by a most powerful artillery preparation. Heavy attacks involved an expenditure of rounds which is yet astonishing. For each gun thousands of rounds were brought up and fired. Thus a situation was born which caused to the belligerent governments a constant worry as to how to supply ammunitions, and even ammunition ministers had to be created. One of the principal precautions of our army command must be to take in time of peace the necessary measures to indicate to the various industrial plants what they would have to produce in the event of war, therewith considering minutely the distribution of labor and tasks. Furthermore, it is necessary that even now in full peace time, a war-time projectile be designed, tested and produced of such a character that it can be manufactured in war times in our country with the means available.

Without any doubt we will be forced to water our wine and to adopt a very simple projectile with probably considerably less effectiveness than peace-time projectiles. France, which entered the war with the best high-explosive shells ever made, was forced to be satisfied during the war with cast steel projectiles of considerably less power. But it is a question of having something or nothing, and then the choice is not difficult. Production, immediate production and rapid production is what is wanted, especially for our country which in peace time fires more rounds than we manufacture.

As to projectiles the war caused at first complaints regarding the insufficient effects of shrapnel. Two defects were ascribed to be the origin of these complaints:

THE FIELD ARTILLERY JOURNAL

- a. Unsatisfactory effect against live targets, which were under even small cover.
- b. Difficult control under the enervating influence of a battle and in the hands of reserve officers.

The first disadvantage must be ascribed to the dispute as to the effect in peace time. In order to arrive at the greatest possible results on the target range, in order to obtain the greatest number of hits, the number of balls was increased to the highest allowable maximum, which was only rendered possible by reducing the weight of the balls. I even know of a country where these balls were reduced to 9 grams while France kept to balls of 12 grams, notwithstanding the fact that the latter country had the big advantage of the great velocity of its filled shrapnel.

A shrapnel with too light balls when bursting somewhat high gives a large number of spent balls against which the slightest cover gives protection. Moreover the moral effect of artillery fire, which can be terrific, is thereby lost for the greater part. This factor must be kept in mind not only in connection with shrapnel, but also with high-explosive shells and in the training of reserve officers who must be able to control shrapnel fire well. Therefore it is primordial to allot sufficient rounds to train the reserve officers. This ability was not wafted to us regular officers by the breeze.

For the rest the discredit of shrapnel was due to the trench warfare which made this type of projectile nearly valueless against entrenched opponents, while it was not simple enough for barrage fire because it soon became dangerous for friendly troops. In connection with the above, it is of interest to know that the French, with the revival of the war of movement in 1918, very considerably increased the percentage of shrapnel fire.

As to the high-explosive shell for field artillery, two tendencies prevailed in pre-war times, *i.e.*, one tendency for obtaining as good as possible fragmentation in order to get maximum execution against live targets, and another tendency which wanted a maximum bursting charge in order to obtain a very large local and moral effect. The first tendency found most proselytes in Germany, the second in France. So far as I can determine the latter were in the right. Especially the moral effect, combined with terror, lameness and fright anæsthesia has proved of greatest importance. As a result the French had most respect for the shells of the German field howitzers while the Germans feared most the French 75-mm. shells, which they believed to be howitzer projectiles.

Now it is unfortunate that just the projectiles to which I give so much value, *i.e.*, war-time projectiles, are not apt to contain a very high percentage of explosives, because they will not be forged steel

DEVELOPMENT OF ARTILLERY DURING AND AFTER WORLD WAR

shells and will therefore have thicker walls and less cavity. In order to meet these drawbacks I should like to suggest making war-time shells somewhat heavier than those now in use. The French, too, considerably increased the weights of their projectiles during the war. Now there are several objections against such a procedure, but objections only exist to be overcome; the principle is to get a projectile which is as effective as possible.

In connection with the difficulties for providing for sufficient ammunition in war times, I want to point out the importance for our country of purchasing artillery which can be fired without using cartridge cases. Of course the use of cartridge cases offers many advantages (also disadvantages), but the difficulty of fabrication in war times renders it worth while to accept some disadvantages.

Now a few words on the new shape of projectiles. Formerly longer ranges were not desired so intensely as during the war. The use of long-point bullets for infantry rifles was not meant to obtain better ranges, but only to get a flatter trajectory. These bullets became thereby so light that they quickly lost so much velocity that they were outranged by the heavier round nose bullets at the greater distances. Meanwhile the problem has become vital, especially for those who only possess small quantities of long-range artillery. By sharpening the nose of the projectile and by giving a conical shape to the base and behind the band, less air resistance at the front and less vacuum at the base is obtained which results in increase of range. Thus the existing maximum ranges of field guns could be increased by about 10 per cent. The sharpened nose is in some cases a false nose of aluminum or sheet steel, in other cases it forms a real part of the shell and holds the fuze. A false nose construction allows a more pointed shape, therefore less air resistance and greater range. For low velocity guns the blunt nose shells are to be recommended, the stream line projectiles not offering enough advantage for such guns. I need not emphasize that this problem is most important for us; we are working on the solution which is far from simple, especially as to transformation of existing ammunition. For new ammunition the modern shapes are to be carefully studied and experimented with.

Another vital point in the ammunition problem is the use of new types of fuzes. I mention especially two factors connected with long-range firing. In the first place, firing against air targets, and the necessity of long-range firing with shrapnel and timed high-explosive shell required the construction of clock fuzes, the increase of the number of rings in a common time fuze resulting in too large dispersion. The French constructors had a comparatively easier task. They simply lengthened the spiral fuze train and obtained thereby a longer time of burning with sufficiently small errors.

THE FIELD ARTILLERY JOURNAL

Nevertheless, I consider a good clock fuze preferable, especially from the point of view of standardized manufacture. My objection against clock fuzes is that our country has no industry available for the construction of them.

In the second place the necessity of having a very quick acting contact fuze is felt. The use of shells against live targets, or at the greater ranges, resulting in greater angles of fall and penetration of the projectile instead of ricochet, requires such an instantaneous bursting that there is no time for penetration and no occasion for ineffective splinters. Especially is this quick acting contact fuze indispensable for our country.

One single word yet on the many types of special projectiles, as gas, illuminating, incendiary, smoke, and signal projectiles. The time available will not allow me to go far into details, however important this subject may be. I will only call your attention to the difficulty for the artillery to transport all these types of projectiles, which for several definite cases are, however, indispensable. In the event of a war of movement such transport will prove nearly unfeasible. It would lengthen the columns inadmissably. Nevertheless, the fabrication of these various types must be prepared during peace time.

Now I want to spend a few minutes on the epoch-making subject of long guns of very heavy calibre for land warfare. This again is to be considered as a phase in the struggle for long-range supremacy. If we want to fire above a certain range while retaining a moderate calibre, the muzzle velocity has to be so increased that the resulting gun construction becomes unproportionally uneconomical; the moderate calibre shell has a greatly increasing dispersion and causes a short life of the gun. The only remaining method is to increase the calibre. Therefore coast and naval guns were used after mounting on railroad carriages. Lack of time prevents my telling you more on this subject. I shall speak only a few words on the possible use of this type of artillery for our country.

Our coast defence has a strong inclination—seen the enormous power of modern naval guns—to refrain from permanent coast fortifications, the exact location of which cannot be kept secret and thereby are exposed to systematic and previously studied bombardment. Also we must refrain from permanent coast fortifications, in every place where such fortifications can come under fire of heavy siege artillery, for example on places near the border, because of the possibility of silencing such coast batteries by heavy counter-batteries of which the location can be kept secret. The latter reason seems to me more sound than the first one. Without doubting the enormous power of naval artillery, men-of-war remain very vulnerable targets for modern coast artillery. During the war the allied navies showed

DEVELOPMENT OF ARTILLERY DURING AND AFTER WORLD WAR

a holy respect for coast batteries. So I can understand why we do not build an armored fortress at Flushing and also why we are going to build such armored fortresses at the Bay of Batavia. Whether mobile coast artillery is preferable to well-constructed, permanent batteries for places like Ymuiden and den Helder is a problem which cannot be discussed here.

It must be taken in consideration that modern coast defence on railroad carriages forms for the opponent the unexpected element to be met in every place where he plans to execute an enterprise against the coast line, while formerly the adversary was eventually to be safe from the coast defence, the locations of which were known to him. This element of surprise, combined with the possibility of bringing reinforcement to the place attacked or menaced, makes me inclined toward heavy railroad artillery. However, many difficulties are yet to be overcome. I mention: unfavorable situation of railroad tracks, weak bridges, the protection of railroad artillery against aerial attacks, the drawbacks of reaching an arbitrary point, the difficulties of good fire control, range finding, observation, etc. Many of these difficulties can be overcome, some have to be taken into the bargain, in order to get the other advantages connected therewith. But I want to warn against one thing. This is against a possible hope that the adoption of a railroad coast artillery will mean a cheap system. The defence will become more modern, more difficult to overcome, more generally adaptable, but not cheaper. Heavy artillery is always expensive.

For defensive purposes at the land side eventual reinforcement of the army artillery with heavy railroad guns, using old naval artillery, with insufficient armor-piercing power, seems valuable and useful. No battles will be won by it, but it can support an operation by hindering the enemy at long distances, by rendering impossible the use of roads, railroads, dykes and waterways, and at last by giving a very valuable moral support to our own troops. I cannot recommend it for bombarding cities, etc., at great distances—even if international law would permit it. The effects of such bombardments of Dunkirk and Paris are not encouraging. Before leaving this special subject I wish to draw your attention to the enormous development given to railroad artillery in America, where it is considered to be the principal element for coast defence. I strongly recommend a careful study of what is happening in this direction.

Discussing the development of ordnance and not mentioning the use of fire "*en masse*" as it was done during the great war at Verdun, and afterwards in increasing quantity, is not permissible. Nevertheless, I must pass over the subject, be it only because no new ordnance construction was connected with it, and it is merely to be considered as a technical edification and a tactical application

THE FIELD ARTILLERY JOURNAL

of artillery fire. Moreover our conditions only permit of speculating on this application.

Now I want to mention the bomb-throwers. The Germans after the Japanese-Russian War began constructing very short pieces for firing at very short range an extremely powerful projectile to be used against an entrenched adversary. Notwithstanding, we can not say that the German Army was equipped with such pieces. With the general trench-warfare both parties diligently sought for a good solution of this problem. The Germans, who began with an advantage, were the most successful and constructed three types, *i.e.*, a heavy, middle and small calibre bomb-thrower, all of them short-rifled pieces. The first type fired projectiles of 100 kgs. with a bursting charge of 50 kgs.; the second projectiles of 50 kgs. with almost 20 kgs. bursting charge, and the third projectiles corresponding to those of their field gun. As a result of the short ranges the penetration was not great, the mining effect of the first two types, however, was enormous. The French gave their special attention to the construction of smooth-bored bomb-throwers. In order to meet the lack of rotation the projectiles were provided with a vaned tail. Also they aimed at obtaining longer ranges than were used in most cases (under 1500 metres) and were able to fire successfully up to 3000 metres. As to my own opinion, I could not make a choice from among the existing heavy types. I shall discuss light bomb-throwers later in the discussion, together with the infantry accompanying gun.

Responsive to the rapid development of aircraft, the importance of good anti-aircraft artillery has become a quick-burning problem. Acknowledging that the best defence against aerial danger must remain with our own air forces, these cannot be everywhere, thus necessitating the creation of a first-class anti-aircraft artillery. This problem is too extensive and too specially technical to be discussed here anywhere near fully. I shall restrict myself to pointing out that for these guns the same problem has to be met as for the heavy field artillery, *i.e.*, the calibre problem. The ranges required in our hazy atmosphere can be obtained with 75-mm. guns. Anti-aircraft—for which motor-traction seems to be desirable—does not require the same mobility as field artillery, thereby allowing great length which results in high muzzle velocity. Herewith ordinates of 7000–8000 metres can be obtained, which in my opinion is ample. On the other hand, a heavier calibre—say 105 mm.—has less dispersion while the effective radius of the burst in the air is importantly larger. The lighter gun has the advantage of greater rapidity of fire and a larger number of projectiles for the same price. The question might be considered whether—just as with the long gun—a middle calibre of 85 mm. would not be a good solution. I must confess the fact that the belligerents continually increased the calibre of their anti-aircraft.

DEVELOPMENT OF ARTILLERY DURING AND AFTER WORLD WAR

Also, it is a fact that flyers had much more respect for the heavy projectiles than for the less powerful ones—again a question of moral effect, which cannot be calculated.

A last question is whether the fire control would allow of a greater rapidity of fire than is possible with the 105-mm. gun. If not, in other words, when it is impossible to use the greater rapidity of fire of the smaller calibre, I believe that all advantages are with the large calibre. For the present I feel inclined to prefer the 105 mm. in view of the advantage of the powerful projectile which causes a large danger zone round its bursting point and in view of its greater moral effects.

Now we arrive at the most difficult problem, with which nowadays ordnance constructors are struggling, the problem of the infantry accompanying gun. Before giving our ideas in relation to this subject we must first determine what tactical use is to be made of this gun. This determination is not yet fixed; there still exists too much difference in opinions to give a definite guide to the constructors. Moreover, people are wanting not a sheep with five legs, but one with six.

Recalling the times in which the desire for infantry accompanying guns came again on the foreground (in olden times this type already existed), we see before us those intense long battles, during which the battlefield was ploughed by innumerable shells from all types and calibres, all telephone communications were destroyed and during which the army direction became extremely difficult. All obstacles, falling outside of predetermined plans had to be cleared by the fighting troops themselves. Under these conditions the advance was often stopped by a single machine gun, which happened to escape from the preparatory artillery fire and which was brought into position by its obstinate crew willing to fight to the bitter end. There existed no sufficient communication rearwards to direct our own artillery to destroy such targets and to control the fire that had to be brought accurately on such a painfully small target. This stopped the advance sometimes for a long period; the adversary gained time to recover his breath, to bring up his reserves and the attack was checked. Against this the infantry called for an arm, always available, rapid in action and quickly masked, because without such an equipment all the infantry's bloody sacrifices proved to be in vain.

It is possible to construct such an arm. Already several good solutions exist, which—dependent upon the desired ballistic power—are heavier or lighter either on wheels, on a tripod or on both—on wheels for transport, on a tripod for firing. The commonly accepted calibre is 37 mm. It is, however, to be obtained in any desired

THE FIELD ARTILLERY JOURNAL

calibre. Of course the calibre dominates the weight of the gun and the ammunition.

By simply mentioning the word "weight" we have touched the sore spot of the infantry accompanying gun. Because, where this gun with its ammunition provision has to follow at all times the infantry over all sorts of terrain, it must be light—very light even and the calibre cannot be too great considering that the weight of the ammunition is increasing with the cube of the calibre. This involves that its ballistic power be restricted within narrow limits.

And now a new fiend advances in the shape of the light tanks. The great results of these tanks on the battlefield remain fresh in our memory, and nothing is more natural than the infantry calling for protection against these cars of Juggernaut. The front armor of tanks is not heavier than 15 to 20 mm., but modern armor plate is so resistant that only a rather powerful projectile can perforate it. It is true that we can think of a method of fighting tanks with lighter calibres, *i.e.*, by directing the infantry accompanying guns to neglect the tanks in front and to take under fire those on the flanks. But the shirt is nearer to the body than the overcoat. What is possible during a previously organized defence, becomes most difficult during an attack, stopped by the sudden action of tanks. It has not yet been determined whether the penetrating power can be increased by specially constructed armor-piercing shells.

But there is more. Long, light guns have little or no effect on an unentrenched adversary which displays suddenly a machine gun, fires and disappears again before the accompanying gun has had time to come into action. Against such targets and also against machine-gun nests, the position of which is better covered, we need a curved fire gun. Therefore our new army organization mentions two types of arms, *i.e.*, a long, light gun of 37 mm. and a light bomb-thrower. The first to accompany the infantry in the front lines, the latter to remain behind a few hundred metres, being able to fire from behind cover and remaining sufficiently under control of the infantry commander.

One should say that herewith the problem is solved, but there remains still the insufficient power against tanks. Moreover, experience has taught that too far advanced 37-mm. guns suffer very much from enemy machine-gun fire. This is clear. When venturing oneself with artillery in the foremost lines, its position becomes known as soon as firing is opened. Of course the machine gunners will not neglect anything to silence their natural enemy, the accompanying gun. Where the bundle fire of the machine gun allows of a quicker search than the single shots of a gun, it is probable that the gun will lose the duel. I must be careful because the 37 mm. is a beautiful manœuvre gun and therefore very attractive.

DEVELOPMENT OF ARTILLERY DURING AND AFTER WORLD WAR

From different sides the question arises if it would not be better to adopt a combination gun, which would become somewhat heavier, which could be disassembled in a number of light packs, and which could fire either direct or from behind cover. This would result in some sort of light mountain gun. I also share the opinion that it would be advisable to search for the solution in this direction. In this connection I want to refer to a clearly written article of Lieutenant Breunese who puts the problem in the right light, in the *Military Spectator* of October last, although he does not give proper consideration to eventual curved fire. Again I have to give a warning, *i.e.*, against demanding too much. Let us not join those who say: give to the infantry a good gun, then we can do without light flat trajectory field artillery. Whoever says so forgets the origin of the call for infantry accompanying guns and also that such a gun, if powerful enough, accompanied with sufficient ammunition, becomes impossible. Then it must be left behind and it again becomes field artillery. The problem under consideration is, and remains, a fruitful subject for study. May many feel called to shed their light upon it.

Now we come to the problem of traction. I had to touch this subject several times earlier in the discussion because each subdivision of artillery is so closely linked to it. Several causes gave birth to the traction problem:

- a. The decreasing number of horses, as the result of commercial motor transport;
- b. The danger from gas, horses being as sensitive to gas as men and not being so easily protected by masks;
- c. The increasing weight of mobile artillery;
- d. The requirement to advance artillery over all terrain.

Let us especially consider the last cause. When motorizing the artillery we may not content ourselves with a motor-traction simply replacing horse traction, but we must endeavor to get every advantage out of motorization. We all know that a motor truck is a vehicle for the hard roads, which outside of such roads soon fails. Artillery transport on or behind motor trucks, therefore, only permits a restricted use of artillery. There exist motor vehicles able to take all terrain if sufficiently supporting. I mean the caterpillar. Carrying as well as pulling, caterpillars can bring enormous loads anywhere. Swampy land too soft for caterpillars cannot be crossed by horses, not to speak of motor trucks.

Now track-layers are not yet infallible, but enormous progresses are being made. The American built "Caterpillar" has perfectly flat track-shoes, clad with rubber, which do not injure the surface of the road. This caterpillar appears to be for the time being the

THE FIELD ARTILLERY JOURNAL

artillery motor vehicle. However, its practicability for our country must be proven by experience. Another important point is the question whether such vehicles will be available in sufficient quantities during time of peace. I do not hesitate to declare, that in case the caterpillar proves to be suitable for artillery, this Government shall find it a motive to encourage and to further the use of caterpillars in this country, in the same way it encourages horse breeding.

America has constructed self-propelled mounts for several calibres. The weight of such a combination is rather heavy, but the bearing surface is so enormous, that the pressure per unit of surface is less than that of horse traction. To what extent our bridges will stand caterpillars must still be determined. If a lighter weight is necessary, the gun must be drawn behind a tractor. As to the speeds, these are variable, and the maximum speed—depending upon the type—generally exceeds by far the speed of draft horses. In order to bear the strain the carriage wheels must have rubber tires or the guns must be mounted on spring-supported carriages, which springs must be rendered inactive when firing. Here also it is a question of "testing."



CLIMBING MOUNT PINATUBO

BY CAPTAIN F. B. INGLIS, 24TH F. A.

Mount Pinatubo is a high peak heretofore generally considered inaccessible. It is located near the post of Stotsenburg, Philippine Islands.

ON February 27, 1923, a detachment of the 24th F. A. (P.S.) under command of Captains F. B. Inglis, R. Campbell, and R. C. Snyder, reached the top of the highest peak of Mt. Pinatubo. This was repeated on the next three days, so that by March 2nd all soldiers of our party (29 in all) had made the climb.

In preparation for the actual ascent, Captains Campbell and Inglis, in November, 1922, took six soldiers and a small pack train and spent four days laying out a suitable route for a trail from Camp Stotsenburg, toward Pinatubo. This expedition reconnoitred a trail from Camp Stotsenburg south to the Dry Pasig River, thence west one mile on the Dry Pasig, thence northwest and west through a narrow canyon to a high plateau above the Bamban River, at a distance (by this trail) of thirteen miles from Stotsenburg. From about the point where the trail made by this party leaves the Pasig, heavy cutting of brush was necessary the entire distance to the Bamban River. This expedition succeeded in making a trail suitable for pack train use, as far as the top of a high plateau about 600 feet above the Bamban.

During the Christmas holidays Captains Campbell, Snyder, Hirsch and Inglis (all 24th F. A. (P.S.)) took a pack train of 68 animals, with 25 soldiers, and spent five days building a trail from the top of the high plateau to the Bamban and there built Camp Three, with a large corral. At one place this trail comes down the face of a 200-foot cliff; in another a deep cut was made in a 50-foot cliff, to reach the Bamban.

A third trip, of two days' duration, was made in January, 1923, by the same officers. On this expedition the trail was greatly improved, and in two places steep hills were avoided by the discovery of other trails leading around them. On this trip the party proceeded on foot up the bed of the Bamban River to the fork of the river, about two and one-half miles west of Camp Three. It was then decided that the best avenue of approach to Pinatubo lay either up the south branch of the Bamban or overland near it.

On February 23, 1923, having received orders to spend ten days in hunting and reconnaissance toward Pinatubo, Captains Campbell, Snyder and Inglis, with 29 soldiers, all 24th F. A. (P.S.), and 62 animals, left Camp Stotsenburg over the trail prepared on the three preliminary trips. A radio telephone-telegraph outfit (SCR 109 set)

THE FIELD ARTILLERY JOURNAL

was taken along, partly to use in case of emergency, such as injury of a member of the party, and partly to test this set by packing it (including six storage batteries and a dynamotor) on mules, over very rough trails and through the jungle. This radio set was set up at Camp Three, and was in communication with Stotsenburg during the entire ten days. At the end of the first five days, six more batteries were packed out to replace the exhausted batteries, which were sent into Stotsenburg to re-charge. This radio set is equipped with delicate vacuum tubes; it stood up over a 13-mile trip on a very rough, mountainous trail. The six wet batteries were packed three each in two home-made crates, one on each side of a mule and traveled very well, only a very slight quantity of the electrolyte splashing out.

On February 24th the detachment (less five men at the radio station and two remaining at Camp Three to care for the horses, which were left behind, as they could not carry a load up the bed of the Bamban) proceeded, with the pack train, to Camp Four, and there made camp for the night. That afternoon a reconnaissance of trail was made, and a way to proceed further then decided upon.

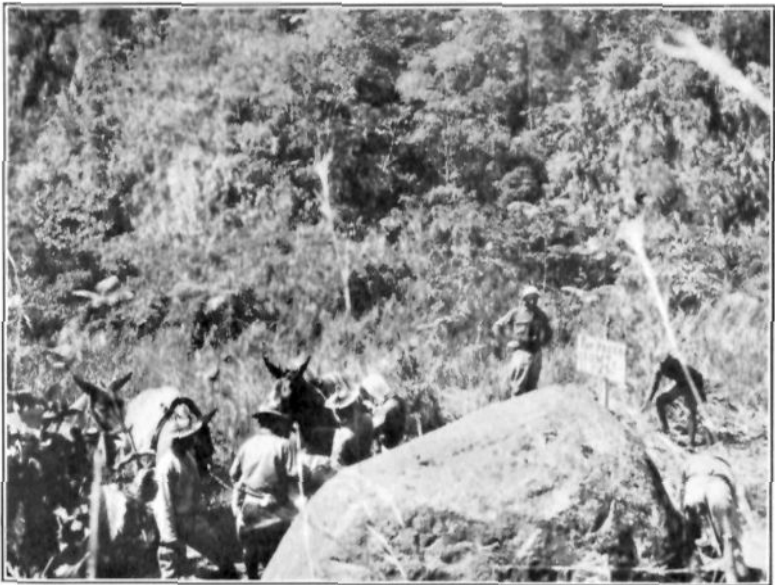
On February 25th, leaving five soldiers at Camp Four in charge of animals and supplies, the party crossed the Bamban River and proceeded west up a narrow canyon up a steep hill, thence in a general westerly direction over the hills toward Pinatubo. All officers and men carried forty-pound packs, made up of food, blankets, clothing, shelter tents, several hundred feet of half-inch rope, cooking equipment, signal rockets, and canvas panels. Each carried a bolo and of course toilet articles. After about five miles on the trail, the party was met by Sergeant Sanchez, who had gone on ahead the day before to find a good place to camp at the foot of Pinatubo and to try for a deer. He brought the information that he had found a camp site with good water, and had shot a deer.

The party reached the camp site at 12:50 P.M. and made camp in an open pass just at the foot of Pinatubo on the south side. This pass leads easily into Zambales from Pampanga so we named it "Zambales Pass." After lunch, Captains Campbell, Snyder and Inglis climbed to the top of the long cogon-grass covered slope on the south shoulder of Pinatubo, cutting a trail through the cogon grass, which is from 6 to 12 feet high. The slope is about 65 degrees from the horizontal, and ends at the top in a vertical drop of about 400 feet to the bottom of a large canyon which runs out on the west and south side of the mountain. The party returned to the Forward Camp at the base of the mountain for the night.

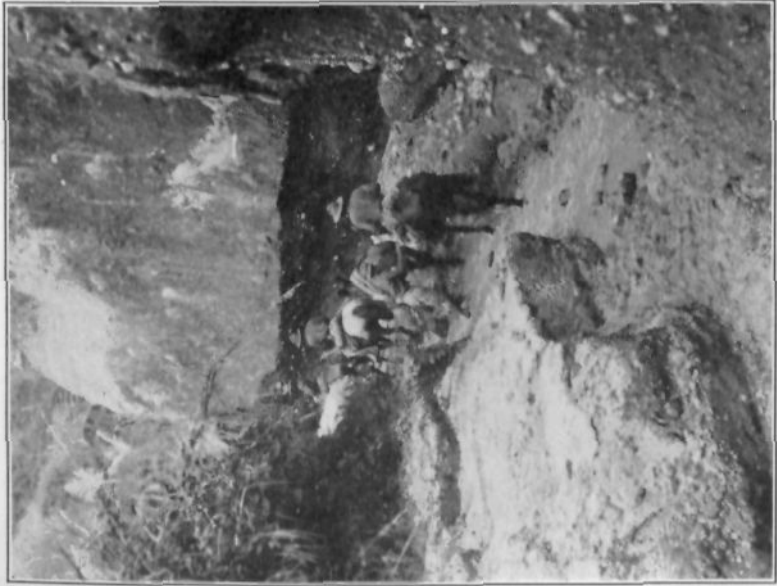
On February 26th the officers, with six soldiers left camp, all carrying packs weighing about 20 pounds, consisting of food and blankets, also two canteens of water and a bolo, as it was planned to



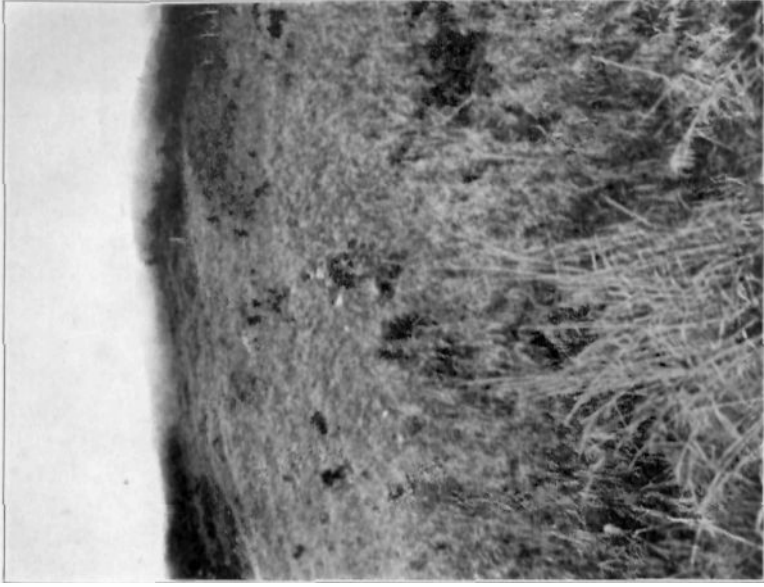
TRAIN CROSSING THE DRY PASIG RIVER



ON THE BAMBAN RIVER
About two thirds of the way to Pinatubo.



GOING UP THE BED OF A STREAM ON THE TRAIL TO THE MOUNTAIN



LOWER SLOPES OF PINATUBO. THIS IS THE SOUTHWEST SIDE

Party can be seen ascending.

CLIMBING MOUNT PINATUBO

spend the night of February 28th on top of the mountain. Upon reaching the top of the cogon-grass slope, a trail was cut through a dense growth of trees and brush, along a very sharp knife edge about the same elevation as the top of the cogon-grass slope. This knife edge heads into a saddle about 100 yards across, with a vertical drop of about 600 feet on the west side, and a very steep (in places vertical) tree-covered slope on the east. After crossing this saddle, trail was made up a vertical cliff about 20 feet high. At this point an airplane was heard. It flew over our Camp Four, but then returned to Stotsenburg. The slope became increasingly steep, but luckily was covered with a heavy growth of trees, which aided considerably in climbing. At one point a vertical cliff 50 feet high was encountered. It was climbed by going up on small roots and two small trees growing on it; then a rope was tied to a tree at the top, making the ascent easy thereafter.

At 12:30 P.M. the party reached Peak One of the mountain, and climbed it. The top was nothing but a large tree, so heavily and completely covered with moss that it looked like solid ground. From the top of this it was seen that there was a still higher peak about 50 yards farther north. The party proceeded to this peak (No. 2) and found it had vertical walls all around. At one point, at the southeast corner, there was a narrow crack in the rock face. One man climbed up this chimney with a rope, which was tied to a tree, and the rest of the party climbed up (about 50 feet). It was then found that there was a still higher peak further to the north, and another high one about 200 yards to the east, across a deep, narrow, tree-filled ravine. It was by this time 1:15 P.M., so we returned to camp, as there was not time enough to make a trail to the top of the next peak and get back to camp before dark, and the trail was too dangerous to attempt except in daylight. On the west side of Peak No. 2 is a vertical drop of about 1000 feet to the bottom of the gorge mentioned before. On the other three sides the peak is from 50 to 100 feet high. The top of this peak is about ten yards from north to south and two yards east to west.

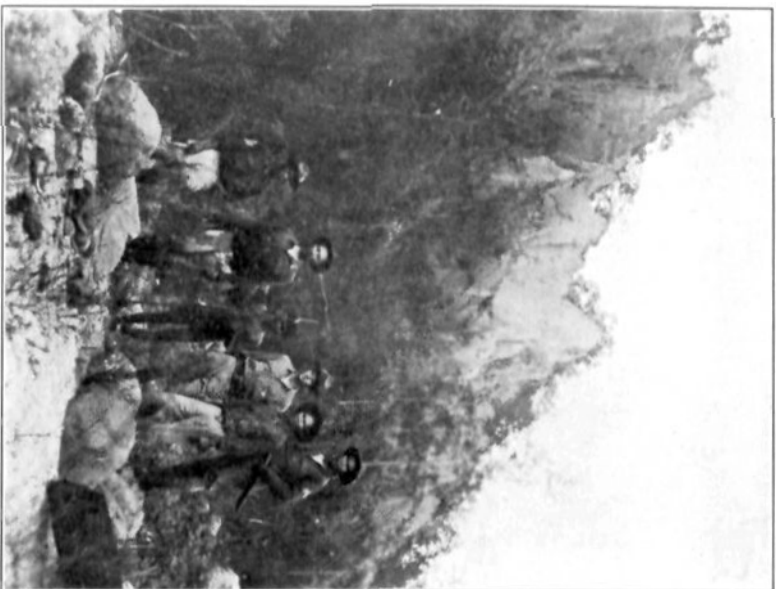
Next day we cleared Peak Four at 11:30 A.M., putting in ropes at two places to get down onto a knife-edge ridge about 150 yards long, running north from Peak Four to Peak Six. This knife edge is of rock, varying in width from three feet to three inches. On the east side of it there is a practically vertical drop of about 2000 feet to the gorge where the Bamnan River rises. On the west side is a slope of 80° to 85°, a drop varying from 100 to 1500 feet. On this side the slope is fairly well covered with small trees, ferns, moss and bushes. The east slope, or cliff, has only small ferns and a plant which consists only of large leaves growing from the ground. This knife edge is partially visible from Camp Stotsenburg; its south part

THE FIELD ARTILLERY JOURNAL

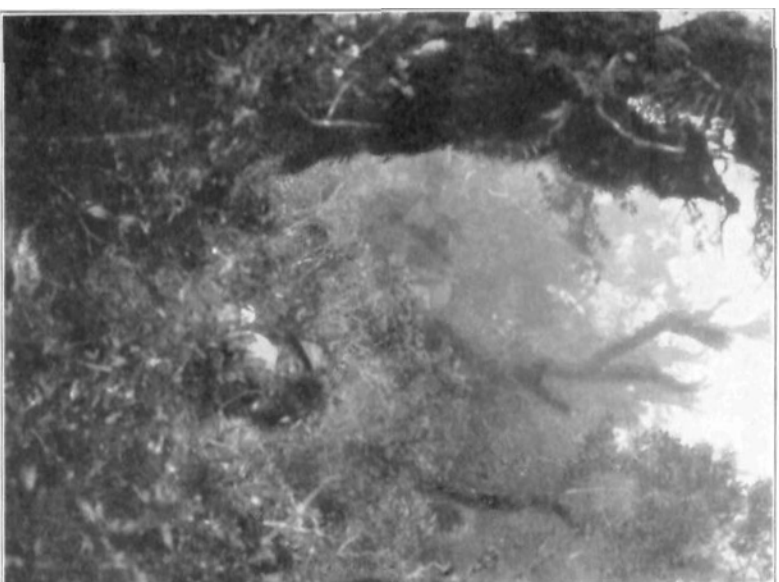
is hidden by a peak to the east of Peak Three, which we called Peak Four. The north end of the knife edge can be seen as a small notch just south of the highest peak. At the north end of the knife edge we climbed a steep slope through dense underbrush and trees about 12 to 15 feet high, and came out onto the open top of the highest peak at 11:50 A.M.

After eating lunch, notes and sketches were made, the day being very clear. About 25 miles west the China Sea could be seen, from the vicinity of Subic Bay north to the limit of eyesight. Two islands were visible southeast of us, about straight west of San Marcellino. Subic Bay was plainly visible; east of it the entire range of the Mariveles Mountains could be seen; then Manila Bay and all the country east and north. We could distinguish the larger buildings at Camp Stotsenburg and Clark Field. The Bamban, Second and Third River valleys could be seen; also the O'Donnell and Tarlac Rivers. A small river rises at the foot of Pinatubo on the north side, and flows to the north. This river is a deep orange-yellow in color. The top of Peak Six is about twenty yards long, north to south, and two yards from east to west. On the east side there is a nearly vertical drop of perhaps 2000 feet to the Bamban; on the north, the same formation; on the west, a narrow knife edge runs over about 50 yards to a needle-pointed rock perhaps 10 feet high, with on its west side a 40-foot drop into a small rocky ravine, out of which we climbed to the base of the large tooth-shaped rock, then up the rock, which is about 75 feet high on the east side, 50 feet on the north, with a 1500-foot, nearly vertical cliff on its southwest side. Only the north face of this rock can be climbed. It slopes at an angle of about 65°, and is slightly rough, affording hand holds. We climbed this rock hurriedly, then returned to Peak Six, as we hoped an airplane would fly low over us to identify us. As none came, we returned to camp at about 3:00 P.M.

On February 28th we again climbed to Peak Six, and after some difficulty succeeded in building a large signal fire, with much smoke. The day was very cloudy, with only short occasional glimpses of Camp Stotsenburg through the clouds. A strong wind blew from the east, and it was very damp and cold. We put in the time by cutting off the brushy tops of the trees on Peak Six, so that the top line of the Peak would look like a straight, level line, as seen from Stotsenburg. At 2:00 P.M. an airplane flew over us, about 100 feet up, then headed south and east and flew through Zambales Pass over our camp. It then went back to Stotsenburg, and returned once again a little later. We caught a few glimpses of it through the clouds, and each time fired a signal rocket; but apparently we were not seen. At 3:45 we started for camp, which was reached at 5:45 P.M., when we found that three thirty-pound packages of food had been dropped by the



CAPTAIN CAMPBELL, ON THE LEFT, CAPTAIN INGLIS ON RIGHT. A
BALUGA GUIDE BETWEEN AND THREE NON-COMMISSIONED
OFFICERS OF THE 24TH F. A. (P. S.)



ON TOP OF THE MOUNTAIN CLIMBING THROUGH THE MOSS
COVERED TREES
On some of the rocks the moss is 18 inches thick. It is impossible to walk on
the ground.



TRIBE OF NEGRITIOS, OR AS THE FILIPINOES SAY, BALUGAS
These are the men of the largest group we found.



BALUGAS (NEGRITIOS) WHO ACTED AS GUIDES
The centre one was allowed to wear the belt, holster and gun for the picture.

CLIMBING MOUNT PINATUBO

airplane. This saved us considerable hard packing over the uphill pull of about six miles from Camp Four, our base camp. The food was dropped by Lieutenant Gravely, A. S., in answer to a radio message we sent in from our radio at Camp Three. This message was also sent in from our forward camp in the hands of Corporal Laquindanum, Headquarters Battery, 24th F. A. (P.S.), who left camp at 5:30 A.M. and reached Headquarters, 24th F. A. (P.S.) at 12:10 P.M., a fast trip.

Our trail from Stotsenburg to the base of Pinatubo passes within sight of about 15 or 20 Baluga houses, all occupied. On one of our preliminary expeditions to Camp Three we went for about three miles over a very difficult trail to a Baluga barrio of about fifty people, living in six houses. All other Balugas in that part of Pampanga live by themselves, not in barrios.

These Balugas are all under control of a Filipino named Lamonlon, who lives on the Dry Pasig just at the top of the cliff where our trail crosses to the north, perhaps three miles southwest of Sapang Bato. This chief was appointed by the civil governor of Pampanga, we were told. He speaks Spanish but no English, owns 300 carabao and a very good house in Angeles. He seems to have complete authority over all the Balugas in the Pinatubo area.

These mountain Balugas are perceptibly better developed, brighter and more courageous and dependable looking than the tribe of which Lucas and Paulino are chiefs, near Stotsenburg.

The mountain Balugas have very well-developed leg muscles and their chest and arms are quite well developed. Most of them file their teeth. Many shave the hair in a circular spot about six inches across, around the top-knot, leaving a fringe of kinky black hair around it. Both this and the tooth filing is entirely a matter of personal taste with them. In the same family are found filed and unfiled teeth, shaved heads and long hair. Skin diseases are quite prevalent, probably because the Balugas never bathe, except accidentally when they wade a stream. They claim they do not bathe because to do so would make their bodies tender so that cogon-grass, thorns, etc., would cut them. Also they say they would catch cold. To avoid catching cold many of them wear a necklace of small cord, on which are tied three sticks half an inch long which they say prevents colds. They also claim it will prevent death from snake bite if rubbed in the wound.

All Baluga men and boys, except the very young boys, always wear a gee-string of twisted red or blue cotton cloth, and nothing else, unless one happens to be rich enough to own a shirt, when of course he wears it. All carry a light, keen, sharp-pointed bolo about 15" long, with a thin blade and, usually, a nara handle. These bolos are for hunting and fighting only, and are never used for brush cutting.

THE FIELD ARTILLERY JOURNAL

Some are as sharp as a razor as was demonstrated by one Baluga on his own beard. Nearly all Baluga men carry a long bow (usually from 5 to 6½ feet long) of polished palma brava, with a string of tightly twisted bark, and arrows from 24 to 48 inches long, of tiggao, with neatly shaped sharp heads of iron of various designs, depending upon whether they are to be used for fighting, or for deer, pig, or chicken. Usually about six or eight arrows are carried in the hand with the bow. At short distances these Balugas are quite accurate shots, but cannot do so well as we can with a revolver, at any range.

Many of the Balugas seemed to have eye-trouble, due probably to infection from dirt, and to living in a tightly shut house at night, with a smoky fire going to keep them warm. We saw only one really gray-haired Baluga. We were told that when all of a Baluga's relatives die, he is at once killed by the rest of his tribe, possibly to cut down on the number of mouths to be fed, as then he has no one left to avenge him.

Each Baluga house has its small fields of camotes, sometimes a little rice, a few papaya trees and possibly even some pineapples. These fields are most frequently on nearly vertical hill slopes, and usually well-concealed in almost inaccessible places.

We found all these people very friendly and trusting, probably because the first time we went to Camp Three we stopped at Lamonlon's house and got two Baluga guides, who probably vouched for us as we went along. At every camp Balugas always came in and sat around waiting for meal time and free food, in return for which they were always willing to bring in firewood, water, air-plants, etc.

On the trail, Balugas always sing in a pitched tone as they walk along, so as to let any other Balugas know that they are coming openly, not sneaking up stealthily to kill. On our first expedition, our two Baluga guides sang of the wonderful things they had seen us doing that day, from 6 P.M. until 1:00 A.M. In turn, they would sing a few words in a high-pitched tone, then drop to a low monotone for a sentence or two; then wait a few seconds and repeat the performance. While these Balugas were thoroughly friendly with us, they are wholly savage, and we believe they would be untrustworthy if one happened to be found by them, alone and unarmed, in the hills.

WEAPONS

Two shotguns and a Winchester .401 were carried for hunting purposes. Two of the officers carried the Colts' .45 calibre New Service revolver, and several of the soldiers carried the Colts' .45 automatic. The automatic is not dependable on a trip of this kind,

CLIMBING MOUNT PINATUBO

due to dirt, leaves, sand, etc., getting into the mechanism and causing jams. The revolver is entirely dependable. Every member of the party carried a good native bolo, carefully sharpened. The issue bolo is found to be worthless for any real use, being poorly balanced, with a poorly designed handle, heavy, of inferior temper and especially, it has a very badly shaped edge, being beveled only on one side of the blade, the bevel being very short and rounded. Most members of the party also carried a light, keen hunting knife, which was found to be very useful.

VEGETATION

The trail passes through average tropical country until it reaches the Forward Camp. After leaving the Dry Pasig the trail runs through jungle almost continuously with three open, rolling, cogongrass plateaus. The jungle is made up of large trees of various kinds, and heavy undergrowth of smaller trees, bamban, bamboo, and vines, also wild hemp and wild bananas.

Considerable bejuro is visible along the trail, and on the part of the trail from Camp Four to the Forward Camp are quantities of bejuro which grows like a vine. At times single pieces are several hundred yards long.

On Pinatubo itself the type of vegetation changes. There is no bamboo on the mountain, except, on the lower slope, a very few small, vine-like pieces were seen, not over six feet long and one-eighth inch in diameter. No banana nor hemp plants were seen on the mountain. On the upper two-thirds of the mountain the trees, while large in trunk and branches, had few small branches, which was probably due to the prevailing high winds. The trees are covered with heavy, dense growths of moss, even the smallest twigs sometimes having a six-inch growth of moss on them. The trail in many places on top of the various peaks of Pinatubo, goes for a hundred yards or so through tree tops which are heavily overgrown with moss two feet thick, which supported our weight easily. The moss is of many different and beautiful varieties. One kind was especially noticeable, as it grew only on the top of the highest peaks. It looked like a very small pine tree, with light green tips on the branches, like small pine cones. Another unusual moss grew in deep soft beds on the peaks, especially in the fissure between peaks Three and Five. This moss is very soft and feathery, varying in color through white, light green, yellow and light brown.

A light blue grass flower, with five petals and yellow stamens, apparently the same as the grass flower found in the Mississippi Valley, was quite frequently seen on the peaks, especially on Peak Six. The tree which covered the tops of all the peaks to the exclusion of practically all other kinds is a short, bushy tree, the leaves and

THE FIELD ARTILLERY JOURNAL

flowers of which strongly resemble the mountain laurel found in New York State. The tops of all the peaks of Pinatubo except Peaks Six and Seven, are covered with this tree. Peak Seven is a solid rock, with only a few small ferns and a little grass growing in crevices on the lower part. Peak Six is covered on top with two or three feet of moss, and on the south, west and north edges of the top, with the laurel-like tree. On the east face of Peak Six are great masses of a plant which consists of round green leaves about six inches in diameter, on bright red stems about 15 inches long, which grow on a one-inch stem in the ground. This plant, with moss and a few ferns, covers the entire north and east faces of the highest part of Pinatubo. The west side is covered with a dense growth of the laurel-like tree.

GEOLOGY

The trail from Camp Stotsenburg to the Dry Pasig is in general through dirt and clay; from there on the formation is mostly rock and sand. The rock is apparently granitic gneiss, with a great deal of volcanic ash. The lower slopes of Pinatubo are mostly small rocks (gneiss), sand, and volcanic ash. The sides of the deep ravines and all peaks of the mountain show solid masses of gneiss, with many large detached fragments and crevices.

To a cursory examination only, no traces of valuable minerals appeared, except that the water of the small river which rises at the north base of Pinatubo (possibly a branch of the Bukao River of Zambales) is a bright orange-yellow, which might seem to indicate the presence of some iron ore. The water course of the Bamban shows some finely divided mica and iron pyrites, or "Fools' Gold."

TOPOGRAPHY

From Stotsenburg to the Dry Pasig, the trail traverses comparatively level country, except for three ravines perhaps 100 feet deep. From the Dry Pasig to Pinatubo the trail traverses very rough terrain, apparently of volcanic origin with many steep, high hills and deep canyons.

Pinatubo itself rises as a high peak with nearly vertical cliffs on all sides except for a very steep nose or knife-edge ridge running down to the east from Peak Five; one a little gentler in slope running down to the south and southwest from Peak One (our trail ascends this nose), and a knife edge running north from the canine-tooth peak (Peak Seven). On the east side of Peak Six is a canyon perhaps 2000 feet deep, which runs out to the east and southeast, with a fairly high mountain on the east side of it. This canyon is the course of the Bamban River.

The nose or ridge up which our trail runs is by far the most

CLIMBING MOUNT PINATUBO

practicable route to the top of the mountain, and is quite easy. We were able, after having made the trail, to ascend to the top of the highest peak from camp, in two hours and forty minutes, and to descend in one hour and twenty minutes.

MAPS

The area including Pinatubo, from our Camp Two near the Dry Pasig, to near the coast of the China Sea in Zambales, has apparently never been mapped. We had a topographer, Corporal Pedrenai, Headquarters Battery, 24th F. A. (P.S.), with us on our trip, and he made a three-inch sketch of our route, and of Pinatubo and Zambales, on the trail to San Marcellino. However, upon checking this map, we find it too inaccurate as regards contouring, to be of any practical value.

AIR—WINDS

The air is slightly rarefied on top of Pinatubo; it was noticeable while climbing. A cold night wind springs up every evening at about sunset. It blows from the east all night long with a velocity of perhaps 10 to 20 miles per hour. On top of Pinatubo an east wind seems to blow continuously (at least at this time of year). Velocity varied during the time we were on top, from 15 to 40 miles per hour, usually about 25 miles per hour. Judging from the number of large uprooted trees and broken branches, the wind must at times attain very high velocities there.

CLOUDS

The peaks of Pinatubo are usually hidden by clouds, except during the dry season, when the whole mountain can usually be seen during the forenoon. A cloud cap forms during the afternoon. In the rainy season the mountain is practically never visible. When in the clouds while we were on top of the mountain, it was cold, very damp, and rather dark. The clouds are carried by the east wind against the east face of the mountain, and then shoot upward on a swiftly rising air current, and pass over the top at a high rate of speed. The clouds seem to be formed by the condensation of the moisture carried in the warm, rapidly rising air currents from the hills east of Pinatubo. When this warm air reaches the cold layers of air around the peaks of Pinatubo, the moisture is condensed into clouds.

TEMPERATURE

Even in the day time at the Forward Camp it was perceptibly cooler than at Camp Stotsenburg. On top of Pinatubo it was still cooler. Whenever clouds obscured the sun it was uncomfortably

THE FIELD ARTILLERY JOURNAL

cold. At night the temperature at the Forward Camp was estimated to be about 55° F. We slept in all our clothes, with an extra O. D. shirt, and rolled up in two blankets apiece, sleeping in a tent with a large fire burning close in front of it all night long. With all that we were chilly.

INSECTS, ANIMALS, SNAKES

On the trail en route to Pinatubo the usual insects are found—many ants, especially on bamboo. They are not especially annoying, as they never seem to bite. A few centipedes are found, and some spiders and bugs. Two or three horses and a few men have been stung by bees, usually when riding through camote patches.

Only one snake was seen by our party anywhere near Pinatubo. It was nine inches long and of the diameter and appearance of a horse hair. It was found in the spring at the Forward Camp. One or two small and apparently harmless snakes have been seen along the trail between Stotsenburg and Camp Three. None was over two feet long.

Pinatubo itself is surprisingly free of insects. No snakes were seen. Droppings and tracks of wild pigs were seen about half way to the top. Sergeant Sanchez, the hunter for the expedition, saw several deer and wild pigs, and killed one deer. He said the game was scared out by our party.

DIFFICULTIES

Officers and soldiers in ordinary physical condition can make this trip, including the climbing of the mountain without undue fatigue or difficulty. No preliminary training should be necessary, assuming, of course, that anyone undertaking the climb is normally strong and healthy, a fair rider accustomed to hill trails, and a good packer. It is not considered advisable for women to attempt this trip.

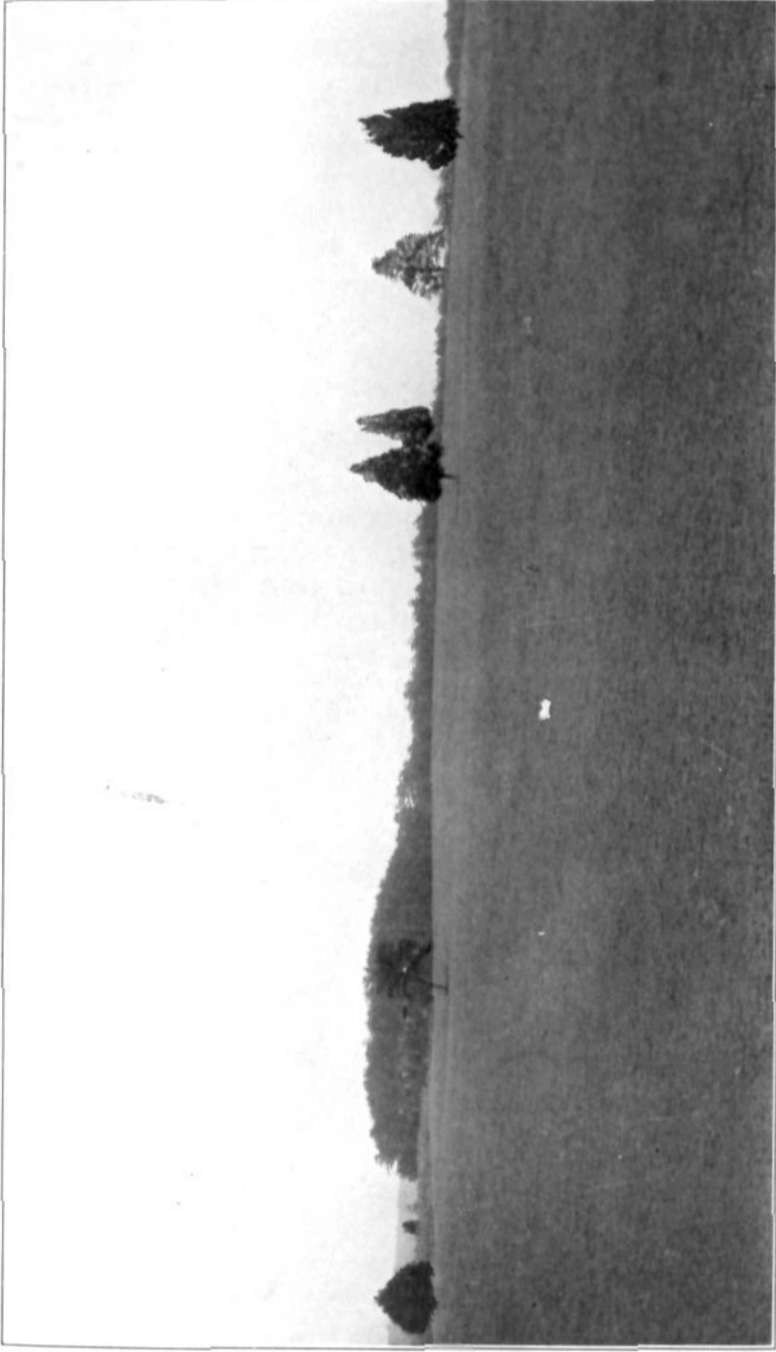




A BALUGA



CLIMBING UP BY ROOTS, VINES AND BRANCHES



BULL RUN BATTLEFIELD

The small marble slab in the foreground marks the front of Rickett's and Griffin's Batteries, firing almost point blank into the Confederate Line near the cedar trees in front. While standing at the slender, notch-topped cedar, Thomas J. Jackson was wounded and earned the name, since known to fame, of "Stonewall."

OBSERVATIONS UPON THE EVOLUTION OF FIELD ARTILLERY CONSTRUCTION AND EMPLOYMENT

BY JOSEPH MILLS HANSON, F.A., O.R.C.

(A PAPER PREPARED FOR DELIVERY BEFORE THE OFFICERS OF THE 147TH FIELD ARTILLERY,
S.D.N.G., JUNE, 1923)

IN undertaking the following historical survey of the development of field artillery in construction and employment, it should be made plain at the outset that no highly technical study is to be attempted. Such a study would be not only presumptuous on the part of the present writer, but impossible within the permissible limits of this discussion. It is, rather, merely an effort to present to soldiers, many of whom have had a varied and intense, even though brief, experience in the actual handling of field artillery in modern warfare and who, from patriotic motives, are maintaining their proficiency with the arm so far as possible in days of peace, a very abbreviated outline of some of the salient features of field artillery history which seem of possible interest in connection with problems of the present. As for the facts presented and the deductions made therefrom, it can only be said that for his data the writer has availed himself of the best authorities which happened to be at his hands, while his conclusions are merely his own and made in a spirit of inquiry rather than of finality.

So much having been said by way of limitation, the following statements are set forth in the belief that they are basically true concerning field artillery in general:

1. That field artillery is not, and never has been, an arm capable of independent action, but is an auxiliary, and the most powerful of all auxiliaries, to the infantry.

2. That, though useful in many minor capacities, the true chief function of the field artillery is, in the offensive, to assist the infantry in driving home a successful attack; in the defensive, to assist the infantry in repulsing the attack of the enemy.

3. That, for the accomplishment of the above objects, the mission of the field artillery has always been the mission which is today defined in the latest "General Instructions on Field Artillery Firing" of the French Army, as, "sudden, complete and brutal destruction" of the enemy. This was as true in the days of Gustavus Adolphus or Napoleon as it was in the World War, though it was not always so clearly recognized.

THE FIELD ARTILLERY JOURNAL

4. That the methods of bringing the fire power of the artillery to bear at the decisive point and the decisive moment have changed with the years, but that the principle of doing so has never changed. And, therefore,

5. That the study of the tactics of skilled artillerists, of no matter how remote a period, is never wasted effort, providing that due allowance is made for progress in the mechanical means of bringing fire power to bear on the enemy; in other words, remembering that results which could be accomplished with the short-range weapons of one hundred or two hundred years ago only by the bodily presence of the guns at the point of contact, are accomplished with the long-range guns and highly perfected laying apparatus of today by placing the sheaf of fire, instead of the guns themselves, at the point of contact.

With the above statements as a basis, we may proceed to take a sort of bird's-eye view of a few facts in the long and exceedingly interesting chronicles of the field artillery, which seem pertinent and useful to the field artilleryman of the present who is prepared to regard a broad familiarity with the history of his profession as one of the most useful adjuncts to the successful practice of it. It need hardly be pointed out that what little can be said here is merely suggestive of the rich material which study can unearth and reflection assimilate in the records of past conflicts.

Though various forms of engines for hurling projectiles, usually depending for their propulsive power upon some application of the elastic force of twisted cords or bent wood, existed from the earliest known times, it was not until the introduction of gunpowder into Europe, about the year 1320, that artillery in its modern sense came into being. Even then, it was nearly three centuries before a real field artillery was evolved from the cumbersome and heavy weapons which up to that time were useful as a rule only at the siege of fortified places. It would be interesting but not particularly profitable to follow the development of artillery through those long years. It will be sufficient to say that during many generations the service of cannon was entrusted not to soldiers but to artisans, who carried on their work as they would carry on any other trade; that the best method devised for transporting guns from place to place was that of laying the tubes on wooden platforms which were dragged about by anywhere from 16 to 36 horses, depending upon the size of the piece, and that when so-called field guns were set up on the field of battle, they were so unwieldy that they had to remain where first placed, being incapable of either following up a victory or joining a retreat, so that the artillery of a defeated army invariably fell into the hands of the victors.

Merely as a curious illustration of the slowness with which such guns could be served, it may be worth while to quote the orders by

OBSERVATIONS UPON THE EVOLUTION OF F. A. CONSTRUCTION

which a single shot was fired by a gun of the English Army of those days. They were 13 in number, as follows:

1. Put back your piece.
2. Order your piece to load.
3. Search your piece.
4. Sponge your piece.
5. Fill your ladle.
6. Put in your powder.
7. Empty your ladle.
8. Put up your powder.
9. Thrust home your wad.
10. Regard your shot.
11. Put home your shot gently.
12. Thrust home your last wad (with three strokes).
13. Gauge your piece.

But Gustavus Adolphus, the great King of Sweden (1594–1632) changed all this as he changed and improved many other features of the art of war, rendering obsolete the pedantic and often unintelligent practices of the Middle Ages. Gustavus, whose name would certainly have to be included in any enumeration of the dozen ablest generals of all history and who was the greatest that had appeared in the sixteen centuries since Julius Cæsar, gave numerous demonstrations of his genius as a tactician and, particularly, as the restorer of the lost art of strategy.

But his greatest contribution to the art of war was probably in the development of mobility in the Swedish armies which he so often led to victory during his short career of no more than twenty years. Not the least part of this contribution was made to the field artillery, which he raised from the position of an awkward supplementary weapon on the field of battle, unassimilated with the rest of the army and often of doubtful value, to that of a flexible and trustworthy auxiliary to the infantry, available either for assisting an advance or covering a retreat. He and some of his able artillery officers devised guns on mobile carriages which were so light that one horse or three men could handle them readily. Some of these field pieces were made of a thin copper tube reinforced by iron bands, then bound with rope set in cement which, in turn, was covered with sole leather; others were of cast iron. The guns fired balls weighing only three or four pounds, and the king invented a cartridge consisting of the charge held in a thin, turned-wood case wired to the ball—the original fixed ammunition.

Naturally such guns were of short range and small power, but their great merit lay in the fact that they could be brought to the spot where they were needed with great rapidity and could be fired even faster than the infantryman of the day could fire his match-lock musket; eight shots, in fact, to the musketeer's six. These guns were meant to be used directly with the infantry, one or two pieces to a regiment, not regularly massed in batteries, which was a later

THE FIELD ARTILLERY JOURNAL

arrangement introduced by Frederick the Great. Nevertheless, Gustavus himself sometimes used his artillery in masses and achieved notable results. Colonel Theodore A. Dodge has said:

"This arm with the Swedes was immensely superior in effectiveness to that of any other European army; the king was the first to show of what artillery was really capable."

It is worth noting that, although before the World War military critics generally regarded Gustavus' practice of placing field pieces directly with the infantry as an antiquated idea long since obsolete, we have found it revived in no small degree in the "accompanying artillery" of the battles of 1918.

As but one instance of Gustavus' ability to get decisive results from his artillery when he chose to wield it in mass, may be cited the passage of the Lech River, in Bavaria, April 14, 1632. Gustavus, advancing from the north, crossed the Danube and confronted the army of the Catholic League, under Count Tilly, securely entrenched in low ground on the further side of the little river Lech, its front protected by this stream and its right flank by the Danube below its confluence with the Lech. Gustavus determined to force the passage of the Lech and drive the enemy from his entrenchments; a manœuvre almost unheard of in that day and deemed practically impossible of accomplishment.

On some high ground overlooking a convex bend in the river above the enemy's works he massed a battery of 72 guns, and while they swept the opposite shore with their projectiles, he sent 300 men down to the river who threw a pontoon bridge over the bight of the bend, protected from observation by burning damp straw, which produced a thick smoke; what we should call today a "smoke screen." Then he led a large part of his army across the bridge and deployed them on the other side, where on April 16th they were vigorously attacked by Tilly. The attacks, however, were repulsed, partly by the Swedish infantry but mainly, it appears, by the covering fire of the Swedish guns still shooting from the high ground across the river. So well were they served that the enemy's losses were twice as heavy as those of the Swedes—4000 to 2000 of Gustavus'—and the enemy lost all heart, evacuated his strong positions during the night and retreated. It seems that such effective use of artillery might almost be classed under the modern heading of "protective barrage."

Though at the time of his death in 1632, Gustavus had added so much to the usefulness of field artillery that in his army the proportion of guns was about six per 1000 men, against one per 1000, as it had been previously, with his passing its employment as a

OBSERVATIONS UPON THE EVOLUTION OF F. A. CONSTRUCTION

weapon of decisive character seems almost to have come to a standstill for a hundred and twenty-five years. Then came Frederick of Prussia, who did much to improve the organization and tactical efficiency of this arm. It was upon his fertile mind that there first dawned the conception of artillery as an instrument to be employed not by single pieces, but by batteries permanently organized, whose multiplied fire power would be capable of really positive effects when brought to bear upon an enemy. He assembled his guns in batteries of from six to ten pieces and inaugurated tactics by which they were enabled, for the first time, to move from place to place as they might be needed during the course of an action.

One of the most admirable examples of Frederick's use of his artillery was at the battle of Rossbach, in November, 1757, where the French and Saxons under Subise attempted to cut the line of retreat of the Prussians by a march around the latter's flank. Frederick's troops, however, were concealed from the view of their opponents behind a ridge of low hills and while the French and Saxons were badly strung out in their hasty advance, Frederick formed line of battle facing toward their naked flank and suddenly advancing across the ridge, fell upon them furiously. His artillery, massed on his right flank, tore great gaps in the opposing columns and prevented them from forming a line of resistance while the Prussian cavalry, thus magnificently supported, smashed in the enemy's vanguard, and the Prussian infantry routed the main body. It was as fine an example as was ever given of the skilful and decisive use of field artillery.

In spite of Rossbach, however, the Prussian artillery under Frederick, though usually well handled, often showed to less advantage than that of the Austrians, against which it was frequently pitted, for Austria had always been apt with the artillery arm. It must be conceded, however, that any of the artillery of that day must have been capable of pretty accurate shooting if we are to credit the story that just previous to Rossbach, Frederick himself owed his life to the chivalry of a French officer who forbade one of his gunners to pick off the king with a cannon ball.

With the exception of the incident mentioned above, we must pass in this very rapid survey over the countless interesting though perhaps not outstanding instances of the use of artillery in the wars of such brilliant leaders as Turenne and Condé, Marlborough and Prince Eugene, Vendome, and the generals of the Revolutionary armies of France, to the period of Napoleon. This incomparable captain, who profoundly altered the practice of warfare in nearly all its manifold ramifications, reducing it, in fact, for the first time to an art or science, was perhaps by disposition more an artilleryman than anything else; at all events it was in the artillery that he

THE FIELD ARTILLERY JOURNAL

received his early training and did his first service as a subordinate officer. His handling of the arm in his later great wars was naturally of a correspondingly distinguished nature.

At the beginning of his reorganization of the French armies, Napoleon was able to profit by the technical reforms in the artillery which had already been instituted by General Gribeauval. This officer had separated from the field artillery proper all pieces of heavier calibre than 12-pounders, reduced the number of varieties of pieces and standardized their construction, improved the ammunition and the means of ammunition transportation and supply, introduced elevating screws and tangent scales, and in many other ways added to the efficiency of the matériel. But the artillery with an army in the field was still divided between regimental guns and a certain number of batteries which were held under the orders of the army commander as a sort of army artillery group. It remained for Napoleon to reorganize the improved matériel in his Grand Army so that a proportion of it became divisional artillery; another part was in the hands of the corps commanders, and a third portion, held under his own orders, together with the Guard divisions and the heavy cavalry, constituted the reserve artillery of the whole army.

With what skill Napoleon wielded the mighty weapon which he had molded can be illustrated here by only two or three striking examples from the many which he and his great lieutenants gave. A most impressive demonstration of the decisive power of a judiciously massed group of artillery was given at the battle of Friedland, June 14, 1807. The Russian Army under Bennigsen, coming from the east, crossed the river Alle at the town of Friedland, hoping to cut off the advanced French Corps of Lannes. But the balance of Napoleon's army, with the Emperor himself, soon arrived on the field, Lannes held his ground and Ney was ordered to break the Russian centre and occupy Friedland, thus cutting off the Russians from retreat across the river. The Russians, however, resisted Ney fiercely, repulsed him, and the battle seemed about to turn against Napoleon when the French artillery general, Senarmont, gathering up the divisional artillery of the 1st Corps, placed it in two batteries of fifteen guns each on either side of the road to Friedland. Opening a converging fire upon the Russian attack columns he broke them up, prevented them from resuming the offensive, and finally drove them in confusion back into the reëntering bend of the river in which Friedland stood, partly wrecked the bridges by which they sought to regain the opposite bank and contributed in the greatest possible degree to the complete overthrow and rout of the whole Russian Army.

Again, at the battle of Wagram, June 6, 1809, Napoleon achieved a great victory by the use of his artillery. When his left had been

OBSERVATIONS UPON THE EVOLUTION OF F. A. CONSTRUCTION

worsted by the Austrians under the Archduke Charles and his right was, at best, gaining but a slow and partial success, the Emperor, perceiving that the enemy's wings had been too widely extended, massed all his available reserves in the centre, preceded, so says the biographer Morris, "by such an array of cannon as had never been put together before," and fell upon the enemy. The fire of these guns, about 100 in number, obliged the Austrians to give ground even though the French artillerymen themselves suffered excessive losses owing to the short range and, the French left being thus enabled to recover itself and manœuvre, the enemy was eventually forced from the field.

Passing, for lack of time, over all such interesting and instructive subjects as the Crimean War, the campaigns of Napoleon the Third in Italy, etc., we may pause for a few moments at the period of our own Civil War, that inexhaustible mine of material profitable for the study of military students, particularly Americans. There is perhaps a tendency today, following the vast upheaval of the World War, to regard lightly and as something rather antiquated, the lessons of our internal conflict of 1861-1865. But, considering that the materials only and not the principles of warfare have changed in recent years, does it not seem that, for Americans, a war in which our forces will be required to cross 3000 miles of sea and to fight on foreign soil is likely to be very exceptional, and that warfare under the conditions governing it on the American continent, most amply exemplified in the Civil War, should properly be a subject of perennial interest to the military student? Indeed, if there is any inclination to question the value of the American Civil War as a subject of attentive study today, it need only be said that the French Ecole de Guerre has recently dropped from its courses all lectures on the Franco-Prussian War and substituted therefor lectures on our Civil War. This is because the French have recognized the close similarity between the Civil War and the World War, both having been fought, as no other wars have ever been fought, not by armies alone but by entire nations with all of their resources enlisted in a struggle which was economic as well as military.

To digress for a moment from the main subject, a few years ago the writer had the curiosity to search out and enumerate in detail a large proportion of the devices of modern warfare which had their origin in the fertile brains of Americans, both Northerners and Southerners, of the Civil War period and which also had not merely their experimental but their first successful practical applications during that conflict. This was true not only of such well-known inventions as the first armor-clad warships and the first really formidable torpedoes and floating mines. The Civil War saw the first successful use, even though in a limited way, of a submarine;

THE FIELD ARTILLERY JOURNAL

the first searchlights, the first machine gun, the first electrically fired mines, and the first field telegraphs, prototypes of the later field telephones. It also saw the first visual signalling system which, by means of flags in the day time and torches at night, was carried to a high state of perfection by the Signal Corps of both the Union and Confederate armies, the first observation balloons and the first wire entanglements. The Official Records of the War of the Rebellion contain extensive reports of indirect observation and correction of artillery fire; to all intents and purposes lateral observation and the control of fire from observation posts. This occurred at the siege of Vicksburg. In the pages of "THE FIELD ARTILLERY JOURNAL," Colonel Jennings C. Wise, F. A., O. R. C., has recently enumerated some curious researches of his own, proving that during the Civil War field artillery also first made use of topographical preparation of fire by establishing aiming points and firing by deflection at night, first practiced the registering and laying of guns on unseen targets and then used them in what we should call "defensive barrage," and first employed incendiary shells for illuminating purposes and star shells for signalling. Further, it was a distinguished Confederate artillery officer who first conceived the idea of employing gas shells, or as they were termed, "stink shells," but his government refused to make use of them because of their inhuman character. Surely a conflict which revealed such fertility of inventive genius has not yet ceased to be worthy of serious study.

But to return to our proper subject of the use of field artillery in the Civil War, it should be said that at the time of its occurrence artillery was in a state of rapid evolution owing to recent important developments in the manufacture of ordnance. Every variety of weapon, from the old bronze smooth-bores of Napoleon's wars to the latest English breech-loading rifled Whitworth guns, had ample opportunity for displaying its virtues and defects during the course of the conflict. But in the main the best type of gun of the period was the quite handy muzzle-loading, rifled field gun of 12-pound, or 3-inch calibre. This sort of gun was used under every conceivable condition in every conceivable kind of country, for it is one of the most interesting facts about the Civil War that in it can be studied the detailed stories of scores and hundreds of battles ranging from hot skirmishes between a few scores or hundreds of combatants, often embracing troops of all three arms, infantry, artillery and cavalry, to struggles involving 100,000 or more men. Sometimes the artillery amounted to masses of hundreds of pieces; sometimes a battery of four or six guns, or even a section of one or two pieces, did most brilliant work in its circumscribed field, affording its commander opportunity for exercising rare qualities of judgment and initiative.

OBSERVATIONS UPON THE EVOLUTION OF F. A. CONSTRUCTION

In a general way it can perhaps be said that, whereas in previous wars from the time of Napoleon or even of Frederick, the function of the artillery was conceived to be only mass action in a great battle, in the Civil War it came to be a reliance of the infantry and the cavalry at any and all times; a valued and trusted ally in even the smallest affairs. This is a fact of no uncommon interest to the battery commander and the lieutenants of today. It was certainly a more logical view of the field artillery than the one previously held, and it would seem that the question then became tactically what it still is today—how best to organize the artillery so that it can function with the small unit when so needed and yet be readily massed and brought efficiently under the control of higher authority for concerted action in the great battle.

But to come to a few examples, which are not easy to select out of such a wealth of material. As showing how vitally even a small body of artillery may influence the decision in even a great battle, perhaps no better instance could be given than the well-known one of Rickett's and Griffin's batteries in the very first major engagement of the war; the first battle of Bull Run, July 21, 1861. Being composed of raw and inexperienced troops, both armies before they had fought very long were badly shaken. But the Confederates were probably nearer to actual defeat than the Union troops when Rickett's and Griffin's Union batteries, six guns each, were rushed up on the Henry House Hill to assist the infantry of the Union right flank in turning the Confederate left. The guns were placed directly in front of the Union infantry, firing point blank into the ranks of the Confederate infantry before them, and if they had succeeded in holding their position here the battle would have been won, as the Confederate flank would have been definitely turned. But some Confederate infantry, a regiment apparently, came out of the woods to the right of the batteries and delivered a volley which cut down so many of the gunners that the batteries became helpless and were captured. The Union right was first held up and then driven back, and the whole battle was lost which, if it had been won, would probably have averted four long years of bloodshed. Ricketts and Griffin did not have proper infantry support and, being out in an entirely exposed position, could not protect themselves and carry on their offensive mission at the same time. Today, when the bodily presence of the guns is not needed at the point of contact, they would probably have delivered just as effective an indirect fire over the heads of their infantry, and would have swept the Confederate lines on the Henry House Hill without themselves being exposed to capture, in a manner, we might say, similar to the support rendered to the 165th Infantry, 42nd Division, in the Bois Colas and around Meurcy

THE FIELD ARTILLERY JOURNAL

Farm, by the American batteries firing from south and west of the Ourcq, in July, 1918.

It is undeniable that the danger from the rifle bullet and the "cold steel" to the artilleryman is not as great today as it was between 1861 and 1865, owing to the prevalence of indirect fire at longer ranges, though he has other dangers to make up for it. In those days it did not take a breakthrough by the enemy to get at the artillery positions, as the Germans got at the positions of the artillery of the 5th British Army when they broke through on the Somme in the offensive of March, 1918. The guns of the Civil War were right on the infantry firing line and sometimes ahead of it. As a parenthesis, some verses may be quoted which were composed by the present writer several years before the World War was dreamed of, but which are believed to be typical of some of the rough-and-tumble fighting of Civil War artillery. For the benefit of those not familiar with some of the famous leaders of that day, it may be said that General Joe Hooker was a very noted and able corps commander of the Union army while General Longstreet commanded with the greatest distinction throughout the war one of the three corps of Lee's Confederate Army. The "Captain Bill" of the poem is supposed to be a regular army officer who knew both of those generals personally in the "old army" of the United States before the war, and who had been in the forces which were defeated by Longstreet at the battle of Gaines's Mill in 1862.

THE HILL WE HELD FOR HOOKER

We'd formed our guns for action, for they'd started on the right,
Where Sykes had bumped on Jackson and their lines had clinched at sight,
While we waited there for Longstreet, who never missed a fight.

An aide-de-camp in shirt-sleeves come lopin' up the hill;—
"You hold this hill for Hooker!" he yells at Captain Bill,
"And mind you hold it longer than you did at Gaines's Mill!"

Old Captain Bill made answer: "You boys must have your fun,
But we didn't break at Gaines's till all the staff had run,
And we'll hold this hill for Hooker while we've men to work a gun."

Across the field below us ripped out the rebel yell
As Longstreet's line of battle came streakin' up the swell,
And we whipped the limbers closer and opened out with shell.

But shell was meat for Longstreet; he ate it with his bread,
And so we changed the menu and gave 'em shrap, instead,
And when that didn't stop 'em, the canister was spread.

OBSERVATIONS UPON THE EVOLUTION OF F. A. CONSTRUCTION

We pounded 'em to jelly, but the jelly wouldn't jell;—
The powder scorched their faces but they took it like the shell,
And then they reached our muzzles and tumbled through, pell-mell.

It seemed we'd best be goin', with bayonets so near,
When, through the woods behind us, there rolled a roarin' cheer
And Captain Bill yells, "Hold 'em! That's Hooker, almost here!"

We fought between the sections just like a game of tag;
A Johnny jumped my field gun and waved a battle flag
But I lammed him with the gun-swab and dropped him like a rag.

They had forced us to the limbers, where the teams were tangled thick
And were pivoting our pieces to teach us our own trick
When Hooker's boys came through us, deploying double-quick.

The Johnnies hung like bull dogs and faced us breast to breast,
But Longstreet's men were winded, while Hooker's had a rest,
And when the smoke had lifted we Yankees held the crest.

And Hooker stopped to thank us, and then said Captain Bill:—
"They thought we couldn't hold 'em, but, General, here's your hill,—
And I'd like to ask Jim Longstreet if we're quits for Gaines's Mill!"

Batteries were fought in very much the way depicted in this fictitious instance on many fields of the Civil War, but there is no particular lesson from most cases excepting that the artillery arm seems to be a little safer proposition on the whole from the standpoint of life insurance than it used to be.

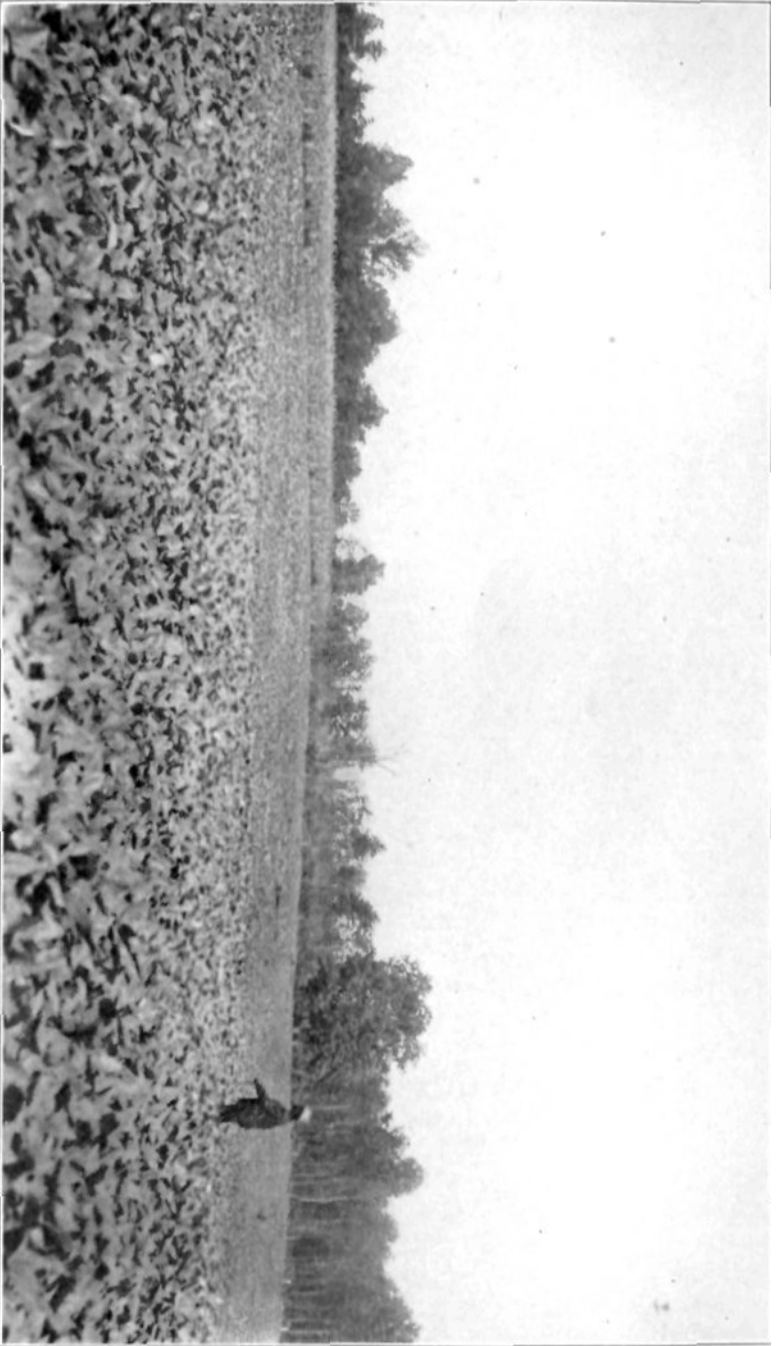
To resume, it has always seemed to the writer that one of the finest instances on record of the decisive use of artillery, hurriedly massed to meet a crisis, was that of the Union batteries used to check the advance of Stonewall Jackson's Corps at Chancellorsville, on the evening of May 2, 1862. By one of the most daring and brilliant manœuvres of history, Jackson had taken half of Lee's Army, already outnumbered two to one by the Union Army of the Potomac, and marching around the front of the latter through the thick woods of the Wilderness, had fallen upon its right flank and completely crushed it in. Toward evening the Confederate line of battle, flushed with success, was vigorously following up the broken ranks of the 11th Corps, which was retreating in disorder and making practically no resistance. The Confederate advance, if unchecked, threatened literally to roll up the entire Union right upon its centre at Chancellorsville, cut the line of retreat to the fords of the Rappahannock, and involve the whole army in an irretrievable disaster.

THE FIELD ARTILLERY JOURNAL

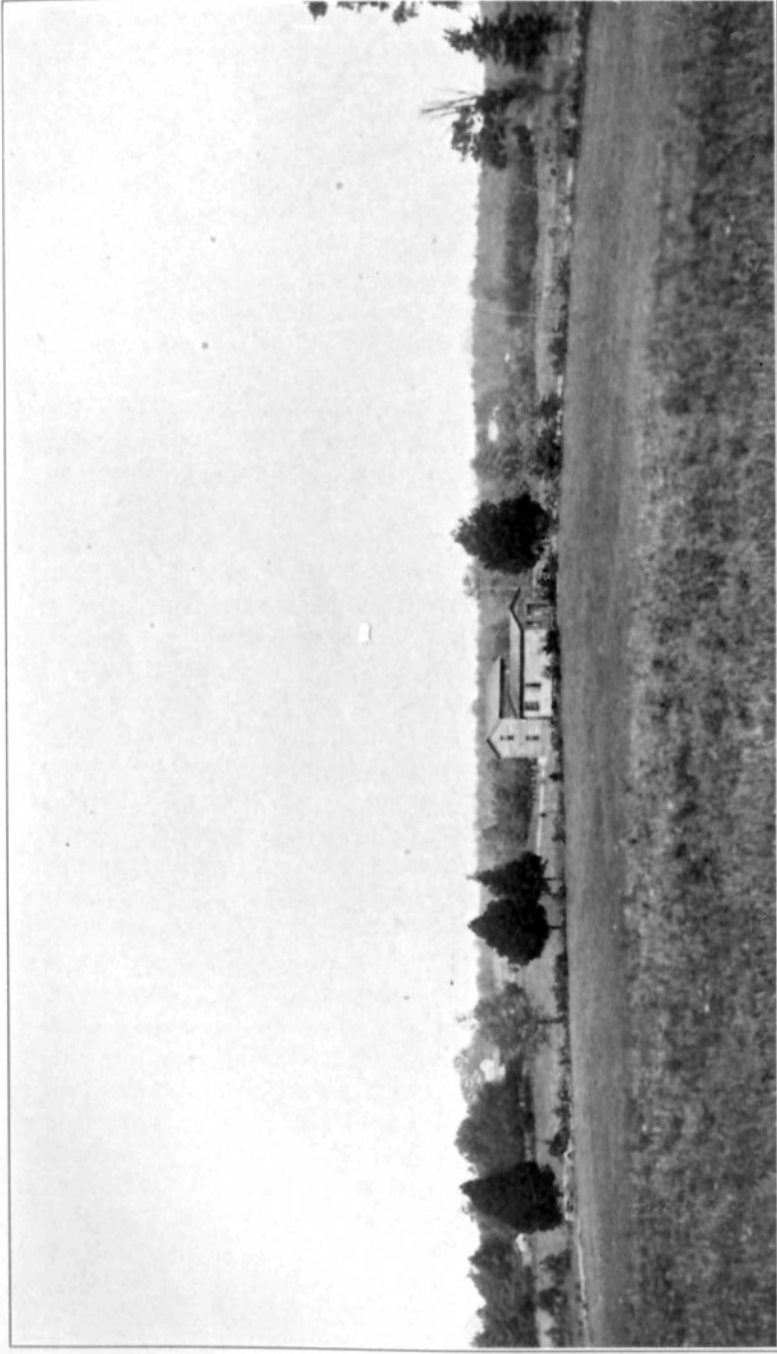
At this juncture General Alfred Pleasanton, commander of the cavalry corps of the Army of the Potomac, an officer whose exceptional abilities and many brilliant achievements do not seem often to receive from military writers the attention which they deserve, found himself at Hazel Grove, a clearing in the woods toward the left rear of the retreating 11th Corps. Taking one battery of his own horse artillery of the Cavalry Corps as a nucleus, he collected four other batteries and posted them all in a line across the clearing facing toward the advancing enemy. According to Pleasanton's own statement these batteries were of divisional artillery from different corps in the vicinity—two from the 1st Division and one from the 3rd Division of the 3rd Corps, and one from the 1st Division of the 12th Corps. None of the army artillery reserve under General Hunt was near enough to intervene in this crisis. Pleasanton says that he got twenty-two guns into position, which indicates that some of the batteries must, in the confusion, have been short some guns, as all five of them were six-gun batteries and should therefore have counted thirty guns altogether.

But at all events they were enough, for when Rodes' division, which was the front line division of Jackson's corps, came out of the woods in the gathering darkness, they were met with a blast which mowed them down from guns which were double-shotted with canister. The Confederates were some of the best veterans of one of the best armies the world has ever seen, the Army of Northern Virginia, and they still made gallant efforts to overwhelm Pleasanton's guns, which were fighting in the open without infantry support. But the intense artillery fire was kept up without pause for twenty minutes and by that time the enemy was swept from the field, definitely repulsed. During the night the Union positions were reorganized so that, though defeated in the campaign and forced to withdraw, the actual destruction of a large part of the army was averted by the skilful utilization of these twenty-two guns. Their action might be compared to that of the American and French artillery supporting the 42nd American and the 170th and 13th French Divisions on the Champagne front on July 15, 1918, when their terrific counter-barrage almost broke up the German attack before the assaulting waves had even reached the main line of resistance of the Allies. Only, in the Civil War instance, the guns themselves had to take the brunt of the attack, while in the Champagne they accomplished their object by laying their projectiles out in front of the line of resistance.

Though, as has been said, the 11th Corps on the evening of May 2nd was in general confusion and retreat, this was not true of all its elements. In a recent issue of THE FIELD ARTILLERY JOURNAL, Colonel Wise, previously quoted, detailed the action of



THE CLEARING WHERE PLEASANTON'S GUNS WERE POSTED



STONEWALL JACKSON FORMED HIS CORPS IN THE WOODS ON EITHER SIDE OF THE PIKE ROAD COMING IN PAST THE TALLEY FARM—THE WHITE BUILDING IN THE LEFT DISTANCE

When this force debouched upon the Talley fields, Dilger wheeled his battery to the immediate foreground of this picture and poured in a withering fire until the last of the surprised and routed Eleventh Union Corp had fled when he withdrew leaving one of his six guns in the very hands of the enemy. With his remaining guns he occupied successive positions to cover the retreat down the Pike.

OBSERVATIONS UPON THE EVOLUTION OF F. A. CONSTRUCTION

a single battery under Captain Hubert Dilger who, without orders and entirely on his own initiative, kept his battery in hand and retired it along the Orange Turnpike, firing all the time from well-selected successive positions, considerably retarding the Confederate pursuit and particularly retarding their artillery by sweeping fire along the Turnpike which prevented their guns from unlimbering on this only open lane through the woods and by their fire breaking up the Union brigades which were endeavoring to organize a new line of resistance further east. Moreover, Dilger's fire down the Turnpike seriously interfered with communication between the two wings of Rodes's attacking infantry. So much for the unaided efforts of a single enterprising battery commander.

There is time for only a word about the most famous artillery duel of the Civil War; that preceding Pickett's charge on the 3rd day of July, 1863. But it is worth remembering that both the Confederate artillery commander, General Alexander, who conducted the preliminary bombardment, and General Longstreet, who directed the assault, knew by professional instinct before the attack was launched that the artillery preparation had failed to accomplish its mission and that the infantry would be repulsed. The artillery lined up on the opposing sides was very evenly matched; about 130 Confederate guns against 120 Union guns. Alexander, a thoroughly experienced artillerist, saw in the course of the fire that most of the Union artillery maintained its position under the shelling and that the batteries which did retire were doing so merely to save ammunition and would come back into action as soon as the bombardment ceased. But he was running short of ammunition and finally gave the word to Longstreet, who was under positive orders from General Lee to carry through the assault. On this day, the most momentous of his career, Lee, that superb commander who usually handled problems of strategy and tactics as a skilled swordsman handles a fine Toledo blade, seemed led astray by strange vagaries of judgment; or was it an all-wise Providence momentarily confusing that sagacious mind as if saying through him to the soul of the Confederacy, "thus far but no further"? He seemed to feel that there was no possible alternative to seeking an instant decision of the battle by an assault on the Union centre. That decision he lost, and with it the South lost the war; and it was the unbroken Union artillery on Cemetery Ridge that had accomplished the decision before the first man of Pickett's and Pettigrew's divisions had stepped forward in the fatal advance.

These observations have already reached too great a length and a conclusion must be reached, passing with only a word by the Franco-Prussian War of 1870, in which breech-loading rifled guns were first extensively employed and in which the French artillerymen,

THE FIELD ARTILLERY JOURNAL

fighting with all their traditional dash and gallantry, were yet usually worsted in battle by the superior organization and leadership of their German adversaries, whose judicious concentrations and boldness in manœuvring contributed immensely to the German victories at Worth, around Metz and Sedan and on other fields. In this war, also, the French, pioneering the way to the employment of the mitrailleuse, or machine gun, made the mistake, which seems so strange today, of regarding this deadly weapon as an artillery, instead of an infantry arm, and handling it as such, thereby nullifying almost all the advantage which they might have gained from its use. This was a case parallel to that of the introduction of tanks by the British during the World War. In the first case the Germans regarded machine guns with contempt and refused to adopt them, as in the latter case they at first declined to take the tanks seriously. But the French of the war of 1870 failed to reap the benefits of their innovation, while the British had the satisfaction of seeing their enemies converted to wholesome dread of the tank under stress of its terrible efficiency in battle.

I would like to conclude with a few thoughts concerning the South African War and the Russo-Japanese War. In both of these conflicts, the first of which took place in 1899–1900, and the second in 1904–1905, the armament of the field artillery already consisted of very modern types of guns capable of using high explosive and provided with firing and laying apparatus only less perfected than the weapons of the World War. This armament, however, was seldom used with anything like the effectiveness of the artillery of the World War nor even the effectiveness which its mechanical excellence would have made possible. This would seem to have been because the science of ordnance construction had, for the time being, outstripped the science of operating the matériel provided. At the same time it must be said that both in South Africa and in Manchuria, one side made much more advantageous use of the matériel than did its opponents, the Boers displaying the greater comprehension of the possibilities in this regard in South Africa, and the Japanese in Manchuria.

The British fought the Boer War with 12- and 15-pounder Armstrong field guns of English manufacture. Of these they had the large number suitable to the armed forces of more than 200,000 men which they eventually employed, and in addition they had numerous siege guns of larger calibres and also machine guns. The Boers, with a maximum army of about 40,000, had only about 38 light field guns, eight mobile 120- and 155-mm. siege guns, and 45 machine guns, aside from Armstrong guns which they captured from the British and put to use. Their own field guns were chiefly 75-mm. Krupp guns which they had bought in Germany and 75-mm.

OBSERVATIONS UPON THE EVOLUTION OF F. A. CONSTRUCTION

Creusot guns which they had bought in France. But these few Boer guns far outranged the British Armstrongs, having an effective range of over 5000 yards, while the Armstrongs were not accurate beyond 3500 yards. Moreover the Boers used their artillery to so much better advantage that in many battles they neutralized and even defeated the vastly more numerous British guns.

An extreme case was at the battle of Colenso, December 15, 1899, when General Buller sought to force the passage of the Tugela River to relieve the British forces besieged in Ladysmith. Buller's infantry, 18,000 strong, made a frontal attack in three columns, advancing across a broad, open plain supported by batteries amounting to 36 field guns and six naval guns, the object being to cross the river by fords and a bridge which was still standing, and drive the enemy from the hills beyond, which the Boers were defending with about 2000 men and some 20 guns. The latter were well concealed among the hills and began inflicting casualties on the British infantry even while the latter was deploying for attack. The outranged British artillery, in order to get to grips, galloped forward across the plain and went into action in positions which were completely swept by the hidden foe. The Boers, consequently, were almost unharmed while the British artillerymen, pouring the shrapnel of the day, with its narrow cone of dispersion, uselessly over the narrow trenches of the enemy along the contours of the hills, suffered staggering losses. In particular, the twelve guns of the 44th and 66th Batteries, R.F.A., in attempting to prepare a crossing for the centre column over the wagon bridge at Colenso, came up so close to the river that the men and horses were practically all killed, though the guns continued to fire until this had happened. The infantry attack was repulsed at all points and ten of these guns were subsequently captured by the Boers, two of them only being rescued.

The action undoubtedly redounded to the fame of British bulldog courage, but it was the courage of folly. As our military attaché with the British Army, Captain S. L. Slocum, U. S. Army, wrote: "If ever a people or nation exemplified the phrase, 'brave to a fault,' it is the British. If they were less brave there would have been many less faults and more victories in this war." The spectacle of Lieutenant Roberts, son of the British Field Marshal, mortally wounded, loading and firing one of those doomed guns all alone out there on the fire-swept plain by Colenso until he died—an act for which he received the posthumous award of the Victoria Cross—is a symbol of the sacrifices of the British artillery in South Africa to antiquated methods of fighting.

As the Boer artillery, acting under great handicaps, showed a marked efficiency in defensive battle even though much less marked

THE FIELD ARTILLERY JOURNAL

on the offensive, so in Manchuria four years later the Japanese artillery displayed in the offensive the results of superior tactical training and the intellectual ability to utilize the powers of matériel. In this war the Japanese field gun was in every way inferior to the Russian. The Japanese carriage had brakes and recoiled with the gun; the Russian was provided with a practicable, even though not a perfect, hydraulic recoil mechanism. The Japanese piece could fire only six or seven shots a minute; the Russian was capable of firing twenty-three. The Russian projectiles were heavier and ranged further than the Japanese, and in the aggregate, after the battle of Liao Yang, the Russians had a great many more guns in the field than their adversaries.

Yet, for all this, the Japanese artillery almost invariably had the best of the argument in battle; a fact for which several reasons were assigned by our American observers with the opposing armies. For one thing, though both artilleries used shrapnel almost exclusively, the Russians having no shells whatever while the Japanese employed their excellent high-explosive shells only against earthworks, the Japanese made a great feature of indirect fire, concealing their guns well and firing deliberately. The Russians, on the other hand, clung generally to direct fire and also made a practice of firing one gun of a battery and then, without waiting to observe the burst, firing the others in quick succession. Thus they wasted great quantities of ammunition, as they did also in uselessly searching the hills with fire—what, in the Civil War, was called "shelling the woods." The Japanese, before going to fire for effect, habitually verified the estimated range with shell which on burst gave out a yellowish vapor. Another chief fault found with the Russian artillery was its tactical employment in small groups, there being a tendency to scatter the batteries by assigning them to infantry organizations even down to regiments. Thus powerful concentrations were difficult of realization when needed.

As a matter of fact, the Russian armies in Manchuria in 1904–1905 were no doubt suffering from the fatty degeneration which followed them down to the World War; the result of bad government, oppression and general corruption in high places, while the Japanese, feeling the vital urge of a great national danger, had taken care to build up their military establishment on the soundest possible principles and with the most thorough and efficient training of the personnel.

After all is said, that is the kernel of the matter. The matériels of war, including artillery, change constantly. But whether it is the old, leather-bound 3-pounder of Gustavus Adolphus or the wonderful little soixante-quinze which, in the hands of the French poilus and the Yankee doughboys, hustled the Germans out of France in

OBSERVATIONS UPON THE EVOLUTION OF F. A. CONSTRUCTION

1918, it is the spirit of the man behind the gun that counts the most. If he is animated by zeal for a country which he loves and in whose institutions he believes, and nerved by the conviction that he is fighting in a righteous cause, he will fight well even with inferior weapons in his hands. But if his country is all he believes it to be, it will see that he has the best weapons and the best education in the use of them that science and training can provide, to the end that devoted blood may not be wasted uselessly upon the altar of patriotism, and the young manhood always needed for building up national greatness through the industries of peace be not burned up in the awful holocaust of war.



ON THE POLISH-BOLSHEVIK FRONT IN 1919 AND 1920

BY MICHAEL J. FIBICH, MAJOR, F.A., O.R.C.

(Continued)

THE PSYCHOLOGY OF ARMIES AND PEOPLES AND WAR

THE people who are to compose an army which will be adequately effective in time of war and inherently national, must be reared in an atmosphere of patriotic and historic culture. By this I mean that a soldier, in addition to possessing good military instruction, must also be imbued with an intense, almost blind love for his country and every incident associated with it. To accomplish this, proper social education and preparation are necessary before he enters the army. Every measure should be taken in civil life to teach and glorify, in the schools, in the theatres and elsewhere, the traditions of the land and the heroic deeds of the valiant soldiers who have fought for the honor of their country during its past history. We create in that manner all *tradition* and a national *esprit de corps*.

There is a marked difference between a soldier who fights in the defence of the rights of his country simply because it is "Fun"—that "show what we can do spirit"—or to defend the land because he obtains his "bread and butter" from it, and that soldier who fights for the higher ideals, for the freedom, for the honor of his country and its sacred traditions. The latter soldier feels that he is fighting not so much for the present as for the future, for the preservation of the trust and traditions that were bequeathed to him by his forefathers. The men of Valley Forge nobly displayed like sentiments. It is this spirit that made Poland free again and enabled her to endure safely the terrible experiences of 1919 and 1920.

Prior to the war, and immediately after we entered it, the people of the United States were not united in their true expression of the higher ideals. The nation had not been brought up uniformly in *one* environment or with *like* principles. Leading public associations gave very little of their attention to these matters before the war. Much to our chagrin we have learned that second citizenship papers will not alone develop that type of an American who will fight not only for the material benefit of America but also, and yet more willingly and determinedly, for her idealism and her institutions. The continued influx of immigrants to this country and the indifference of the American public for a long time to the social and political education of the former, were likewise responsible, in no small degree, for the absence of this spirit.

ON THE POLISH-BOLSHEVIK FRONT IN 1919 AND 1920

However, the fault was not entirely with the naturalized Americans. Numbers of American boys whose forefathers were born in the states were not sincere advocates of even some of the basic principles of Americanism. "My Country Right or Wrong" and "One for All and All for One" held no deeper meaning for them. Many Americans in France refused to drill when the Armistice came, walked away from their posts, all because, as they claimed at the time, they had come to France to fight and for no other reason; now, because the fighting was over, they wanted to go home at once. It would have been a sad picture of disorder had discipline not been enforced up to the last moment of relief from the army. The various military duties of peace time are the most efficient means for creating discipline. In addition, the training that the men received did not fail to benefit them personally in various ways.

My observations of the allied armies in Europe have led me to believe that there is much of the "Bolshevik" and the "grumbler" in our soldier. He endeavors to reason too much for himself the "whys" and the "wherefores" that he must perform such and such a duty and tries to explain, with his own understanding, many of the various orders that are given him. There is one word that virtually embraces a soldier's complete dictionary in time of warfare and that is "obey." The only thing that he is supposed to know thoroughly is "how to obey." The more active and severe the operations, the more tightly must the bonds of discipline be drawn and it is here that the soldier is called upon to do the least amount of reasoning. Occasional unwillingness, everlasting grumbling over the food, clothing, duties assigned, lack of promptness in executing formalities and instructions, were some of the characteristics noticeable.

The American public will be inclined to call the above, the natural-born independence of the individual American; an attitude assumed by him for reason of the strong dislike for military service. I would call it the lack of considerate appreciation and understanding for the duties and requirements of citizenship, and for the ideals and the historic mission of our country.

Our noble women at home had spoiled the average soldier to such an extent that many of the little comforts and pleasures made possible by their coöperation and which should have been looked upon by the soldier as a luxury, were accepted by him as a "matter of course." Wars are cruel and one must be prepared to suffer. Though they suffered some discomforts, on the whole, our soldiers were better off than the soldiers in any of the allied armies. It is difficult to state beforehand, how large numbers of American soldiers in France would have acted had they been compelled to perform their duties without overcoats and gloves in intensely cold weather, many without

THE FIELD ARTILLERY JOURNAL

shoes and underwear, not to mention the absence of numerous other comforts, most of which the Boys in France had. Those were the trials to which the Polish soldiers were subjected.

Some little justice must be given, however, to those who *complained*. The screws of discipline naturally had to be drawn tightly during active operations but once hostilities had definitely ceased, those same screws might have been loosened up just a little bit without any harm being done, on the contrary even, "for the good of the service."

I doubt whether a more enthusiastic class of young officers had ever entered the army at any previous period from civil life. The intense desire and impatient willingness to learn and to do the proper thing was as sincere as might have been hoped for. It was not discipline so much—this was especially true of that particular type of college man who had entered the service—that was needed. What they required, above all else, was proper and *considerate* guidance and leadership. The refusal, for instance, to permit the men to wear their helmets when it was raining very heavily, or, compelling the men to wash daily the carriages and harness, even though the terrain through which they would be marching (not on parade but campaign marches) on the following day, was very muddy—all, for no other reason than to make an *impression* on the "Boche"—were not very likely to enhance the "*esprit de corps*" of any organization. On the contrary, it destroyed the enthusiasm and made evident an astonishing lack of understanding of the psychology of those "New" elements who had entered the army.

The chief aims should have been: guns in good condition that shoot straight, and horses that were capable of taking those guns wherever necessary. These latter should have been the principal concerns of the higher commanders, while those mentioned above were two of many minor incidences far too insignificant to have required the personal attention of a busy colonel, especially a general, in the field.

The regular army should not, under any condition, isolate itself from the people at large. Such isolation in the past has done more than anything else to bring about the present unpleasant feeling of hostility of the American public toward everything that is "regular." It must remain constantly in a position to feel the pulse of the nation. In the World War, there were frequent and lucid examples that the average regular personnel were strangers and did not understand adequately either the nature of the beatings of that pulse or the spirit that animated it.

A national army is a people's army, bound inseparably with the highest and purest of national ideals. There is nothing strange about its existence—of which all citizens might not be proud. It

ON THE POLISH-BOLSHEVIK FRONT IN 1919 AND 1920

has given to our nation the most noble of all of our traditions. It has never played for popularity or overemphasized its own importance. It has always been exceptionally modest in its behavior and I believe too much so, for there is a possibility that in the future, our public school histories will lay great stress on the fact that the American troops would not have put "one over" the Boches if the marines had not been there. Many of our citizens look upon the army as something peculiar and unwelcome, as something which has been forced upon them and with which they *will* have nothing in common. "Oh darn the regular army officers and soldiers" is frequently heard on all sides. Regular troops have always been and must continue to be kept purposely in the side light, *out of sight*, for fear that they might be seen, while I suppose the public will never cease to say, as it did in the past, "A marine here, a marine there, a marine is everywhere."

But it is *our* army, the American Army, and every citizen should bend all of his endeavors, if not for sentimental reasons then at least for patriotic reasons, to make it the finest army possible. The army needs to be boosted now and then; it needs good will and public moral support. It is the citizen who must, whether he wills it or not, provide for its maintenance. He must also provide the human "food" element. There can be no difference, no impassable gulf between the regular and the civilian armies. Both are a vital part of each other and, do they not aim toward the same ideal?

The attitude of the European toward his army is somewhat different from that of the American. A regular army officer is regarded as a normal human being engaged in vitally important work. For is his work not important? Is it not possible for an army officer to labor for an ideal, to become wholly enthused and "in love" with his work just like any person in civil life with his profession? The former must work uninterruptedly, with dogged patience, and must constantly prepare for the day when that final test and supreme decision on all of his efforts up to that time, shall be made. That day may never come for the officer, while the man in civil life reaps the fruits of his labors progressively as the days go by. Most European troops will not be billeted in "dog" tents even in peace time if there are barns and other adequate billeting facilities on hand. Many an American lady would call it murder if her poor little "Doggie" were left over night in a "human dog tent."

Armies will exist and wars will take place until the time shall come when the peoples of the world will have sincere faith in the *same* lofty ideals and adopt more or less the same standards of living and culture. Such a condition of affairs throughout the world unfortunately is, as yet, far from realization. Until this goal is attained,

THE FIELD ARTILLERY JOURNAL

mere union, without the power to *command* respect for decisions, will have no concrete significance.

One cannot talk ideals to, or claim the respect of peoples who do not confess the same beliefs or who do not understand us. It would be absurd to rely entirely on honeyed declarations of peace offerings to a people whose psychology differed so fundamentally from our own. Certain of those peoples have been living for centuries in fear of the knout. If you desired to treat them courteously as equals, to invite them to your table, they would lose respect for you because you had lowered yourself to their level. On the other hand, there remains the opposite extreme, the typical aristocrat and many of the nobles and the intellectuals who are too arrogant to sit at the table with commoners. I merely cite this as an example, and make mention of the two extremes of the Russian people because both of them together compose over ninety per cent. of the population of Russia. The only thing that such peoples understand is *force* and the power to enforce what you say.

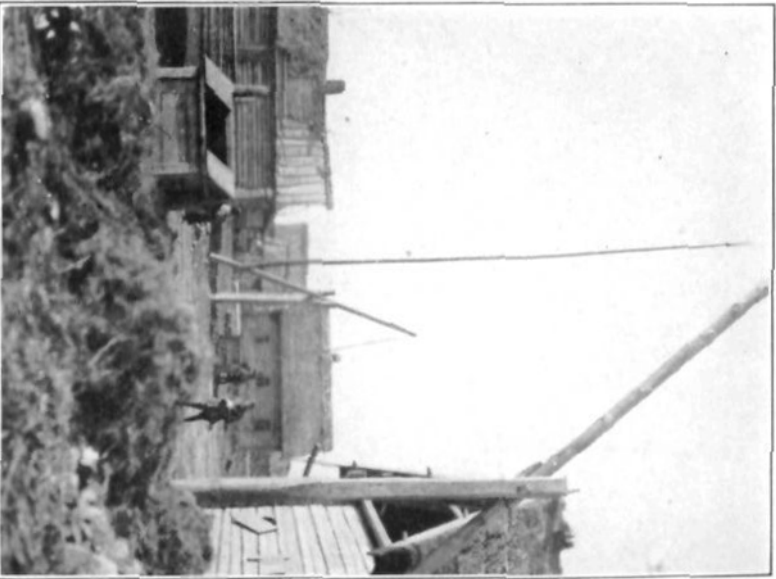
The same might be said of certain other nations. They have to be brought up all over again—"made over"—and entire generations would be required for the purpose. One cannot change the psychology, habits, and customs of a people with the stroke of a pen or by means of a peace treaty. In the early years of the present century, our public school histories taught us of the great friendship of the people of the United States for the government and the *people* of Russia. No Russian people *ever* ruled Russia. The most degenerate aristocracy, possibly in all the world, with the Czar as their chief, ruled its people in a despotic manner. We might have sympathized with the lot of the people but we could not express our friendship, in other words, our approval. Friendship can only exist between those who are spiritually equals.

If the United States and other powers at that time had adopted a different policy and had refused to enter into intimate relations with the Russian government until the latter had turned over a "new leaf," then the latter might have been induced to treat its own people as equal *human* beings with *godly* souls and not as cattle. Unfortunately, material benefits cover up many a loop hole.

Notwithstanding the fact that the spirit of idealism did so much for Poland, that country suffered nevertheless from a serious handicap, forced upon the people by external influences. One hundred and forty-seven years of subjugation had been sufficient to alter, in a moderate degree, the psychology of the Polish people. The three occupying powers had succeeded in imbuing the natures of the Poles who inhabited the respective parts of Poland, with many of their own characteristics. All the Poles did not think in the same manner, practiced various standards of efficiency and did things in different ways.



WHITE RUTHENIAN PEASANTS



IN A POLISH VILLAGE



BRINGING IN CAPTURED BOLSHEVIK ARMORED CARS



ARTILLERY TRAINS

ON THE POLISH-BOLSHEVIK FRONT IN 1919 AND 1920

Many of these characteristics contradicted each other as they were brought into play when Poland began forming her army. They were closely associated with the events that preceded the war and with the peculiarities of the environment in which the Poles had been brought up for generations by the hostile nations who had divided her among themselves. Their effects would not have proved so discouraging and detrimental to *initial* progress had they been applied in practice separately within each of the three parts. But when brought together in one organization, trouble and friction was the result. In spite of all that, the spirit of Valley Forge permeated the Polish Army during 1919 and 1920.

THE POLISH SOLDIER

The Pole has it in him to become a splendid soldier. Proper military instruction and national education should eventually give the best results. He grumbles very little, is of a quiet disposition and patiently submits to the disagreeable experiences of actual warfare. Although numbers of them have no public school education, they nevertheless are intelligent and sensible, and grasp things very quickly in their own way. Before the war, numbers of them had not received any uniform national training, either in the duties of citizenship or in the principles of democratic patriotism. Dependent upon the locality from which they came, their culture was local rather than national. It is this *national historical culture* which must play so important a rôle in every sincerely patriotic country. The evils resulting from the difficult and limited conditions in which they were forced to live before the war, produced certain moral defects that were discernible during the Bolshevik advance into Poland. I believe that these defects are temporary and must eventually disappear under a strong, centralized and patriotic form of government.

I doubt whether Poland will ever organize of her own volition, a military expedition against any of her neighbors. The offensive toward Kijew was not an attack against the vital interests of Russia or true Russian integrity. The purpose then was to break up hostile concentrations of troops on the southeastern frontiers of Poland. There is greater probability that some such expedition will be organized against her by a foreign power. In such an event, she will be compelled to fight in a way that she least knew how to do at that time, and that is, to defend herself systematically.

The Polish soldier prefers the attack to the defense. The offensive is more agreeable to his temperament. He will not submit willingly or joyfully to the rôle of a defender in the trenches.

It is true that certain units in the Polish Army fought very bravely during the retreat. The nature of such fighting, wherever

THE FIELD ARTILLERY JOURNAL

it did take place, proves that the Polish soldier possesses the characteristics requisite for a soldier on the defensive. The display of these characteristics was not as general as might have been the case and was more commonly conspicuous among the troops from the former German and Austrian parts of Poland than it was among those who came from Congress Poland (Russian part).

Discipline is required to make an attack, but a better kind of discipline is required for a successful defense. Fighting alone is not the most difficult part of warfare. In the excitement of the moment, during an attack, soldiers will move forward—the braver will lead while the less brave will follow—but bearing up with the discomforts of a war of position, the intense drudgery and monotony immediately in rear of the front line, the nerve-racking bombardment, the wet, the cold, the mud, etc., all make greater demands upon a soldier. Soldiers will prove themselves more equal to these demands, the longer and the more thorough their course of training has been.

To defend the ground effectively, retreat slowly and systematically in the presence of the enemy, in accordance with the demands of the military situation, requires a special kind of training. The majority of these Polish units did not receive this training. The chief obstacle to everything in those critical days was the lack of time. They had been hastily gathered together and immediately after, thrown into action against the Bolshevik invaders.

A good soldier for the defensive must possess certain psychological characteristics. I believe that the Pole of today possesses those characteristics and whether dormant or apprehensible, thorough preparation and instruction beforehand, is the surest and the only method to be considered when it is desired to bring them into play.

However, I cannot overemphasize the importance for the Poles of instruction in the strategy of the defensive as a primary consideration, while instruction in the strategy of the offensive should receive only secondary attention.

GENERAL ASPECTS OF THE FIGHTING ON THE POLISH-BOLSHEVIK FRONT

The numerous battles did not take place along one continuous line but comprised, in the majority of cases, individual manœuvres and partisan warfare. The Polish fighting line was made up of independent mobile and flexible combat units, the smallest of them being a regiment—in exceptional cases a battalion.

From the very beginning, the fighting with the Bolshevik army disclosed the fact that it aimed in all of its manœuvres to occupy only the more important points of resistance, as villages, woods and roads.

ON THE POLISH-BOLSHEVIK FRONT IN 1919 AND 1920

All of its offensives were directed along the lines of main roads, making almost exclusive use of flank attacks.

The Poles did not, as a general rule, undertake frontal or direct attacks against the Bolsheviks. 'Tis a fact that during the offensive toward Kijew, there were numerous instances of frontal attacks, but these were made against troops more or less on the run. The aim was rather to initiate flank movements. The psychology of a *good* Russian soldier is important enough to be given consideration because he is better on the defensive than on the offensive. He fears flank attacks. The appearance of enemy soldiers on his flanks or to his rear has seldom failed to produce a panic.

Amid these conditions certain higher Polish commanders considered it most important to withhold under their direct orders as large bodies of reserves as possible. Of course, a higher commander can personally direct a battle or influence it in any way, only if he has on hand effective reserve supports.

A series of strong points, such as villages, railroad stations, etc., were organized in great depth and occupied by independently acting groups. Strong advance guard posts, both mounted and on foot, were placed far to the front. This arrangement afforded an opportunity for striking the enemy on the flanks whenever he broke through, possibly defeating in that manner his purpose.

The name usually given to this form of fighting was an active defense. To a certain extent it agreed somewhat with the temperament of the Polish soldier who had proved himself more fitted for adapting his nature to it than to a passive defense. The strength of resistance of the latter is less than that of the former.

ARTILLERY TACTICS AND FIRING

I relate the following incidences because I consider them important when firing and manœuvring artillery in movement warfare. Certain facts stood out with particular vividness. They were the salient features of all warfare. Formerly, before the war, I was not prone to give some of them much thought. But after having been confronted with numerous and varied situations, I feel that their importance cannot be overemphasized. I was fortunate in having been assigned to the 11th Polish Division because these facts were brought home to me in a more impressive manner than would have been the case had I been attached to one of the better and more matured Polish divisions.

1. The numerous orders received in action, on the march, and in the billets were conspicuous for their lack of a continued execution of some one definite plan. Such a plan should have aimed boldly toward the general goal and might have been later modified by the

THE FIELD ARTILLERY JOURNAL

progress of events, as the situation demanded. Poor results and the weakening of the *esprit de corps* are due to the initiation of a piecemeal and a wavering preparation.

Orders were frequently used which were the direct opposite of orders issued earlier, sometimes even a few hours. This also occurred in the American Army during the march to the Rhine. The frequent changes of order in column, kinds of ammunition in batteries, the unnecessary interchanging of battalions and batteries within the same or between different battalions, and the return of the same batteries or battalions to their former positions (sometimes the order for the second change would come a few hours after the first change), could find its justification not only in the lack of a definite plan, but also in the general constant desire to see things moving.

There is a fault which can cause much trouble. It is the failure to send to an organization beforehand, a word of warning, foretelling some contemplated movement. Orders when received usually demanded *immediate* action without consideration of the time necessary for preparation. Artillery requires a little time for preparation.

Battery and battalion billets were often selected from the map without regard to the situation or the comfort of the men and of the horses. In some instances batteries, upon arriving at the designated villages during the night after a long march, found them already occupied by troops of other organizations.

During the nine days that the artillery remained within the area of Brest Litewsk (September 1–10), I was twice placed by written orders, on two different occasions, in command of artillery in the southern half of the eastern sector. According to the orders, this artillery was supposed to be defending Brest Litewsk. When I was not in command of the sector, other officers were being changed about in a similar manner and placed in command of it for a day or two. As there was not at that time in the Polish Army, any uniform method for preparing a defensive plan of fire organization, different kinds of plans were attempted but none completed.

The above and similar occurrences may appear offhand of minor importance, but they were nevertheless, in many instances, avoidable and resulted needlessly in:

- (a) Increased fatigue to soldiers.
- (b) Very tired and improperly cared for horses.
- (c) Natural discontent incident to frequent unnecessary changes which even the ordinary soldier could sometimes comprehend.
- (d) Numerous delays on the part of the artillery, which delays caused misunderstandings, confusion and at times, hard feelings between officers.

ON THE POLISH-BOLSHEVIK FRONT IN 1919 AND 1920

- (e) Inability of battalions and batteries to efficiently prepare even a temporary organization of fire within the sector assigned to them.
- (f) Without a prepared flexible organization of fire, no fire concentration could have taken place in *time* to be of any good.

I must admit that many of the errors committed were justified by events that preceded the operations. The Polish Army was, to a certain extent, like the American Army. The latter was a young organization and the defects that were apparent were due primarily to our necessarily hurried and abnormal expansion from a small unit into an army of millions. On the other hand, the Polish Army was not only young but an entirely new organization.

The staffs of all units are the most important and yet the most difficult to train. Such training requires a lot of time. The situation in our army was more favorable in that we had a fairly efficient staff organization before the war. This enabled our higher staffs later on to meet more confidently the varied situations of actual warfare. But the Polish staffs had been organized since the armistice. Among the staff personnel there were comparatively few who possessed prior general staff training and there had not been time to put others through some course of instruction.

This is an important lesson for the people of America. Our general staff in time of peace should be a few times larger in number than the tables of organizations normally require.

If we had been thrown on our own responsibilities right from the very beginning and under the same conditions as the French were, could we have accomplished the same results in the same space of time?

The beneficial effects of French assistance to our army in France cannot be overestimated. At every important point there was to be seen a capable French officer or sergeant who was always on hand with very valuable advice.

I believe that one of the greatest tasks that the French ever put over—which is a proof of their extraordinary forethought and patience—was to place at our disposal a large, excellently trained personnel who could speak the English language. Over two million Americans in France were not required to have even the most elementary knowledge of French in order to learn the warfare as it was then being fought on the western front. It was a wonderful feat. They met us with our own language. Imagine what would have happened if two million French soldiers arrived in the United States and we had to do all the instructing in their language.

Everything that money, national prestige and moral influence could obtain was ours in France. This was not the situation in

THE FIELD ARTILLERY JOURNAL

Poland in 1919 and 1920. Europe was just getting over the World War. All aid that was received by Poland was given begrudgingly and doubtfully, probably even with a taint of unjust suspicion.

2. It is understood that divisional artillery is placed in reserve when it is exhausted, shot up or otherwise unfit to perform efficient work on the front. Nevertheless it appeared as though there was a constant endeavor to place batteries in reserve even though such batteries were in fairly good condition. In the Brest Litewsk area, at least two batteries were kept in reserve almost continuously near the other batteries which were in position. In the event of a strong attack by the Bolsheviks these batteries would have been unable to throw effective fire upon the enemy at the proper time.

In a situation where the Bolsheviks had little artillery and no observation of any kind, it would have been putting the artillery to more effective use by placing all the batteries in positions and then whenever the situation required it, to move forward a platoon from any one battery for special missions with the infantry. Under the conditions existing at that time, batteries rested best when "dug in," with the guns near the villages in which were quartered the horses and the greater part of the men. A more comfortable arrangement was possible than would have been the case if the Bolsheviks had been able to counter-battery.

3. In order to obtain the most efficient fire direction, the units of one command should be centralized as much as is possible and whenever the military situation permits. Yet it appears that the tendency toward decentralization of a command and of the fire power was the common occurrence. The *battalion* is the tactical firing unit. Every device should be used to keep it as such. Batteries and platoons should not be turned over unconditionally to infantry commanders whenever it is possible for the battalions to which those batteries and platoons belong, to operate as a tactical unit. Special missions are frequent in movement warfare and it will be necessary to make such divisions, but when these divisions are unnecessary, then the shifting of responsibility to battery and lower commanders appears to be the only aim. The fire power of artillery is thereby destroyed. The rapidity and efficiency with which a battalion or higher commander might coördinate, or concentrate it upon a given point, at the proper time, are seriously hampered because of the divided and independent battery-firing organizations.

The front of a battalion of infantry may be too wide to be effectively covered by the fire of an artillery battalion. The fronts of the respective companies may vary in width. They may be irregularly distributed over the terrain, with unequal spaces between them. Under those conditions it would be an error to assign one battery independently to each company. The situation would be best solved

ON THE POLISH-BOLSHEVIK FRONT IN 1919 AND 1920

by the concentrated fire of the three batteries upon the most threatened point or part of the line.

Another false tendency is the other extreme: ambition for concentrating. Certain brigade commanders in the American Army were also overambitious in this way. Although their commands had been split up, that is, the regiments or battalions detailed in support of various infantry units (which shifting about is at times necessary when moving forward rapidly), they were nevertheless very jealous of this division. Instead of being satisfied to exercise merely the functions of general supervision and administration over the care and the supply of their units, they endeavored by every means possible to retain direct command of all of them, even down to batteries and guns.

By the improper division of responsibilities an excellent opportunity was lost to develop the initiative of junior officers. The demand of the higher commanders should have been for concrete results. The method of obtaining these results should have been left to the immediate commanders, guided by necessary instructions. The Polish battery commanders on the whole were good artillerists. Their control of fire was even excellent in some cases. Most of them were former officers of the Russian, Austrian and German armies. What they needed was encouragement and incentive to go ahead with the work within their proper spheres. A feeling among them that they would be held responsible for certain results was all that was necessary to obtain excellent improvement in conditions. But instead of an intelligent and considerate form of procedure, we saw in the higher artillery commanders a tendency to control the actions of subordinate officers, leaving very little field for individual initiative.

If visible signs of fire direction were to be seen it was due, in specific instances, to the initiative of certain battalion and even battery commanders. If single guns were placed in advanced positions it was also due to their initiative, although the use of advance guns was not as general as should have been the case.

4. A serious error is often made in the failure to take proper precautions on every occasion by preparing for any possible emergency, especially when the enemy is hurriedly retreating. One should always credit the enemy with doing that which we least desire or that which we might try to do were we in his place.

During a halt of a few days near the Szczara River, nothing was done to prepare our sector for defence by designating lines of defence, eventual battery positions, etc., as precautionary measures. War was still going on. The Bolsheviki might attack. This was the same situation (11th of November) within the area of Sluck. No orders had been received since the 13th of October requiring the

THE FIELD ARTILLERY JOURNAL

preparation of defence plans. Peace had not yet been signed. Such plans might have included eventual assembly places for troops, lines of resistance, eventual battery positions, the fires, sectors, observation posts, liaison nets, etc. This preparation would not have necessitated the movement of troops which were naturally scattered all over the terrain on account of the quartering conditions. It would have been merely a defensive measure taken in the event that the Bolsheviks should attack.

There is only one reason that might have justified this condition of affairs exclusive of the reasons given in the foregoing pages. Possibly the Polish higher commands felt the absolute certainty that the Bolsheviks would not come back and attack. This is very probable because the retreating Bolshevik soldier at that time had very little fight in him. Such certainty would have been impossible in the face of a more trained enemy.

5. In the majority of cases the preparatory data for firing was made with the aid of the map. The 1/100,000 map was used for this purpose. This preparatory data (the magnetic north angle and the range) was fairly accurate and the method gave satisfactory results. The aim was to obtain initial firing data, which, when used, would throw the first salvo in the direction or the zone where the observing officer was looking for it. This latter result, when firing by light of day, was always obtained. When the batteries had had time to adjust their fire during the day on certain points within their sectors, moderately accurate fire could be directed upon any threatened point within the respective sectors during the night. When the batteries had not had time to adjust their fire, then the accuracy of such fire was problematical. Upon the receipt of a report that the Bolsheviks were attacking a certain point, a short period of observed sweeping zone fire generally sufficed to hold them temporarily. But, of course, this would not always be the case against a trained and determined enemy. For fire during the night without previous day adjustment, in addition to the data obtained from the map, adequate allowances had to be made, for reasons of safety, in the range, and also, if possible, certain meteorological conditions were considered. Precision fires were never used. Zone, sweeping and systematic fires were of the most common occurrence.

The other method of firing was direct fire with open sights. Seldom were guns laid for indirect fire by the use of B. C. instruments. This was due, to a large extent, to the character of the terrains across which the battery commander or observer had to move forward with the advancing infantry. The practice of laying the guns by the B. C. instrument under the conditions then existing, was superseded by a more practical and easier method. In possession of a 1/100,000 map, the observer merely noted thereon by a dot,

ON THE POLISH-BOLSHEVIK FRONT IN 1919 AND 1920

the location of his battery and proceeded forward paying very little attention as to how far he was proceeding, to the position of the guns with relation to his observation post, or to the direction line of his guns. He was concerned primarily with the enemy, with his own infantry and with the terrain over which he was passing. After he had reached a suitable place from which to observe, he identified on the map some point to his front, drew a line from the latter point to his guns, and telephoned the magnetic north angle and the range with other corrections to his battery.

6. An observer from each battery was always well up toward the front, very frequently in the front lines of the infantry. During an advance either one section or a platoon accompanied each advancing infantry battalion. A platoon was found to be the more practical. A system was worked out by means of which one gun was always ready to fire. It was connected by telephone with the observer. The other gun was in motion toward the observer. When the latter gun had proceeded forward far enough (that is, in advance of the gun already in position), the telephone line was cut near by it and a telephone was attached, while the gun furthest to the rear was started forward and the wire between guns rolled up. If only one section were used, the gun must necessarily be out of action during the time that it was in motion. The latter fact was bound to have a bad moral effect upon the infantry whenever armored cars and trains were expected. A gun of the same calibre as the field gun but of the howitzer type would have been preferred, due to its curved fire and the ease with which it might have been concealed.

7. The telephone was our chief means of communication. The telephone will always work, if not at once, then after a short delay. In the Polish Army, where there were telephones and telephone controls of many varieties, Austrian, Russian, German and French, the telephone had never failed to work. Sometimes its operation was delayed but the more experienced the personnel, the shorter the periods of delay. Each battery had from seven to eight miles of wire. With sometimes two forward observers per battery, most of this wire was in constant use. It is of primary importance that the artillery have its own independent liaison net. In the army during the advance, the higher commands ran telephone wires to the lower units while during the retreat, the reverse took place.

Flag signalling was never resorted to, due no doubt to the efficiency of the telephone. Also, the nature of the country and the position of the forward observers made its use impossible. Some of the batteries were proficient in flag signalling.

8. When on the march each gun carriage, caisson and wagon had with it some loose hay. At every stop or halt for at least a few

THE FIELD ARTILLERY JOURNAL

minutes, the drivers would drop their horses a little hay. When the column moved on, the drivers or cannoneers would pick up what hay remained on the ground. This habit gave good results, for it helped to keep up the strength of the horses which got on the average as little as two or three pounds of oats per horse per day. A soldier will always contrive to get some hay for his horses if he loves them and he should be permitted to keep such hay near him on his carriage. He should be encouraged to seize every opportunity to procure it when the regular supplies fail to arrive. Fear that the Bolsheviks (as was the case with the American Army on its march to the Rhine in the presence of the Germans) might be displeased by the unsightly appearance of artillery carriages with hay packed up on the limbers, was not permitted to interfere with the welfare of the horses and a soldier's love for them. For the lack of grooming kits, the horses were rubbed down for months with nothing more than barley or rye straw. It was never necessary to hitch more than six horses to a gun carriage or caisson. Frequently not more than four horses were used.

9. Each Polish battalion commander has attached to him a quartermaster and a personnel officer. The former performs general quartermaster duties: the procurement of food for animals and men and the various other supplies and materials needed by a battalion. The personnel officer helps the quartermaster and is also the paymaster of his battalion. I think this is an excellent arrangement especially that of having attached to a battalion staff, a quartermaster officer. In mobile warfare, the battalion acts more independently. It is more advantageous and easier for it to supply itself with its own transportation from a rendezvous or refilling point than would be the case if a regiment or other headquarters, not interested personally in them, attempted to supply two or more widely scattered battalions. When the Lieutenant, my quartermaster officer, reported to me for duty, I informed him that I had no intention of giving much thought as to the whereabouts of his train (which was under my orders) or of the needs of my batteries; that he was to take those burdens upon his own shoulders. He was a very efficient officer and in the days that followed, I could devote all the time to my firing batteries, manœuvres, the firing, our infantry and the enemy.

10. In open warfare, it is absolutely necessary that a battery be very mobile. Therefore an arrangement, whereby a battery commander during an active campaign would be responsible for only that which he used from day to day (say the first five sections), with the remaining caisson sections assembled together within each battalion in the nature of a caisson company under the command of a separate officer (also of the battalion), would, I think, be very satisfactory. Placing the various supplies within reach of a battalion

ON THE POLISH-BOLSHEVIK FRONT IN 1919 AND 1920

should be the primary function of the regiment and higher units. The battalion should be furnished with the means to procure those supplies intended for its own use.

The small country baggage wagons are very practicable. They can go almost anywhere, and if necessary, be taken apart quickly and carried across a stream.

11. A system of coördinates, even double kilometric squares, superimposed on these 1/100,000 maps, would have greatly increased the efficiency of the work both for the artillery and for the infantry. It would have facilitated and hastened the responses of the artillery to the calls made by the infantry for artillery fire. The ideal map for the use of artillery in mobile warfare would be either the 1/40,000 or the 1/50,000 with a superimposed quadrilateral system of coördinates.

12. The pantograph issued down to include battalion commanders, when none other than the 1/100,000 map was obtainable, would have proved a very valuable instrument. For special, temporary or rather short-period operations, directions for firing on tracings which contained greater details, might have been given to the units interested. The tracings could be made to a larger scale easily and rapidly. When the infantry receive a tracing like that, they seldom need any long accompanying verbal or written explanation.

13. Light one horse, two-wheeled carts with proper mechanism for quickly dropping and rolling up wire would have proved of great service to the artillery, especially for accompanying guns. Quantity would not have been as valuable as mobility, ease in concealing and handling. About two miles of light thin wire per cart would have been adequate. A six-horse telephone carriage of the American type would have been too cumbersome and practically useless in Poland in battery and battalion manœuvring.

CAVALRY

The attachment of the Polish soldier for his horse is sincere and probably an hereditary trait. As a rule he makes a good horseman. The traditions of Poland of hundreds of years ago have done much to create the splendid *esprit de corps* that exists at the present time in certain mounted units.

At the beginning of the Bolshevik offensive, the Polish Army was seriously handicapped by the lack of sufficient forces of cavalry. In order to meet the destructive attacks and raids of Budena's Cossack cavalry, a corresponding force, giving strong protection to the front, the flanks, and along the lines of communication was needed. This was the primary cause for the retreat of the Polish Army. Bolshevik cavalry, sometimes in numbers as low as ten,

THE FIELD ARTILLERY JOURNAL

would pass through the Polish lines, suddenly attack hospital and other columns or units, put all, even the wounded, to the sword and disappear. The entire incident would ordinarily last but a few minutes, so quickly was it done.

Within the terrain of operations of hostile cavalry, independent Polish fighting units customarily concentrated in villages. To meet the mounted attacks, use was made of advance guard posts and patrols and of an organized line of resistance in front of (outside) the village. The village proper was prepared for defence. Entrances were blocked, roads were closed, machine guns efficiently placed. Advantage was taken of all other means of defence such as fences, ditches, houses, etc. It was the intention of the Polish commanders to defeat the Bolshevik charge beyond the outskirts of the village.

Sometimes the Bolsheviks attacked in what might be called a crescent formation. A Cossack cavalry force upon sight of a Polish mounted body would immediately advance to the charge with the front of their line dented to the rear (form of a crescent). Immediately after the two forces had clashed together, the Bolsheviks would suddenly swerve about and gallop to the rear. The Poles would probably follow. But prior to that, the two Cossack wings (points of the crescent) during the charge, did not stop with the rest but kept on galloping for some distance further until they became screened behind woods or other barriers. At a given signal, they would emerge from their hiding-places and attack the Poles on the flanks and in the rear.

The Bolshevik cavalry instituted a method of using their machine guns which had not been practiced in other armies until that time. The guns were mounted on small, light, two-wheeled, one-horse carts, always prepared for action. They could fire at a moment's notice from the carts, by facing the rear ends in the general direction of the objective.

THE INFANTRY AND FIELD SERVICE

The Polish Army contained some very good divisions of which the 14th, 15th and 16th Pozanian, and the 1st, 2nd and 3rd Legionary might be mentioned. The method of attack of the former was steady, massed and heavy, while that of the latter was lighter and resembled very much the skirmish formation.

It appears that the greatest possible use was not made of machine guns. They should have been compelled to keep up with the attacking infantry. They generally postponed the occupation of the forward positions until the latter had been made secure by the infantry.

When marches are undertaken in situations similar to those which existed on the Bolshevik front, machine guns should not march together in machine-gun company formation, but should be distributed

ON THE POLISH-BOLSHEVIK FRONT IN 1919 AND 1920

throughout the column. Guns must be prepared for instant action and their personnel must always accompany them. The same distribution should be made of the artillery, possibly a platoon to a battalion of infantry.

The forward reconnaissance of the infantry of the 11th Division might have been bolder and more determined, more thorough and persistent. It kept very close to the main body. The reports sent in from such reconnaissance parties frequently overestimated the strength of the enemy.

The service of security was not as well conducted as it might have been. The old rule that "a main body without artillery should be safe from rifle fire and a main body with artillery should be safe from hostile artillery fire" was not generally lived up to. At times the advance guard failed to make it possible for the main body to proceed unimpeded by smaller obstacles and without unnecessary halts.

When the column reached the Szczara River and the Sluck road, it was delayed about thirty hours because the reconnaissance had not been bold and thorough. It was reported that the infantry could not cross at once because all the crossings had been either burned or destroyed. The main bridge was reported as entirely destroyed. This river divided formerly, the Russian and the German occupation forces during the World War. But the main bridge was not destroyed. On the night of 2nd-3rd October, the infantry crossed the river by means of loose boards over the smoldering piles.

I had an excellent opportunity to observe closely the work of the infantry in numerous engagements. The infantry of the division as a whole did not place enough reliance in its own weapon. It never aimed, in any one instance, to gain its point by rifle fire superiority. It did place reliance in the machine guns which were used consistently. The fact that it advanced so rapidly was due to certain company and battalion commanders who were very efficient.

The Polish engineers did excellent work in the construction and repair of bridges. Bridges, 50 metres wide, strong enough to hold artillery and heavily loaded trucks, were constructed in from three to four hours.



CURRENT FIELD ARTILLERY NOTES

Organizing a National Guard Battalion

COLONEL E. ST. J. CHAFFEE of the Reserve Corps and Rhode Island National Guard has consented to give us the following account of the organization of a battalion after the war. He has a live and progressive organization today. His means and methods are interesting.

"The Rhode Island Batteries were called into Federal service in July, 1917, as a three-battery battalion. Used as components of the 103rd Field Artillery, they left for France in September, 1917. They saw about nine months' service at the Front and were returned to the United States and mustered out April, 1919.

"After such a period of service there were few interested in reorganization. Of course all pre-war organization was gone. There was not even a nucleus to build upon. One item, however, remained. A corporation used before the war to hold and manage the battalion fund remained in existence, and the fund in its possession was substantial.

"The Adjutant General of Rhode Island requested various officers to take up reorganization, but no one was available until a former captain of Field Artillery bravely undertook Battery A in the fall of 1920. The work dragged. It was five months before the Command was accepted by the Federal Government and then with approximately sixty-five men. But suddenly, with the spring of 1921, the announcement that the equipment would be French "75's," horsed, the generous use of funds to assist in recruiting, and the enlistment of undergraduates from Brown University, the Command was in excess of one hundred men within ten days.

"Shortly thereafter Battery B was reorganized and accepted with four officers and eighty-five men, the recruiting being accomplished within three weeks. Fifty per cent. of the eighty-five men had served in the war and many of its noncommissioned officers as officers. Nothing more was done in the way of reorganization until the following October. By this time public support and newspaper publicity were the powerful factors. Former officers who could not assist by joining the newly formed organizations saw that the battalion fund was amply supplied and sent in recruits. French "75's" and other matériel had begun to arrive. On November 7th some 64 artillery horses detrained at Providence. On November 11th, with horses clipped and polished, with steel helmets, with famous

CURRENT FIELD ARTILLERY NOTES

cannon from French arsenals, with new silk guidons, a detachment from Batteries A and B made their appearance. Something of war's reactions must have gone by for no one will forget the cheers of the veterans forming for the Armistice Day parade when this detachment from the Field Artillery trotted along their front, and rumbled into its place in the column. The outfit was welcomed with applause all along the line of march and by November 17th, Battery C and Headquarters and Combat Train, both well over strength, had been accepted and the battalion was complete.

"After any war there must be reorganization, it seems. But the whole work would have been greatly simplified, of course, by having retained in service at least a small nucleus with equipment of horses and guns upon which to build.

"All difficulties of reorganization, however, seem to disappear when the public says, 'these are our troops, we must give them a hand,' when newspapers give the project ample publicity as one of the important affairs of the day, when an officer is placed on duty in a down-town office and has only this object to work for, when men engaged in recruiting are paid some reasonable compensation for the time which must be expended on it, and finally when you have so attractive a proposition to present to officers and men as the horses and guns of Light Artillery."

Summer Camps

REPORTS from the various summer camps indicate a uniformly successful effort. One quite general suggestion for improvement seems to be in the way of grading the work to fit the experience of the Reserve Officers attending. Such problems will no doubt find solution with experience. Lieutenant Colonel Robert C. Lowry, M.I., O.R.C., comments as follows on a typical camp at Fort Sam Houston, Texas:

Members of the Officers' Reserve Corps who attended the recent training camp at Fort Sam Houston, July 15th–29th, believe the course of instruction as developed during the camp the most thorough and comprehensive since the inauguration of the Reserve Officers' Training Camps. The course for artillery officers was divided into two phases, that of special instruction in the respective branches of the Artillery Service and general tactical instruction involving the use of light and heavy artillery in various combat phases.

The camp opened with a demonstration arranged by Brigadier General Paul B. Malone, commanding all summer camps at Ft. Sam Houston, at which time light and heavy artillery participated in firing on targets visible to hundreds of spectators as well as members of the

THE FIELD ARTILLERY JOURNAL

Reserve Corps attending the camp. One battalion of 75's was used as well as one platoon of 155's of the famous Second Division Artillery. One battery was manned by R.O.T.C. students who were just completing their course.

At another period of the course of general instruction a demonstration was given by a battalion of the 12th Field Artillery commanded by Major Fred T. Cruse, showing a battalion going into position. In view of spectators, the observation posts were established, scouting done, batteries located, wire strung to the various posts, signal communications established, targets located, etc. During the course of these manœuvres the explanation was carried on in detail so as to acquaint all those present with the various steps followed in putting a battalion of field artillery into action.

During the first three days of the camp special instruction in the technical branches of the arm were given as a preparation for the solution of a series of tactical problems to be staged during the last week of the camp by the special team from Leavenworth. Student officers were divided into two groups with reference to their assignment to light or heavy artillery, and at some period of the instruction period each student officer was given an opportunity to function as commander of troops in his proper grade both at parade and in manœuvre. All of this was done prior to engagement in the tactical problems.

The tactical problems developed by the Leavenworth team over the terrain near the camp developed the advance of a division of Blues opposed by a reinforced brigade of the Reds and called into play various phases of combat and styles of engagement at which time the artillery officers were called upon to demonstrate their tactical ability in the placing of their weapons in conjunction and in coöperation with the other arms.

Army Contact Camps

AN interesting innovation in instruction camps for National Guard and Reserve Officers was undertaken this summer in the Second Corps Area in the form of what might be termed a voluntary camp. Its nature is indicated in the following sketch written by Lieutenant Colonel K. T. Smith, Infantry, Camp Commander. His expectations seem to be borne out in the result of the camp and may prove to be the forerunner of a considerable activity.

Located on U. S. Senator James Wadsworth's estates, bordering the beautiful Lake Conesus in Western New York, and 25 miles south of Rochester, is being initiated an experiment in the further development of the Three-Component-Army which gives promise of great and lasting possibilities.

CURRENT FIELD ARTILLERY NOTES

Word was sent throughout the state to all Regular, National Guard and Reserve Officers that the camp would be in operation from August 22nd to September 15th and that its purpose would be two-fold; first, to provide a means for the limited instruction of a large number of Reserve Officers who, through inadequate Federal appropriations were unable to attend this summer's regular training camps; and second, and almost equally important, the assembly of designated units during certain specified periods. More or less elasticity in the execution of this latter feature has been provided for to permit officers attending at any convenient time whose business or personal affairs will not permit of any specified time of attendance.

To date, the optimistic expectations as to attendance and interest, by those behind this novel movement, have been greatly underestimated. The camp, in addition to accomplishing its mission in full, has provided closer contact and understanding among the three components; the officers of each unit assembled, and finally, among the Executive Officers, Instructors and Supervising Staffs.

"Camp Wadsworth," the official and fitting designation of this year's camp, owes its existence to Lieutenant Colonel Nathan C. Shiverick, Cavalry, O.R.C., who conceived the idea, and to Brigadier General William Weigel, U.S.A., acting for Major General Robert L. Bullard, Commanding the 2nd Corps Area, who provided the means.

A picked detachment of one officer and twenty enlisted men from Madison Barracks with Mess Sergeant and Cooks from Camp Dix furnishes an organization sufficiently large to accommodate one hundred and fifty officers. Visiting officers pay for their transportation to and from camp and at the rate of one dollar and a half per day for meals; tents, blankets and orderly service are furnished them without cost.

Instruction is confined mainly to the forenoons, and has for its purpose the emphasizing of outstanding principles applying to:

- Organization, to include the Regiment.
- Employment of the Branch.
- Tactics, to include the Battalion and Squadron.
- Map Reading.
- Combat Orders.
- Staff Organization.

The instructions provided at Camp Wadsworth are arranged into three courses; one each for the Infantry, Field Artillery and Cavalry. Each course consists of a three-day schedule which is repeated for every week during the period of the camp.

The principles brought out are those which can best be exemplified

THE FIELD ARTILLERY JOURNAL

by means of thirty-minute lectures, conferences and by tactical walks.

The attendance to date has been heaviest over week ends and is figured on averaging at such times between 100–150. Considering the short notice that officers have had to arrange their visits, and the fact that the great majority of them had already taken advantage of their summer vacation, this is considered by those in touch with conditions as more than satisfactory.

For future years it is well within the range of possibilities for the establishment of one or more such camps in every state, to run during the months of July and August. It seems that no more economical and popular means of furthering the establishment of our Military Policy has yet been developed.

The Camp Wadsworth organization consists of Lieutenant Colonel K. T. Smith, Camp Commander, and Instructor in Infantry; Major J. L. Topham, Camp Quartermaster; Major J. H. Van Horn, Instructor in Field Artillery; Major W. M. Modisette, Adjutant and Instructor in Cavalry, and 1st Lieutenant A. T. McCone, Field Artillery, Commanding Detachment.

Field Artillery Association Membership at Fort Bragg

AT one time during the past summer the officers of the Second, Fifth, and Seventeenth Regiments, the Thirteenth Ammunition Train, and the Thirteenth Brigade Headquarters and Brigade Headquarters Battery, all at Fort Bragg, were all members of the Field Artillery Association. That is a creditable showing and one deserving emulation by friends of the Association.

Results of the Colorado Endurance Ride

THE Colorado Endurance Ride was finished August 3rd. Nineteen horses crossed the starting line Monday morning; seven horses crossed the finish line Friday afternoon. "Commodore," owned and ridden by Captain D. S. Perry, 13th Cavalry, died at two o'clock the first day out. The attending veterinarians reported the horse was excellently cared for and handled, the death being accidental and caused by acute indigestion and resultant gas pressure. Two more horses finishing Monday evening failed to start Tuesday. Six were counted out or withdrawn Tuesday. Eight crossed the finish line Wednesday evening and seven Thursday.

Of the seven horses finishing, Norfolk Star, winner of this race last year, was given first place. He was owned and ridden by Captain H. E. Watkins, 13th Cavalry.

Nintu, owned and ridden by Lieutenant M. M. Corpening, 18th Field Artillery, was awarded second place. She finished three days

CURRENT FIELD ARTILLERY NOTES

of the ride in the minimum time of nine hours, and her total time for the week was 45:44, which is the best record made by any horse in the Colorado endurance rides this year or last, and is within 27 minutes of the fastest record ever made in the New England rides, where the

horses carry the same weight and have no altitude to contend with and no elevations of from 1200 to 1700 feet to climb each day. Moreover, the Eastern rides are held in the cool weather of October.

THE FOLLOWING CHART SHOWS THE HORSES IN THE ORDER OF MERIT AWARDED BY THE JUDGES

Horse	Owner	Rider	Breeding	Age	Height	Weight at start	Weight at finish	Total time	Points on time	Points on condition
Norfolk Star	Captain H. E. Watkins	Captain H. E. Watkins	Thoroughbred	8	16.0	1000	985	46:04	31.47	58
Nintu	Lieutenant M. M. Corpening	Lieutenant M. M. Corpening	Thoroughbred	10	15.3	1045	1030	45:44	34.13	53
Babe	Mr. E. A. Pring	Todd Flynn	Half thoroughbred	8	15.0	950	935	46:45	26.00	56
Indianola	Mr. J. F. Welborn	H. R. K. Tompkins	Thoroughbred and Percheron	7	15.3	1080	1065	46:00	32.00	47
Captain	Mrs. C. L. Tutt	Ed. Bronson	Standard	8	15.1	1055	1005	46:52	25.07	50
Kansas	Mrs. R. K. Daugherty	Jack Joyce	Saddlebred	10	16.0	1160	1125	47:33	19.60	44
Chief	Mrs. Spencer Penrose	Jack Hall	Standard	7	15.2	1065	1005	46:53	24.93	—

Both Captain Watkins and Lieutenant Corpening are planning to enter the Eastern Endurance ride to be held at Avon, New York, October 15, 1923. The best wishes of the western horsemen go with them.

THE FIELD ARTILLERY JOURNAL

Eastern Endurance Ride for 1923

THE Endurance Ride for 1923 will be held in and about Avon, New York, from the 15th to the 20th of October, 1923. This ride is held annually under the direction and management of a Board of Sponsors. Among these Sponsors are the American Remount Association, United States Department of Agriculture, Horse Association of America, Arabian Horse Club of America, The Morgan Horse Club, Thoroughbred Horse Club, and others.

The object of these rides as approved by the War Department, the Chief of the Remount Service, the Chief of the Bureau of Animal Husbandry of the Department of Agriculture, and the Sponsors is to stimulate general interest in the breeding and use of good saddle horses of a general utility type. In particular it is desired:

- (a) To demonstrate the value of type and soundness and the proper selection of horses for a long difficult ride;
- (b) To learn and demonstrate the proper method of training and conditioning horses for a long severe test;
- (c) To encourage horsemanship in long-distance rides.
- (d) To learn and demonstrate the best methods of caring for horses during and after a long severe test, without the aide of artificial methods or stimulants.

The total distance will be approximately 300 miles, to be covered at the rate of about 60 miles a day for five consecutive days, regardless of weather. The distance for any day may be slightly more or less than 60 miles, depending on local conditions. The course will be plainly marked to include numbering the miles from one to sixty for each day.

Awards are made on the basis of 60 per cent. for condition and 40 per cent. for speed. The minimum time permitted on each day is 9 hours; the maximum time 11 hours. The maximum time allowed for the whole race is 50 hours. The maximum score is 40 points for 45 hours and the minimum score is 0 for 50 hours with one point for each 7½ minutes between.

The use of halters, saddle cloths, blankets, brushes, currycombs, etc., is permitted provided that they have been carried on the horse. Hand rubbing and the use of water at the ordinary temperatures are permitted, but salves, liniments, cotton, bandages, etc., are forbidden, Rubbing cloths may be used as such but not as substitutes for bandages or swabs. No medicine, drug or stimulant of any kind may be administered to any horse, except under the direction of the official veterinarian.

CURRENT FIELD ARTILLERY NOTES

Each horse carries a minimum of 225 pounds made up of the stripped weight of the rider (live weight) and everything else that he carries (dead weight). If the stripped rider weighs more than 155 pounds the horse carries a minimum of 225 pounds plus one pound dead weight for every two pounds live weight in excess of 155 pounds.

In addition to the usual ribbons, the following prizes will also be awarded:

First Prize, \$600, the Mounted Service Cup, Arabian Horse Club Medal, The Morgan Horse Club gold sleeve link cuff buttons.

Second Prize, \$400, The Morgan Horse Club gold sleeve link cuff buttons.

Third Prize, \$300, The Morgan Horse Club gold sleeve link cuff buttons.

Fourth Prize, \$200.

Fifth Prize, \$150.

Sixth Prize, \$100.

In addition to the foregoing prizes, bronze medals appropriately engraved with facts pertaining to the ride, will be awarded to each rider who successfully completes the 300-mile Endurance Ride. These are given by the Horse Association of America as a memento which the riders may retain.

Polo

Junior Championship

THE Army Junior Championship Team retained its title at Narragansett on August twenty-second by defeating the Point Judith Club 14-6. The tournament scores were as follows:

Army	13	}Army	10	}Army	14	}	
vs.			vs.						
Orange County	7	}	Penllyn	6	}				
						vs.			
Bryn Mawr	2	}							
vs.									
Point Judith	14	}			Point Judith	6	}Army

The army line-up was Major Arthur H. Wilson, No. 1; Major John K. Herr, No. 2; Lieutenant Colonel Lewis Brown, Jr., No. 3; and Major Louie A. Beard, No. 4, with Major William W. Erwin

THE FIELD ARTILLERY JOURNAL

substitute. The laurels of this team was at no time in danger. Immediately upon conclusion of the tournament they went to Meadow Brook for a short rest and the final preparation to meet the British Army team.

The arrival of the British team was delayed due to strikes in England. The Inter-Army play is planned to be at Meadow Brook, as the JOURNAL goes to press, on September 12th and 15th, and on the 18th if a third game is necessary. The Junior Champions will represent the Americans. The British line-up will be Lieutenant Colonel T. P. Melville, No. 1; Major F. B. Hurdall, No. 2; Lieutenant Colonel L. P. Leaf, No. 3; Major Vivian M. Lockett, No. 4, and Lieutenant McCreery, substitute. This team carries a twenty-nine goal handicap while the American handicap is 19. The Inter-Army games will of course be played without handicap.

Following the Inter-Army play, the Open Championship will be played off at Meadow Brook on September 18th, 19th, 20th and 22nd; and the Monty Waterbury Cups September 24th, 27th and 29th, all American and British teams contending.

Army Second Team

The Army Second Team lost its chance for the twelve-goal championship in the finals against Penllyn Club by a score of 6-8. The game was very even all the way through, the first half ending in favor of the Army 5-4. In the next period Army scored again, and had the lead 6-4, only to be nosed out in the last three periods. The scores of the twelve-goal Championship follows:

Rumson	5		Penllyn	8			
vs.			vs.				
Penllyn	6		Point Judith	2			Penllyn
			vs.				8
Army	8		vs.				6
vs.							
Bryn Mawr	2						Penllyn.

The Army was represented in this tournament by Lieutenant T. Q. Donaldson, No. 1; Lieutenant C. C. Jadwin, No. 2; Major T. Allen, No. 3, and Major R. E. D. Hoyle, No. 4. Major V. P. Erwin, who entered the season a regular member of this team, was seriously hurt when his pony fell in a preliminary game. His loss was keenly felt by the team.

CURRENT FIELD ARTILLERY NOTES

The summary of the team's play at Narragansett is given below:

Rhode Island Cups	Atlantic Cups
July 30th—Army, 12; Bryn Mawr, 8.	August 4th—Army, 7; Penllyn, 3.
August 1st—Army, 10; Rumson, 11.	August 6th—Army, 17; Flamingo, 7.
(Semi-finals)	August 11th—Army, 7; Green River, 6.
12-goal Championship	(Finals) Rathborne Memorial Cup
August 13th—Army, 8; Bryn Mawr, 2.	August 23rd—Army, 17; Shewsbury, 9.
August 16th—Army, 6; Penllyn, 8.	August 26th—Army, 3; Green River, 9.
(Finals)	

Upon completion of the Rathborne cup tournament the Army second team was disbanded and the players and ponies ordered to return at once to their proper stations.

Philippine Polo

The midyear Polo Tournament was played at the Manila Polo Club May 24th—June 11th. Teams were entered by the 26th Cavalry, 24th Field Artillery, Fort William McKinley (two teams), Headquarters Philippine Department, Manila Polo Club and a British team from Hongkong.

The tournament was most interesting throughout and characterized by many surprises. The Cavalry team won their games from the Artillery, were defeated rather badly by the Headquarters team, who in turn were defeated by the Artillery team. Many similar instances happened during the tournament. At the conclusion of the tournament, the Artillery and Manila Polo Club having tied in games won and lost, played an extra game which was won by the Artillery.

The Hongkong team was greatly handicapped by the change from the China pony to the fifteen-hand pony on which they were mounted in this tournament, and also by the fact that two of their regular players were unable to make the trip to Manila. They maintained their splendid reputation for sportsmanship, and added greatly to the success and pleasure of the tournament. This is the second season they have entered a team in the Manila tournament and it is hoped that it will be an annual affair.

This tournament would have normally been played at Camp Stotsenburg, but due to the arrival of the Hongkong team, the

THE FIELD ARTILLERY JOURNAL

Stotsenburg teams kindly consented to come to Manila, but insisted on supplying the cups, which were presented to the Artillery team by Mrs. McCoy, wife of Colonel H. B. McCoy, president of the Manila Polo Club.

In connection with Philippine Polo the following extract from a letter from the Polo Representative, Philippine Department to the Central Polo Committee, is of interest:

"The main handicap at present is the lack of ponies in the Islands. The 24th Field Artillery and McKinley are particularly handicapped by poor mounts. These Headquarters and the 31st Infantry have recently formed a Polo Association, but have practically no ponies and no available raw material. The 26th Cavalry while well mounted at present are riding old horses, and the next two years will see a great change in their string since they have very little raw material from which to develop new ponies.

"There seems to be an impression in the states that good ponies are numerous in the Islands, and many officers on being ordered to the Philippines have been discouraged from bringing ponies. This erroneous impression should be corrected. Good ponies are very scarce in this Department and officers should be encouraged to bring good horses where possible."

Individual Grades at the Field Artillery School

INQUIRIES come in from time to time to the Commandant of the Field Artillery School and to the Chief of Field Artillery concerning the class standing of students in the various courses. This information is as a rule not given. The following light on the attitude of the Chief of Field Artillery toward grading and marking students and subsequent publishing of standings, is taken from an indorsement from the Chief's Office:

"The Chief of Field Artillery has never authorized any classification of officers completing the course, other than 'Graduate' or 'Non-graduate.'

"He is strongly opposed to the designation of 'Honor Graduates,' 'Distinguished Graduates,' etc., at the Field Artillery School. He has strong ideas on any classification or marking system, in the Field Artillery School, believing any such system to be a necessary evil, to be utilized only to the minimum extent essential to doing exact justice both to the student and to the government.

"The Chief of Field Artillery takes the position that the officers attending this school as students are grown up men, that they are interested in their profession, that they take the

CURRENT FIELD ARTILLERY NOTES

course at the school with the full determination to get the maximum benefit from it, that the treatment of students should be based on the foregoing ideas, and that any marking system is opposed thereto. These remarks apply to practically the entire class; but, as in every class, there are one or two officers who do not measure up to the standards enumerated, and as such officers invariably claim 'injustice' or 'partiality' when they are deficient, it is essential to keep records in order to refute such claims. The best daily record is a mark, or percentage. This, then, is the only reason why marks are kept at all.

"The Chief of Field Artillery would deplore the introduction of 'fighting for tenths' at the Field Artillery School, rather than the exercise of a sincere and earnest desire to learn on the part of students, by honest hard work and interest."



BOOK NOTICES

MILITARY MOTOR TRANSPORTATION. By Major Richard Donovan, C.A.C., and Major Geo. F. Moore, C.A.C. To be procured from the *Coast Artillery Journal*, Fort Monroe, Virginia.

This book has recently been published at the Coast Artillery School. It contains 414 pages with a good index. There are numerous good cuts. Prepared as a textbook for the Coast Artillery School, it deals with the principles and fundamentals of motors as well as practical application to specific models.

The subject matter is divided into chapters on the different phases of motors as illustrated by the following selection: Chapter V, Timing; Chapter VI, Engine Balance and Firing Order; Chapter VII, Cooling Systems; Chapter VIII, Fuels; etc., etc. The last four chapters are worthy of special mention. They are: Chapter XXXI, How to Drive; Chapter XXXII, Troubles and Remedies; Chapter XXXIII, Care and Adjustment, and Chapter XXXIV, Care and Adjustment Tables. This is an excellent reference book for one in charge of motor transportation.

THE GIANTS OF THE MARNE. By Jesse W. Wooldridge. The Seagull Press, 25 Richard Street, Salt Lake City, Utah. Price \$1.50.

This is an account of the fight of the 38th Infantry on the Marne, July 15 to 20, 1918. It is introduced by a sketch of the German drives up to this fight. The battle account itself is interesting, being more or less a personal story. The author, Major Wooldridge, was in command of Company G, 38th Infantry, at that time, and was no doubt in as severe a fight as any that occurred in France. Those who wish a first-hand account of fighting in France will be satisfied with this book.

FAMOUS HORSES OF AMERICAN HISTORY. By Evelyn Brogan. To be procured from the author at 618 Rigsby Avenue, San Antonio, Texas. Price \$2.15.

Lovers of horses will be interested in this little book by Evelyn Brogan. It is made up of the stories of over thirty horses. Such horses as General Lee's Traveler will not be new to many of us; but this book is unusual in rendering honor to horses in the ranks and between the traces. Peking of Reilly's Battery, Rodney of Battery D, 3rd Field Artillery, and Foxhall of Light Battery F, 5th Field Artillery, all did their turn behind the collar.

The book is not strictly a technical or historical treatise in its field, dealing more with the romantic or sentimental aspect. The sections relating to the various horses are made up largely of the stories left us of these faithful servants of their soldier masters.